# PROJECT MANUAL

**HUNTINGTON PARK LIBRARY**
**REBURSHMENT PROJECT**
**6518 Miles Avenue**
**Huntington Park, CA 90255**
**SPECS. NO.7963; C.P. NO. 8A064**

**NAC Architecture**
**837 N Spring Street**
**Los Angeles, CA 90012**

**July 2025**

**COUNTY OF LOS ANGELES**
**DEPARTMENT OF PUBLIC WORKS**
**BUSINESS RELATIONS AND CONTRACTS DIVISION**
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- Exhibit C BidExpress Set-up Guide
- Exhibit D Contractor Development Bonding Program Flyer and FAQ

# SECTION 00 01 00

# INSTRUCTIONS TO BIDDERS

This project includes the Countywide Community Workforce Agreement (CWA). Refer to EXHIBIT A.

PART 1 - GENERAL

1.01 COPIES OF BIDDING DOCUMENTS

a. Complete set of the Bidding Documents may be downloaded for free from the Los Angeles County Public Works website http://dpw.lacounty.gov/go/constructioncontracts.

b. Complete sets of Bidding Documents shall be used in preparing bids; the County does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

c. All Bidders for this solicitation are strongly encouraged to register at http://dpw.lacounty.gov/general/contracts/opportunities/. Only those Bidders registered for this solicitation through the DPW website will receive automatic notification when any update to this solicitation is made. **County does not have an obligation to notify any Bidders other than through the DPW website automatic notification system.**

d. Electronic Submission of Bid

Bids will only be accepted electronically through BidExpress, a secure online bidding service website, at www.bidexpress.com.

To submit the bid electronically, register with BidExpress, one week prior to the bid opening date. Once the Bidder is registered, an invitation will be sent to the Bidder to allow access to the solicitation on www.bidexpress.com. A Infotech/BidExpress Set-up Guide is included as an Enclosure for reference. There is a nominal service fee to use BidExpress.

Visit the Infotech Knowledge Center at the following link for more information: Bid Express® help guides. https://infotechinc.zendesk.com/hc/en-us/categories/360003900254-Bid-Express-at-www-bidexpress-com.

e. The bid opening will be held using Microsoft Teams, or County accepted platform. The information and link to access the bid opening will be posted on Public Works website, on the project information link. Any changes to this procedure will be issued in a Notice to Bidders for this project.

1.02 QUALIFICATIONS OF BIDDERS AND SUBCONTRACTORS

a. The Bidder and each listed subcontractor must have a valid license, issued by the Contractors' State License Board, for the type of work proposed to be performed by the Bidder and each listed subcontractor under the contract. The required license(s) is required at time of bid in order to be considered a responsive bid.

b. This project requires the Bidder to possess a license classification of “B" at time of bid.

c. In addition to Article 1.02, a. and b., the specifications set forth require specialty licenses, experience requirements, and required certifications from manufacturers concerning approved installers. The apparent successful Bidder shall be required to demonstrate to the County's satisfaction within 10 calendar days of the bid opening that the Bidder and proposed subcontractors (whether required to be listed or not) possess these specialty licenses, experience requirements, and required certifications.

d. All Bidders and their subcontractors must be registered with the Department of Industrial Relations. Qualified contractors and subcontractors are listed on searchable database at: https://services.dir.ca.gov/gsp.

1.03 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

a. Before submitting a bid, each Bidder must: a) examine the Contract Documents thoroughly; b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress, or performance of the Work; c) become familiar with federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the Work; and d) study and carefully correlate Bidder's observations with the Contract Documents.

b. The submission of a bid will constitute an incontrovertible representation by the Bidder that Bidder has complied with every requirement of this Article and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work.

1.04 INTERPRETATIONS

a. All questions about the meaning or intent of the Contract Documents shall be submitted to the Department in writing. Replies will be issued by Notice to Bidders. Questions received less than ten (10) calendar days prior to the date for opening of bids will not be answered. Only questions answered by formal written notice will be binding. Oral and other interpretations or clarifications will be without legal effect.

1.05 BID SECURITY

a. Bid security is required of each Bidder and shall be made payable to Los Angeles County, in an amount of ten percent (10%) of the Bidder's bid price, in the form of cash, a certified check, a cashier's check, or a bid bond issued by a California-admitted Surety.

b. The bid security of the successful Bidder will be retained until such Bidder has executed the Agreement and contract security, whereupon it will be returned; if the successful Bidder fails to execute and deliver the Agreement and furnish the required insurance and contract security within fourteen (14) calendar days of notification from County, the County may annul the Notice of Award and the bid security of that Bidder may be forfeited. The bid security of any Bidder whom the County believes to have a reasonable chance of receiving the award may be retained until the earlier of the effective date of the contract or the ninety-first (91) day after bid opening. Bid security of other Bidders will be returned within thirty (30) days of the bid opening.

1.06 CONTRACT TIME

a. The number of days within which, or the date by which, the Work is to be completed (the contract time) is set forth in Section 01 00 00, "Project General Requirements." By submitting a bid, each Bidder agrees that the contract time is reasonable and the Bidder is capable of performing all Work within the contract time.

1.07 LIQUIDATED DAMAGES

a. Provisions for liquidated damages, if any, are set forth in Section 01 00 00, "Project General Requirements."

1.08 SUBSTITUTE MATERIAL AND EQUIPMENT

a. The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications unless the Bidder complied with the procedure for substitution of Equals as set forth in the General Conditions.

b. If any proposed substitution of an Equal is determined by the County to not be an Equal, the Contractor must complete the Work in accordance with the Drawings and Specifications for the accepted bid amount.

1.09 SUBCONTRACTORS

a. In accordance with Sections 4100 to 4113, inclusive of the Public Contract Code of the State of California, Contractors shall list, on the form provided, the name, license number, business location and classification of work for each subcontractor who will perform work, labor, or render service on the construction work in excess of one-half (1/2) of one percent (1%) of the total bid.

1.10 FORM OF BID

a. The Form of bid is attached hereto. Additional copies may be obtained from Contracts Administration Section, Business Relations and Contracts Division, 8th Floor.

b. The bid price of each item on the form must be stated in words and numerals; in case of a conflict, words will take precedence. Bid prices must be given for all bid items shown on the Form of Bid, including all additive alternatives. Failure to provide prices for all bid items may result in a determination by the County that the Form of Bid is nonresponsive.

c. Bids by corporations must be executed in the corporate name by the President or a Vice-President (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of corporation shall be shown below the signature.

d. Bids by partnership must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

e. All names must be typed or printed below the signature.

f. Bid Documents, Form of Bid, Section 00 03 00, must confirm receipt of any Notice to Bidders (if any).

1.11 SUBMITTAL OF BIDS

a. Bids will only be accepted electronically through BidExpress, a secure online bidding service website, at www.bidexpress.com. Bids shall be submitted at the time indicated in the Information for Bidders.

**1. The following documents shall be submitted at the time of bid.**

**Required bid form documents:**

- Section 00 03 00 Form of Bid
- Section 00 03 10 Best Management Practices
- Section 00 03 11 Construction and Demolition Debris Recycling Requirements
- Section 00 03 12 Insurance Requirements
- Section 00 03 13 LTWHP Jobs Coordinator
- Section 00 03 14 Certification to Comply with Countywide Community Workforce Agreement (CWA) Form
- Section 00 03 15 Cost Impact of Countywide Community Workforce Agreement (CWA) Form
- Section 00 0400 Attestation of Contractors Qualifications
- Section 00 04 10 Bid Bond (scanned copy)
- Section 00 04 30 List of Subcontractors
- Section 00 04 38 Request for Preference Consideration
- Section 00 04 38A Subconsultant Certification Form
- Section 00 04 79 Contribution and Agent Declaration Form-primary firm

***Failure to confirm receipt of any Notice to Bidder(s) provided to bidders on Form of Bid, Section 00 03 00, as required, may result in a determination that the apparent low bidder is nonresponsive and/or nonresponsible.***

2. Original Bid Bond shall be mailed in within two (2) calendar days from the bid opening. This is required only from the first, second, and third apparent lowest bidders.

**3. The following document shall <u>not</u> be submitted at time of bid. Section 00 04 40, Equals, will only be required from the first, second, and third apparent lowest bidders and returned to the County no later than two (2) calendar days from the bid opening.**

- **Section 00 04 40 Equals**

b. No mention shall be made of sales tax or use tax, as all bid prices submitted will be considered as including such tax.

c. The County may consider nonresponsive any bid not prepared and submitted in accordance with the provisions herein and, therefore, reserves the right to reject any or all bids so submitted. The County also reserves the right to accept alternative bids when called for and when items are to be bid on as units, to accept the bid for the list of such items in its entirety, or to accept any portion or portions of same.

d. **The following documents shall <u>not</u> be submitted at the time of bid. These forms will be required only from the first, second, and third apparent lowest bidders and returned to the County no later than seven (7) calendar days from the bid opening.**

**Section 00 04 35 Community Business Enterprises (CBE) Participation Form. If the bidder does not meet the 25% CBE participation goal, provide documentation of bidder's good faith efforts to utilize CBEs. Refer to Article 1.16 of these Instructions to Bidders.**

**Section 00 04 50 Noncollusion Affidavit**

**Section 00 04 60 Attestation of Willingness to Consider GAIN/GROW Participants**

**Section 00 04 65 3-Year Contracting History**

**Section 00 04 70 False Claims**

**Section 00 04 71 Civil Litigation History**

**Section 00 04 72 Criminal Convictions**

**Section 00 04 73 Debarment**

**Section 00 04 74 Labor Law/Prevailing Wage**

**Section 00 04 75 Integrated Pest Management Program Compliance Certification**

**Section 00 04 76 Charitable Contributions Certification**

**Section 00 04 77 Prospective Contractor List of Terminated Contracts**

**Section 00 04 79 Contribution and Agent Declaration Form-subconsultants/subcontractors**

**Section 00 04 85 Contractor Employee Jury Service Program-primary firm and subconsultants/subcontractors**

**Section 00 04 90 Contractor's Industrial Safety Record**

**Section 00 04 91 Injury and Illness Prevention Plan and Code of Safe Practices Affidavit**

**Section 00 04 92 Bidder's Organization Questionnaire/Affidavit**

**Section 00 04 93 Certification of Compliance with the County's**

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|---|---|
| | **Defaulted Property Tax Reduction Program** |
| **Section 00 04 94** | **Avoidance of Conflict of Interest** |
| **Section 00 04 95** | **Familiarity with the County Lobbyist Ordinance Certification** |
| **Section 00 04 96** | **Proposer's EEO Certification** |
| **Section 00 04 97** | **Compliance with Fair Chance Employment Hiring Practices Certification** |
| **Section 00 04 98** | **Zero Tolerance Human Trafficking Policy Certification** |
| **Section 00 04 99** | **Disallowed Cost Attestation** |

e. Upon the County's request, each bidder agrees to provide the County with a cost breakdown of the bid in Construction Specification Institute (CSI) format. Failure to provide this information may result in a determination that the Bidder is nonresponsive and/or not responsible.

1.12 MODIFICATION AND WITHDRAWAL OF BIDS

a. Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a bid must be executed) and delivered to the place where bids are to be submitted or by a Bidder's representative with proper identification and verification, at any time prior to the closing time for receipt of bids.

b. Relief of Bidders shall be as provided in Sections 5100-5107, inclusive, of the Public Contract Code of the State of California.

1.13 OPENING OF BIDS

a. Bids shall be opened publicly, read aloud, and the amount of the base bids and alternates (if any) shall be made available after the opening of bids.

b. Preliminary bids results will be posted on the same day on the Department of Public Works Website: http://dpw.lacounty.gov/general/contracts/opportunities/.

1.14 AWARD OF CONTRACT

a. If the County determines to award a contract, it shall be awarded to a responsive and responsible Bidder with the lowest bid price with preference to businesses that are certified by the County as a Local Small Business Enterprise, as set forth in Article 1.30 of these Instructions to Bidders. If there are alternatives, the lowest bid price shall be determined by adding the lump sum bid and the price of all alternatives. This does not preclude the Board of Supervisors from selecting any combination of alternates after the lowest responsible bidder has been determined. The Board of Supervisors

reserves the right to reject any or all bids or to waive in the public interest technical errors and discrepancies in bids submitted.

b. The Board shall have the right to delay the award of the contract for 90 days after bids are opened and declared, unless otherwise agreed to by the County and Bidders. Bidders may withdraw their bids 91 calendar days after bids are publicly opened and declared by submitting written notice addressed to the Department. In evaluating bids, the County shall consider whether or not the bids comply with requirements, alternatives, and unit prices, if requested in the Form of Bid.

c. Extended Overhead Daily Rate

Extended Overhead Daily Rate is the sum of the Contractor's home office and field office overhead as applicable to this project.

The Bid Form contains an Extended Overhead Daily Rate which will be used to determine the additional compensation due the Contractor for each day of Compensable Delay. The number of days of Compensable Delay shown as a multiplier in the paragraph below is not intended as an estimate of the number of days of Compensable Delay, as defined in Section 00 07 00, General Conditions, Article 17.F.2 may be greater or lesser than the 30 days shown below.

The Extended Overhead Daily Rate in the Bid Form will be used in the evaluation of bids by multiplying the Extended Overhead Daily Rate times 30 days of Compensable Delay and adding it to the bidder's Lump Sum Bid price. However, the amount of the multiplied Extended Overhead Daily Rate for 30 days of Compensable Delay will <u>not</u> be included in the base contract amount.

d. Consultant Services Agreement

Following the determination of the successful bidder by the County, the County will issue a consultant services agreement for the preparation of the baseline construction schedule. The successful bidder shall return the signed consultant services agreement within three days of the County's issuance. Upon the County's receipt of the signed consultant services agreement, the County will authorize preparation of the Detailed Network Construction Schedule in accordance with Section 01 32 00 and preparation of the Schedule of Values in accordance with Section 01 29 73 of the project specifications. Only after acceptance by the County of the Detailed Network Construction Schedule in accordance with the minimum requirements set forth in Section 01 32 00, Construction Schedule, Section 01 29 73, Schedule of Values, Section 01 33 00, Submittals, and execution by the bidder of a contract for the entire project will the County execute a contract for the

construction of the project.

Upon receipt by the County, of an acceptable Detailed Network Construction Schedule, Schedule of Values, and list of Submittals, the Bidder shall receive payment of the sum of Five Thousand Dollars ($5,000) as compensation to perform the work required to provide a Detailed Network Construction Schedule, Schedule of Values, and list of Submittals. The payment of $5,000 shall be deducted from the overall construction contract base bid and shall not be in addition to it.

e. Failure to Produce Detailed Network Schedule and Schedule of Values

The Contractor must have or obtain expertise in the type of automated scheduling specified. The successful Bidder will have ten (10) calendar days from the issuance of a Notice to Proceed under the consultant services agreement to submit its Detailed Network Construction Schedule and Schedule of Values. The successful Bidder will have three (3) calendar days to provide County requested revisions to the Detailed Network Construction Schedule and Schedule of Values provided under the Consultant Services Agreement.

Submission of an acceptable Detailed Network Construction Schedule and Schedule of Values is a condition precedent to the execution of the construction contract by the County. Failure to meet these requirements may result in a determination and a recommendation that the Board of Supervisors determine that the successful Bidder is non-responsible because such failure reflects on the Bidder's ability to manage the work.

f. Execution of Contract by Bidder

Following bid opening and upon notification from Public Works, the apparent successful Bidder will be required to deliver within fourteen (14) calendar days to the offices of Public Works certificate(s) issued by the insurance carrier(s), payment and performance bonds, and three (3) signed and notarized contract signature pages. The contract pages must be signed by the corporate president and secretary, managing partner or sole proprietor.

g. Execution of Contract by County

When the Board of Supervisors or the Director has formally awarded the contract to the Successful Bidder, the County will execute the contract and issue the fully executed contract to the Contractor followed by the Notice to Proceed.

h. Failure to Resolve Equals

In accordance with the General Conditions, paragraph 2, subparagraph d, the first, second and third apparent lowest bidders will have two (2) calendar days after the bid opening to submit their list of Equals and ten (10) calendar days after the bid opening to submit all substantiating data and test results.

i. Protest Policy

The County will handle and process any and all protests in connection with this Bid according to the County of Los Angeles Contracting Manual, Countywide Construction Contracting Policy Guidelines, no. P-05-04, "Bid Protests", dated March 31, 2003. Bidders who wish to file a protest shall do so in accordance with the requirements specified in Construction Contracting Policy Guideline no. P-05-04, which can be found at http://dpw.lacounty.gov/general/bids/BidProtests.pdf

**Policy Overview**
The County of Los Angeles will process bid protests in a timely and consistent manner to assure that all prospective contractors/consultants are accorded fair and equal consideration for the award of County contracts.

**Purpose and Scope**
The purpose of this Policy Guideline is to convey the County's general course of action for addressing bid protests asserted by prospective contractors. This guideline will address the administrative guidelines for protests arising from the acquisition of construction and construction-related services under both the Invitation for Bid (IFB) and Request for Proposal (RFP) methods of solicitation.

**Application and Responsibility**
This Policy Guideline applies to all County departments involved in the contractor selection process for construction and construction-related contracts.

**Policy Guidelines**

1. **Introduction.** Protests received by the County before contract award shall be immediately forwarded to the Contract Analyst issuing the IFB or RFP. The Contract Analyst will prepare a written response, reviewed by County Counsel if necessary, and approved by the department/agency head or his/her designee.

2. **Timely Filing**. The protest of a likely contract award to the apparent lowest bidder (IFB) or best-qualified firm or consultant (RFP) must be made prior to contract award. Untimely notice will not serve the interests of either party. Protests should be received by the County at the earliest practical time.

3. **Post-Award Protests.** With respect to protests received after contract award, the County will not suspend contract performance or terminate the awarded contract unless so directed by the Board.

4. **Protest Format.** The protesting party's protest should reference all pertinent County, State, Federal, or local laws or regulations that are relied upon in support of the protest. Any documents relevant to the protest should be submitted. The County, at its discretion, may decide the protest without requesting further submittal(s) from the party submitting the protest. Thus, the initial protest should include all matters that the party wishes the County to consider in deciding the protest outcome. Such matters include, but are not limited to, the following:
   (1) The name and address of the party and its relationship to the procurement.
   (2) Identification of the proposed project or contract.
   (3) Description of the nature of the protest.
   (4) Identification of the provision(s) of the solicitation, regulations, or laws upon which the protest is based (i.e., identification of the technical specifications or item of content in the IFB/RFP).
   (5) Copies of all (or any) documentation supporting the allegations in the protest.
   (6) Statement of the specific relief requested.

5. **Protest Submittal.** The best interests of the parties are served if the protest is (1) filed with the Contract Analyst, (2) filed in a timely fashion, and (3) filed in the format and detail described in Protest Format above. A contractor may also appear in person before the Board. The Board, acting in the best interests of the County, may decide to continue with the award and acquisition subject to resolution of the protest.

6. **Protest Remedies.** A decision by the responsible official will be made based on the merits of the protest. A written response will be provided by the County and all findings and specified remedies will be considered final. The Board may suspend a contract upon a finding that the protest has merit and is based on solid legal principles.

7. **Authority for Administration of Protests.** The responsible official may assign Contract Analysts to conduct the administrative processing of protests filed with the County. Assigned Contract Analysts shall be responsible for proper distribution of protest submittals and responses, coordination of staff evaluation of the protest, compliance with the time limits stated herein, and maintenance of all documents related to the protest. The responsible official shall request County Counsel to review and advise the Contract Analyst concerning any legal issues involved in protests.

## 1.15 PERFORMANCE AND OTHER BONDS

a. The General Conditions and Supplementary Conditions set forth requirements as to performance bonds and other bonds. When the successful Bidder delivers the executed Agreement to the County, it shall be accompanied by the required contract security.

## 1.16 COMMUNITY BUSINESS ENTERPRISE (CBE) PARTICIPATION

a. The County encourages the participation of Community Business Enterprises (CBE) in the project and has established a goal of twenty-five percent (25%) CBE participation which all contractors must aspire to meet. Participation in the Work is based on total monetary value of the proposed subcontract. CBEs are defined as Minority/Women/Disadvantaged/Disabled Veteran/ Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning owned Business Enterprises (M/W/D/DVBE/LGBTQQ).

b. Bidders shall meet the established goal as indicated above. If the Bidder does not meet this established goal, Bidder shall document its good faith efforts to utilize CBEs. The Bidder shall submit the documentation of its good faith efforts to the County. County will evaluate the Bidder's good faith efforts to meet the CBE participation goal by the following criteria:

1. Bidder attended any pre-solicitation or pre-bid meetings scheduled by the County to inform all Bidders of the CBE program requirements for the Project.

2. Bidder identified and selected specific items of the Project for which the contract will be awarded to be performed by CBEs to provide an opportunity for participation by those enterprises.

3. Bidder advertised, not less than ten (10) calendar days before the date the bids are opened, in one or more daily or weekly newspaper trade association publications, minority- or trade-oriented publications, trade journals, or other media, specified by the local agency for CBEs that are interested in participating in the Project.

4. Bidder provided written notice of his or her interest in bidding on the contract to the CBEs required to be notified by the Project specifications not less than ten (10) calendar days prior to the opening of bids.

5. Bidder followed up initial solicitations of interest by contacting the enterprises to determine with certainty whether the enterprises were interested in performing specific items of the Project.

6. Bidder provided interested CBEs with information about the plans, specifications, and requirements for selected subcontracting or material supply work.

7. Bidder requested assistance from minority and women community organizations; minority and women contractor groups; local, state, or federal minority and women business assistance offices; or other organizations that provide assistance in the recruitment and placement of minority or women business enterprises, if any are available.

8. Bidder negotiated in good faith with the CBEs, and did not unjustifiably reject as unsatisfactory bids prepared by any CBE.

9. Where applicable, the Bidder advised and made efforts to assist interested CBEs in obtaining bonds, lines of credit, or insurance required by these Contract Documents.

10. Bidder's efforts to obtain CBE participation could reasonably be expected by the County to produce a level of participation sufficient to meet the goals and requirements of the County.

c. Bidder may request for a certified CBE listing via email the County of Los Angeles Office of Small Business at:

osb@dcba.lacounty.gov

For additional information, contact the County of Los Angeles Department of Consumer and Business Affairs (Small Business Services). The website is: dcba.lacounty.gov. The County of Los Angeles Certification Portal from the Office of Small business is at the same website for firms seeking County certification. **Information on this program and how to obtain certification are available on the County of Los Angeles Department of Economic Opportunity website: Office of Small Business | LA County AJCC, CA https://www.ajcc.lacounty.gov/businesses/office-of-small-business.**

d. Contractors, material, and services and supplies vendors interested in becoming registered as certified minority or women business enterprises may contact the County of Los Angeles Countywide Contract Compliance Section, at (626) 943-5619.

e. The first, second, and third apparent lowest bidders are required to submit documentation which describes the Bidder's good faith efforts to utilize CBEs within the timeframe indicated in Article 1.11 Submittal of Bids, paragraph d.

## 1.17 BEST MANAGEMENT PRACTICE (BMP) REQUIREMENTS

a. Contractor shall comply with the Los Angeles County Department of Public Works Construction Site Best Management Practices (BMP's) Manual, latest edition. A copy of the BMP Manual can be obtained at the Los Angeles County Department of Public Works Cashier's Office, 900 South Fremont Avenue, Alhambra, CA 91803, or call (626) 458-6959. Specific requirements for this Project are listed in Sections 00 03 10, 01 00 00, and 01 57 00.

b. Contractor shall use Construction and Demolition Debris Recycling Best Management Practices. Specific requirements are listed in Section 01 74 19. Copies of the Best Management Practices handbook are available at the Cashier's Office at the Department of Public Works at no cost to bidders.

## 1.18 RECYCLED BOND PAPER-CONTRACT LANGUAGE

Consistent with the Board of Supervisor's policy to reduce the amount of solid waste deposited at the County landfills, the Contractor agrees to use recycled content paper to the maximum extent possible on the project.

## 1.19 IMPROPER CONSIDERATIONS

a. Attempt to Secure Favorable Treatment
It is improper for any County officer, employee, or agent to solicit consideration, in any form, from a Bidder with the implication, suggestion or statement that the Bidder's provision of the consideration may secure more favorable treatment for the Bidder in the award of a Contract or that the Bidder's failure to provide such consideration may negatively affect the County's consideration of the Bidder's submission. A Bidder must not offer or give either directly or through an intermediary, consideration, in any form, to a County officer, employee, or agent for the purpose of securing favorable treatment with respect to the award of a Contract.

b. Notification to County
A Bidder must immediately report any attempt by a County officer, employee, or agent to solicit such improper consideration. The report must be made to the Los Angeles County Fraud Hotline at (800) 544-6861 or https://fraud.lacounty.gov/. Failure to report such a solicitation may result in the Bidder's submission being eliminated from consideration.

c. Form of Improper Consideration

Among other items, such improper consideration may take the form of cash, discounts, services, the provision of travel or entertainment, or tangible gifts.

## 1.20 CONSIDERATION OF GAIN/GROW PROGRAM PARTICIPANTS FOR EMPLOYMENT

As a threshold requirement for consideration for contract award, Bidders/Proposers shall demonstrate a proven record of hiring the County's Department of Public Social Services' (DPSS) Greater Avenues for Independence (GAIN) or General Relief Opportunity for Work (GROW) participants or shall attest to a willingness to consider GAIN/GROW participants for any future employment opening if they meet the minimum qualifications for that opening. Additionally, Bidders/Proposers shall attest to a willingness to provide employed GAIN/GROW participants access to Bidders'/Proposers' employee mentoring program, if available, to assist these individuals in obtaining permanent employment and/or promotional opportunities.

The County will refer GAIN/GROW participants by job category to the Contractor. DPSS may be contacted at the following locations:

| | |
|---|---|
| Central County | (323) 730-6452 |
| East San Fernando Valley | (818) 729-8933 |
| Palmdale-Lancaster | (661) 575-2646 |
| Pomona | (909) 392-3071 |
| San Gabriel Valley | (626) 927-2723 |
| South County | (310) 603-8359 |
| Southeast County | (323) 261-3065 |
| West County | (310) 655-7725 |
| West San Fernando Valley | (818) 718-4337 |

Bidders/Proposers who are unable to meet this requirement shall not be considered for contract award.

## 1.21 CHILD SUPPORT COMPLIANCE PROGRAM

Contractor is required to fully comply with all applicable state and federal reporting requirements relating to employment reporting for its employees. Contractor is required to fully comply with all lawfully served wage and earnings assignment orders and notices of assignment. Failure to comply with state and federal reporting requirements regarding employees, or failure to implement lawfully served wage and earnings assignment orders or notices of assignment, constitutes a default under the contract, and failure to cure the default within 90 days of notice by the County, shall subject the contract to termination. Failure to comply with these requirements may be cause for debarment.

## 1.22 FEDERAL EARNED INCOME CREDIT

Contractor shall notify its employees, and shall require each subcontractor to notify its employees, that they may be eligible for the Federal Earned Income Credit under the Federal income tax laws. Such notice shall be provided in accordance with the requirements set forth in Internal Revenue Service Notice 1015.

## 1.23 REDUCTION OF SOLID WASTE

Consistent with the Board of Supervisors' policy to reduce the amount of solid waste deposited at the County landfills, the Contractor agrees to use recycled-content paper to the maximum extent possible on the project.

## 1.24 INJURY AND ILLNESS PREVENTION PLAN (IIPP) AND CODE OF SAFE PRACTICES (CSP) AFFIDAVIT

The apparent low Bidder shall submit Section 00 04 91, INJURY and ILLNESS PREVENTION PLAN (IIPP) AND CODE OF SAFE PRACTICES (CSP) affidavit no later than seven (7) calendar days after the bid opening. The affidavit requires that the Bidder shall have an IIPP and a CSP which complies with Cal/OSHA Regulations, and that all subcontractors supplying employees to the jobsite will be required to prove to the Contractor that they have an IIPP and a CSP which complies with Cal/OSHA Regulations, and that their jobsite employees have been trained on IIPP and CSP.

Failure to submit this affidavit as required, may result in a determination that the apparent low Bidder is nonresponsive.

## 1.25 DETERMINATION OF BIDDER RESPONSIBILITY

a. A responsible Bidder is a Bidder who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity and experience to satisfactorily perform the contract. It is the County’s policy to conduct business only with responsible consultants.

b. Bidders are hereby notified that, in accordance with Chapter 2.202 of the County Code, the County may determine whether the Bidder is responsible based on a review of the Bidder’s performance on any contracts, including but not limited to County contracts. Particular attention will be given to violations of labor laws related to employee compensation and benefits, and evidence of false claims made by the Bidder against public entities. Labor law violations which are the fault of subcontractors and of which the Bidder had no knowledge shall not be the basis of a determination that the Bidder is not responsible.

c. The County may declare a Bidder to be non-responsible for purposes of this contract if the Board of Supervisors, in its discretion, finds that the Bidder has done any of the following: (1) violated a term of a contract with the County; (2) committed an act or omission which negatively reflects on the Bidder's quality, fitness or capacity to perform a contract with the County, any other public entity, or a nonprofit corporation created by the County, or engaged in a pattern or practice which negatively reflects on same; (3) integrity or business honesty; or (4) made or submitted a false claim against the County or any other public entity.

d. If there is evidence that the highest ranked Bidder may not be responsible, the Department shall notify the Bidder in writing of the evidence relating to the Bidder's responsibility, and its intention to recommend to the Board of Supervisors that the Bidder be found not responsible. The Department shall provide the Bidder and/or the Bidder's representative with an opportunity to present evidence as to why the Bidder should be found to be responsible and to rebut evidence which is the basis for the Department's recommendation.

e. If the Bidder presents evidence in rebuttal to the Department, the Department shall evaluate the merits of such evidence, and based on that evaluation, make a recommendation to the Board of Supervisors. The final decision concerning the responsibility of the Bidder shall reside with the Board of Supervisors.

f. The terms shall also apply to proposed subcontractors of Bidders on County contracts.

1.26 BIDDER DEBARMENT

a. The Bidder is hereby notified that, in accordance with Chapter 2.202 of the County Code, the County may debar the Bidder from proposing on, or being awarded, and/or performing work on other County contracts for a specified period of time, which generally will not exceed five years but may exceed five years or be permanent if warranted by the circumstances, and the County may terminate any or all of the Bidder's existing contracts with the County, if the Board of Supervisors finds, in it discretion, that the Bidder has done any of the following: (1) violated a term of a contract with the County or a nonprofit corporation created by the County; (2) committed an act or omission which negatively reflects on the Bidder's quality, fitness or capacity to perform a contract with the County, any other public entity, or a nonprofit corporation created by the County, or engaged in a pattern or practice which negatively reflects on same; (3) committed an act or offense which indicates a lack of business integrity or business honesty; or (4) made or submitted a false claim against the County or any other public entity.

b. If there is evidence that the highest ranked Bidder may be subject to debarment, the Department shall notify the Bidder in writing of the evidence which is the basis for the proposed debarment, and shall advise the Bidder of the scheduled date for a debarment hearing before the Contractor Hearing Board.

c. The Contractor Hearing Board shall conduct a hearing where evidence on the proposed debarment is presented. The Bidder and/or the Bidder's representative shall be given an opportunity to submit evidence at that hearing. After the hearing, the Contractor Hearing Board shall prepare a tentative proposed decision, which shall contain a recommendation regarding whether the Bidder should be debarred, and, if so, the appropriate length of time of the debarment. The Bidder and the Department shall be provided an opportunity to object to the tentative proposed decision prior to its presentation to the Board of Supervisors.

d. After consideration of any objections, or if no objections are received, a record of the hearing, the proposed decision and any other recommendation of the Contractor Hearing Board shall be presented to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny or adopt the proposed decision and recommendation of the Contractor Hearing Board.

e. If a Bidder has been debarred for a period longer than five years, that Bidder may, after the debarment has been in effect for at least five years; submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The County may, in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Bidder has adequately demonstrated one or more of the following: (1) elimination of the grounds for which the debarment was imposed; (2) a bona fide change in ownership or management; (3) material evidence discovered after debarment was imposed; or (4) any other reason that is in the best interests of the County.

f. The Contractor Hearing Board will consider requests for review of a debarment determination only where (1) the Bidder has been debarred for a period longer than five years; (2) the debarment has been in effect for at least five years; and (3) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment, and includes supporting documentation. Upon receiving an appropriate request, the Contractor Hearing Board will provide notice of the hearing on the request. After the hearing, the Contractor Hearing Board shall conduct a hearing where evidence on the proposed reduction of debarment period or termination of debarment is presented. This hearing shall be conducted and the request for review decided by the Contractor Hearing Board pursuant to the same procedures as for a debarment hearing.

The Contractor Hearing Board's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment. The Contractor Hearing Board shall present its proposed decision and recommendation to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny, or adopt the proposed decision and recommendation of the Contractor Hearing Board.

g. These terms shall also apply to proposed subcontractors of Bidders on County contracts.

1.27 CONTRACTOR EMPLOYEE JURY SERVICE PROGRAM

The prospective contract is subject to provisions of the County's ordinance entitled Contractor Employee Jury Service ("Jury Service Program") as codified in Sections 2.203.010 through 2.203.090 of the Los Angeles County Code.

a. Unless Contractor has demonstrated to the County's satisfaction either that Contractor is not a "Contractor" as defined under the Jury Service Program (Section 2.203.020 of the County Code) or that Contractor qualifies for an exception to the Jury Service Program (Section 2.203.070 of the County Code), Contractor shall have and adhere to a written policy that provides that its Employees shall receive from the Contractor, on an annual basis, no less than five days of regular pay for actual jury service. The policy may provide that Employees deposit any fees received for such jury service with the Contractor or that the Contractor deduct from the Employee's regular pay the fees received for jury service.

b. For purposes of this Section, "Contractor" means a person, partnership, corporation or other entity which has a contract with the County or a subcontract with a County contractor and has received or will receive an aggregate sum of $50,000 or more in any 12-month period under one or more County contracts or subcontracts. "Employee" means any California resident who is a full-time employee of Contractor. "Full time" means 40 hours or more worked per week, or a lesser number of hours if the lesser number is a recognized industry standard and is approved as such by the County. If Contractor uses any subcontractor to perform services for the County under the Contract, the subcontractor shall also be subject to the provisions of this Section. The provisions of this Section shall be inserted into any such subcontract agreement and a copy of the Jury Service Program shall be attached to the agreement.

c. If a contractor does not fall within the Jury Service Program's definition of "Contractor" or if it meets any of the exceptions to the Jury Service Program, then the contractor must so indicate in the Certification Form and Application for Exception and include with its submission all necessary documentation to support the claim such as tax returns or a collective bargaining agreement, if

applicable. Upon reviewing the contractor's application, the County will determine, in its sole discretion, whether the contractor falls within the definition of Contractor or meets any of the exceptions to the Jury Service Program. The County's decision will be final.

d. If a contractor is not required to comply with the Jury Service Program when the contract commences, the contractor will have a continuing obligation to review the applicability of its "exception status" from the Jury Service Program, and the contractor must immediately notify the County if the contractor at any time either comes within the Jury Service Program's definition of "contractor" or if the contractor no longer qualifies for an exception to the Program. In either event, the contractor must immediately implement a written policy consistent with the Jury Service Program. The County may also require, at any time during the contract and at its sole discretion, that a contractor demonstrate to the County's satisfaction that the contractor either continues to remain outside the Jury Service Program's definition of "Contractor" and/or the contractor continues to qualify for an exception to the Program.

e. If a contractor uses a subcontractor to perform services for the County under the contract, the subcontractor shall also be subject to the provisions of the Jury Service Program, unless the subcontractor 1) does not fall within the definition of "contractor" or 2) meets one of the exceptions to the Jury Service Program. The provisions of the Jury Service Program must be inserted into any applicable agreement and a copy of the Jury Service Program shall be attached to the agreement.

f. A contractor's violation of the Jury Service Program may constitute a material breach of the contract. In the event of such material breach, County may, in its sole discretion, terminate the contract and/or bar a contractor from the award of future County contracts for a period of time consistent with the seriousness of the breach.

## 1.28 VENDOR REGISTRATION WITH THE COUNTY OF LOS ANGELES

All potential bidders/proposers with the County of Los Angeles are required to register in WebVen and have a valid vendor number assigned to them. The vendor number is required by the Auditor-Controller and is necessary for any payments to be made to a contractor who is awarded a County project. Vendor registration can be done online at http://camisvr.co.la.ca.us/webven or calling the County's Internal Service Department Central Purchasing Vendor Relations Unit at (323) 267-2650. If you are awarded a contract and you do not have a valid vendor number, your payments will be delayed until you are registered.

1.29 NO PAYMENT FOR SERVICES PROVIDED FOLLOWING EXPIRATION/TERMINATION OF AGREEMENT

Contractor shall have no claim against County for payment for any money or reimbursement, of any kind whatsoever, for any service provided by Contractor after the expiration or other termination of this Agreement. Should Contractor receive any such payment it shall immediately notify County and shall immediately repay all such funds to County. Payment by County for services rendered after expiration/termination of this Agreement shall not constitute a waiver of County's right to recover such payment from Contractor. This provision shall survive the expiration or other termination of this Agreement.

1.30 COUNTY'S PREFERENCE PROGRAM: LOCAL SMALL BUSINESS ENTERPRISE

**Overview of County's Preference Program**

The County of Los Angeles has The Local Small Business Enterprise (LSBE) preference program. The Board of Supervisors encourages business participation in the County's contracting process by continually streamlining and simplifying our selection process and expanding opportunities for these businesses to compete for County opportunities.

The LSBE Preference Program requires that a business must complete County of Los Angeles certification prior to requesting a preference in a solicitation. This program and how to obtain certification are further explained in this solicitation.

The maximum percentage of a LSBE Preference Program preference shall be 7 percent of the lowest responsible bidder meeting specifications and the maximum financial value shall be one hundred fifty thousand dollars ($150,000) for any bid.

Sanctions and financial penalties may apply to a business that knowingly, and with intent to defraud, seeks to obtain or maintain certification as a certified LSBE when not qualified.

a. **Local Small Business Enterprise (LSBE) Preference Program**

The County will give LSBE preference during the solicitation process to businesses that meet the definition of a LSBE, consistent with Chapter 2.204.030C.1 of the Los Angeles County Code. An LSBE is defined as a business: 1) certified by the State of California as a small business and has had its principal place of business located in Los Angeles County for at least one year; or 2) certified as a small business enterprise with other certifying agencies pursuant to the Department of Consumer and Business Affair's (DCBA) inclusion policy that: a) has its principal place of business located in Los Angeles County, and b) has revenues and employee sizes that meet the State's Department of General Services requirements. **The business must**

**be certified by the Department of Consumer and Business Affairs as meeting the requirements set forth above prior to requesting the LSBE Preference in a solicitation.**

To apply for certification as an LSBE, businesses should contact the County of Los Angeles Department of Consumer and Business Affairs at http://dcba.lacounty.gov

**Certified LSBEs may only request the preference if the certification process has been completed and certification is affirmed. Businesses must complete and submit Section 00 04 38 Request for Preference Consideration Form and submit a letter of certification from the County of Los Angeles Department of Consumer and Business Affairs (DCBA) with their proposal. As shown on the County DCBA letter, the certification must be valid as of the bid due date.**

Information about the State's small business enterprise certification regulations is in the California Code of Regulations, Title 2, Subchapter 8, Section 1896 et seq., and is also available on the California Department of General Services Office of Small Business Certification and Resources Web site at http://www.pd.dgs.ca.gov/smbus/default.

b. Should one or more of the Bidders request and be granted the Local Small Business Enterprise (LSBE) Preference, the bid amount shall be adjusted as follows:

Local Small Business Enterprise (LSBE) Preference: Seven percent of the lowest bid amount will be calculated, which shall not exceed $150,000, and that amount will be deducted from the bid amounts submitted by all LSBE bidders who requested and were granted the LSBE Preference.

The contract award will be the bidder's original bid price, not the price with preference(s) that is used for evaluation purposes.

**Preference Program Enterprises (PPEs) - Prompt Payment Program**

It is the intent of the County that Certified Preference Program Enterprises (PPEs) receive prompt payment for services they provide to County Departments. Prompt payment is defined as fifteen (15) calendar days after receipt of an approved, undisputed invoice which has been properly matched against documents such as a receiving, shipping, or services delivered report, or any other validation of receipt document consistent with Board Policy 3.035 (Preference Program Payment Liaison and Prompt Payment Program).

## 1.31 NOTICE TO EMPLOYEES REGARDING THE SAFELY SURRENDERED BABY LAW

The Contractor shall notify and provide to its employees, and shall require each subcontractor to notify and provide to its employees, a fact sheet regarding the Safely Surrendered Baby Law, its implementation in Los Angeles County, and how to safely surrender a baby. The fact sheet is available on the Internet at www.babysafela.org for printing purposes.

The Contractor acknowledges that the County places a high priority on the implementation of the Safely Surrendered Baby Law. The Contractor understands that it is the County's policy to encourage all County Contractors to voluntarily post the County's "Safely Surrendered Baby Law" poster in a prominent position at the Contractor's place of business. The County's Department of Children and Family Services will supply the Contractor with the poster to be used.

## 1.32 REQUIRED CERTIFICATION/DISCLOSURE

Bids must provide full disclosure on violations and civil/criminal legal actions as provided for on the bidding requirement forms Sections 00 04 70, 00 04 71, 00 04 72, 00 04 73, and 00 04 74. Failure to complete these forms may result in a determination that the Bidder is nonresponsive and/or not responsible.

## 1.33 NOTIFICATION TO COUNTY OF PENDING ACQUISITIONS/MERGERS BY BIDDING COMPANY

The Bidder shall notify the County of any pending acquisitions/mergers of its company unless otherwise legally prohibited from doing so. If the Bidder is restricted from legally notifying the County of pending acquisitions/mergers, then it should notify the County of the actual acquisitions/mergers as soon as the law allows and provide to the County the legal framework that restricted it from notifying the County prior to the actual acquisitions/mergers. This information shall be provided by the Bidder on Section 00 04 92 - Bidder's Organization Questionnaire/Affidavit. Failure of the Bidder to provide this information may eliminate its bid from any further consideration. Bidder shall have a continuing obligation to notify the County and update any changes to its response in Section 00 04 92 - Bidder's Organization Questionnaire/Affidavit during the solicitation.

## 1.34 COUNTY'S DEFAULTED PROPERTY TAX REDUCTION PROGRAM

The prospective contract is subject to the requirements of the County's Defaulted Property Tax Reduction Program (Los Angeles County Code, Chapter 2.206). Prospective contractors should carefully read the Defaulted Tax Program Ordinance and the pertinent provisions of the sample contract which are incorporated by reference into and made a part of this solicitation. The Defaulted Tax Program applies to both contractors and their subcontractors.

Bidders/proposers shall be required to certify that they are in full compliance with the provisions of the Defaulted Tax Program and shall maintain compliance during the term of any contract that may be awarded pursuant to this solicitation or shall certify that they are exempt from the Defaulted Tax Program by completing Certification of Compliance with the County's Defaulted Property Tax Reduction Program required forms. Failure to maintain compliance, or to timely cure defects, may be cause for termination of a contract or initiation or debarment proceedings against the non-compliant contractor (Los Angeles County Code, Chapter 2.202).

Bids/proposals that fail to comply with the certification requirements of the Defaulted Tax Program will be considered non-responsive and excluded from further consideration.

## 1.36 LOCAL AND TARGETED WORKER HIRE PROGRAM

Local and Targeted Worker Hire Program applies to this project.

A. At least 30 percent of total California construction labor hours worked on each project must be performed by a qualified Local Resident. Where allowable, contractors are encouraged to achieve higher participation levels for Local Residents.

B. At least 10 percent of total California hours worked shall be performed by County residents classified as a Targeted Worker facing barriers to employment. Hours worked by a Targeted Worker who is also a Local Resident may be applied towards the 30 percent Local Resident hire goal. A Target Worker is a resident of the County who has indices of career-limiting circumstances, specifically, one or more of the following:

1. Has a documented annual income at or below 100 percent of the Federal Poverty Level;
2. No high school diploma or GED;
3. A history of involvement with the criminal justice system;
4. Protracted unemployment (receiving unemployment benefits for at least 6 months);
5. Is a current recipient of government cash or food assistance benefits;
6. Is homeless or has been homeless within the last year;
7. Is a custodial single parent;
8. Is a former foster youth; or
9. Is a veteran, or is the eligible spouse of a veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 U.S.C.4215[a]).
10. Eligible Migrant and seasonal farmworkers
11. English Language Learners
12. Older Individuals (55+)
13. Disabled

14. Individuals with Low Levels of Literacy
15. Multi-Craft Core Curriculum (MC3) program graduates.

C. A Local Resident is defined as an individual living within the Tier 1 or Tier 2 ZIP Codes of the County. Before employing worker(s) from Tier 2 ZIP Codes, the available pool of local residents whose primary place of residence is within Tier 1 ZIP Codes must first be exhausted. Tier 1 means ZIP Codes within five (5) miles of the proposed project site, and where the average percentage of households living below 200 percent of the Federal Poverty Level (FPL) is greater than the County average for such households. Tier 2 means any ZIP Codes within the County where the average percentage of households living below 200 percent of the FPL is greater than the County average for such households. This definition shall also apply to affordable housing projects and for privately financed developments located on County property.

D. Contractor shall comply with the provision required under the Local and Targeted Hire Program in the Agreement.

E. In addition, there shall be a **mandatory** requirement to use a Jobs Coordinator to be hired directly by the contractor, prior to the start of work on the project. The Jobs Coordinator is an independent third-party individual, entity, or employee with whom the Prime Contractor enters into a contract or employs to facilitate the implementation of the Local and Targeted Worker Hiring Requirements of this Agreement. The Jobs Coordinator may be selected from the approved Jobs Coordinators list available as Form 00 09 12-5. If the Prime Contractor utilizes an employee as a Jobs Coordinator, the Jobs Coordinator must be able to demonstrate or document to the County the minimum qualifications and/or experience to fulfill the duties and responsibilities as outlined in Sections 2.02 and 2.03.

F. Per State Labor Code, a minimum ratio of one apprentice hour for every five journeyman hours shall be enforced, and contractors shall strive to obtain half of all apprentice hours on the project be performed by Local and Targeted Workers. Hours worked by an apprentice who is also a Targeted Worker or a Local Resident may be applied towards the 30 percent Local Resident and/or the 10 percent Targeted Worker hire goals.

1.37 Contractor CARD Track/Monitoring Database

The County maintains the Contractor Alert Reporting Database (CARD), which is used to track/monitor poorly performing contractors. When a County department identifies a significant performance/non-compliance issue(s) with a contractor, the department will provide notice to the contractor and will give the contractor an

opportunity to correct the issue(s). If the contractor does not take any appropriate steps to correct the issue(s), the County department will enter the contractor, along with any other relevant information pertaining to the contractor's performance issue(s), into CARD.

The information entered into CARD can be accessed by all County departments, and will be used, along with any other relevant information not included in CARD, in determining bidder responsibility. If a department reviews this information and determines that a finding of non-responsibility should be pursued, the department will adhere to the guidelines specified in the Los Angeles County Code Chapter 2.202, and the County's Implementation Procedures for Determinations of Contractor Non-Responsibility and Contractor Debarment.

1.38 Time Off for Voting

The Contractor shall notify its employees, and shall require each subcontractor to notify and provide to its employees, information regarding the time off for voting law (Elections Code Section 14000). Not less than 10 days before every statewide election, every Contractor and subcontractors shall keep posted conspicuously at the place of work, if practicable, or elsewhere where it can be seen as employees come or go to their place of work, a notice setting forth the provisions of Section 14000.

1.39 ADDITIONAL BIDDER REQUIREMENTS

a. A pre-bid conference and site visitation will be held on August 14, 2025, at 10:00 a.m., at the project site to provide information regarding the project, bidding process and answer questions that potential bidders may have. Interested parties are requested to meet promptly at 6518 Miles Avenue, Huntington Park, CA 90255. Attendance is strongly encouraged but not mandatory.

b. ADDITIONAL PROJECT DOCUMENTS

- Report of Hazardous Building Materials Survey Huntington Park Library Renovation Project dated May 2, 2024.

1.40 PUBLIC WORKS CONTRACTOR REGISTRATION PROGRAM

a. This project is a public work as defined in Section 1720 of the California Labor Code, and subject to compliance monitoring and enforcement by the Department of Industrial Relations (DIR).

b. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to requirements of Section 4104 of the California Public Contract Code, or engage in the performance of any contract for public

works, unless currently registered with the Department of Industrial Relations and qualified to perform public work pursuant to California Labor Code Section 1725.5.

c. The County shall not accept any bid nor award any contract without proof of the contractor and subcontractor's current registration to perform the project. A copy of the confirmed registration from the Department of Industrial Relations website (https://services.dir.ca.gov/gsp) must be attached in applicable part of the bid package. The bid submitted by an unregistered contractor shall be basis for considering the bid non-responsive [with limited exceptions from this requirement for bid purposes only under Labor Code Section 1771.1].

d. An inadvertent error in listing an unregistered subcontractor pursuant to Labor Code Section 1725.5 in a bid proposal shall be grounds for considering the bid non-responsive, unless:

(1) The subcontractor is registered prior to the bid opening.

(2) Within 24 hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in subparagraph (E) of paragraph (2) of subdivision (a) of Section 1725.5.

(3) The subcontractor is replaced by another registered subcontractor pursuant to Section 4107 of the Public Contract Code.

e. All contractors and subcontractors must furnish certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement) in a format prescribed by the Labor Commission.

f. The prime contractor is required to post job site notices prescribed below:

**8 Calif. Code Reg. §16451(d):**

*"This public works project is subject to monitoring and investigative activities by the Compliance Monitoring Unit (CMU) of the Division of Labor Standards Enforcement, Department of Industrial Relations, State of California. This Notice is intended to provide information to all workers employed in the execution of the contract for public work and to all contractors and other persons having access to the job site to enable the CMU to ensure compliance with and enforcement of prevailing wage laws on public works projects.*

*"The prevailing wage laws require that all workers be paid at least the minimum hourly wage as determined by the Director of Industrial Relations for the specific classification (or type of work) performed by workers on the project. These rates are listed on a separate job site posting of minimum prevailing rates required to be maintained by the public entity which awarded the public works contract. Complaints concerning nonpayment of the required minimum wage rates to workers on this project may be filed with the CMU at any office of the Division of Labor Standards Enforcement (DLSE).*

*Local Office Telephone Number:*

*Division of Labor Standards Enforcement Office*
*320 W. Fourth Street, Suite 450*
*Los Angeles, CA 90013*
*(213) 620-6330*

*"Complaints should be filed in writing immediately upon discovery of any violations of the prevailing wage laws due to the short period of time following the completion of the project that the CMU may take legal action against those responsible.*

*"Complaints should contain details about the violations alleged (for example, wrong rate paid, not all hours paid, overtime rate not paid for hours worked in excess of 8 per day or 40 per week, etc) as well as the name of the employer, the public entity which awarded the public works contract, and the location and name of the project.*

*"For general information concerning the prevailing wage laws and how to file a complaint concerning any violation of these prevailing wage laws, you may contact any DLSE office. Complaint forms are also available at the Department of Industrial Relations website found at* http://www.dir.ca.gov/Public-Works/PublicWorks.html."

g. In addition, electronic certified payroll records must be submitted to the County through an online system designated by the County when requested by County.

1.41 MENTAL HEALTH SERVICES FOR CRITICAL INCIDENTS

In the event of a serious accident on the Project site, the Los Angeles County Department of Mental Health (DMH) will, if requested, respond. The response may be within a few hours or as long as a few days after the incident, depending on when the request was made. The services DMH will provide include crisis intervention, normalization of the stress response that survivors may be experiencing, stress management techniques and resources if the stress reactions increase in frequency or intensity. Requests for services may be made by calling the DMH Emergency Outreach Bureau Deputy Director, (213) 738-4924, during normal business hours or the ACCESS Center, (800) 854-7771, evenings, holidays, and weekends.

## 1.42 CONTRACTOR INDEPENDENCE/PROHIBITION FROM PARTICIPATION IN FUTURE SOLICITATION(S)

In accordance with Board Policy No. 5.090, Contractor Independence, the County Board of Supervisors has adopted a countywide policy that prohibits any person, or any firm or any subsidiary of a firm (collectively "firm") from submitting a bid or proposal in any County solicitation process where the person or firm, assisted in the development of the solicitation document(s).

A Bidder/Proposer, or a Contractor or its subsidiary or Subcontractor ("Bidder/Proposer/Contractor"), is prohibited from submitting a bid or proposal in a County solicitation if the Bidder/Proposer/Contractor has provided advice or consultation for the solicitation. A Bidder/Proposer/Contractor is also prohibited from submitting a bid or proposal in a County solicitation if the Bidder/Proposer/Contractor has developed or prepared any of the solicitation materials on behalf of the County. A violation of this provision will result in the disqualification of the Bidder/Contractor/Proposer from participation in the County solicitation or the termination or cancellation of any resultant County contract.

## 1.43 Background and Security Investigations

Background and security investigations of Contractor's staff may be required at the discretion of the County as a condition of beginning and continuing work under any resulting Contract. The cost of background checks is the responsibility of the Contractor.

## 1.44 LOCAL SMALL BUSINESS ENTERPRISE/SOCIAL ENTERPRISE/DISABLED VETERANS BUSINESS ENTERPRISE UTILIZATION

Local Small Business Enterprise means a business that is certified by the County of Los Angeles as a Local Small Business Enterprise (Local SBE), consistent with Chapter 2.204 of the Los Angeles County Code.

1. When requested by the County, the contractor shall provide to the County via methods specified by the County, such as submission of electronic live (or dynamic) data on invoices for the prime and all subcontractors using County-designated third party software system or to a County approved website, or other means of submitting expenditure information on subcontractors, including but not limited to the following information: the name, business address, California Contractor License number and telephone number/email address of each subcontractor who will perform work or labor for the contractor on the Project in an amount in excess of one-half of 1 percent of the contractor's total bid. In addition, the contractor shall be required to provide each of the specified subcontractors' Local SBE status (i.e., whether any of the listed subcontractors are Local SBE's), Social Enterprise (SE) status, and Disabled Veterans Business Enterprise status, and the proposed monetary amount of the work the subcontractor will

perform on the Project. In addition, at the time of submittal of the final invoice, the contractor shall indicate, via methods specified by the County, the actual dollar amounts paid to each listed subcontractor who performed work on the project.

2. Contractor's failure to comply with the provisions of this Article is a material breach of the Agreement. The parties agree that it will be impracticable or extremely difficult to fix the extent of actual damages resulting from the failure to the Contractor to comply with this Article. The parties agree that under the current circumstances a reasonable estimate of such damages is specified in the Schedule for Liquidated Damages for Local Small Business Enterprise Utilization hereunder, and that the Contractor shall be liable to the County for said amounts.

   If in the judgment of the Director, or his/her designee, the Contractor is deemed to be in non-compliance with the terms and obligations assumed hereby, the Director or his/her designee, at his/her option, in addition to, or in lieu of, other remedies provided herein in this Agreement, may deduct and withhold liquidated damages from County's final payment to the Contractor as follows:

SCHEDULE FOR LIQUIDATED DAMAGES FOR LOCAL SMALL BUSINESS ENTERPRISE/SOCIAL ENTERPRISE/DISABLED VETERANS BUSINESS ENTERPRISE UTILIZATION

| Final Invoice Price | Liquidated Damages |
|---|---|
| Up to $100,000 | $50.00 plus 0.1% of contract amount |
| $100,001 to $500,000 | $150.00 plus 0.07% of all over $100,000 |
| Over $500,000 | $430.00 plus 0.05% of all over $500,000 |

1.45 Proposer's Acknowledgement of County's Commitment to Zero Tolerance Human Trafficking

On October 4, 2016, the Los Angeles County Board of Supervisors approved a motion taking significant steps to protect victims of human trafficking by establishing a zero tolerance human trafficking policy. The policy prohibits contractors engaged in human trafficking from receiving contract awards or performing services under a County contract.

Contractors are required to complete 00 04 98 Zero Tolerance Human Trafficking Policy Certification, certifying that they are in full compliance with the County's Commitment to Zero Tolerance Human Trafficking provision as

defined in "Compliance with County's Zero Tolerance Human Trafficking" in the Agreement. Further, contractors are required to comply with the requirements under said provision for the term of any contract awarded pursuant to this solicitation.

1.46 Claims

Notwithstanding Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, Section 9204 of the Public Contract Code shall apply to any claim by the Contractor in connection with the Project.

a) Upon receipt of a claim pursuant to Section 9204 of the Public Contract Code, the County will conduct a reasonable review of the claim and, within a period not to exceed 45 Days, provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the Contractor and the County may, by mutual agreement, extend the aforementioned time period.

b) The Contractor shall furnish reasonable documentation to support the claim.

c) If Board approval is needed to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the Board does not meet within the 45 Days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the County will have up to 3 Days following the next duly publicly noticed meeting of the Board after the 45-Day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

d) Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the County issues its written statement. If the County fails to issue a written statement, paragraph (j) shall apply.

e) If the Contractor disputes the County's written response, or if the County fails to respond to a claim issued pursuant to Section 9204 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the County will schedule a meet and confer conference within 30 Days for settlement of the dispute.

f) Within 10 business days (Monday-Thursday) following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the County will provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the County issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the County and the Contractor sharing the associated costs equally. The County and the Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed

portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside those established in Section 9204.

g) Mediation shall include any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in Section 9204.

h) Unless otherwise agreed to by the County and the Contractor in writing, the mediation conducted pursuant to Section 9204 shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

i) Section 9204 does not preclude the County from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under Section 9204 does not resolve the parties' dispute.

j) Failure by the County to respond to a claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of Section 9204 shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the County's failure to have responded to a claim, or its failure to otherwise meet the time requirements of Section 9204, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

k) Amounts not paid in a timely manner as required by Section 9204 will bear interest at 7 percent per annum.

l) If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the County because privity of the Contract does not exist, the Contractor may present to the County a claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on its own behalf or on behalf of a lower tier Subcontractor, that the Contractor present a claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the claim be presented to the County shall furnish reasonable documentation to support the claim. Within 45 Days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the claim to the County and, if the original Contractor did not present the claim, provide the Subcontractor with a statement of the reasons for not having done so.

m) A waiver of the rights granted by Section 9204 is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the Contractor and the County may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) the County may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of Section 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in Section 9204.

1.47 Proposer's Acknowledgement of County's Commitment to Fair Chance Employment Hiring Practices

On May 29, 2018, the Los Angeles County Board of Supervisors approved a Fair Chance Employment Policy in an effort to remove job barriers for individuals with criminal records. The policy requires businesses that contract with the County to comply with fair chance employment hiring practices set forth in California Government Code Section 12952, Employment Discrimination: Conviction History (Section 12952).

Contractors are required to complete Compliance with Fair Chance Employment Hiring Practices Certification (Required Forms), certifying that they are in full compliance with Section 12952, as indicated in the Sample Contract. Further, contractors are required to comply with the requirements under Section 12952 for the term of any contract awarded pursuant to this solicitation.

1.48 Default Method of Payment: Direct Deposit or Electronic Funds Transfer (EFT)

The County, at its sole discretion, has determined that the most efficient and secure default form of payment for goods and/or services provided under an agreement/contract with the County shall be Electronic Funds Transfer (EFT) or direct deposit, unless an alternative method of payment is deemed appropriate by the Auditor-Controller (A-C).

Upon contract award or at the request of the A-C and/or the contracting department, the Contractor shall submit a direct deposit authorization request with banking and vendor information, and any other information that the A-C determines is reasonably necessary to process the payment and comply with all accounting, record keeping, and tax reporting requirements.

Any provision of law, grant, or funding agreement requiring a specific form or method of payment other than EFT or direct deposit shall supersede this requirement with respect to those payments.

Upon contract award or at any time during the duration of the agreement/contract, a Contractor may submit a written request for an exemption to this requirement. The A-C, in consultation with the contracting department(s), shall decide whether to approve exemption requests.

1.49 Disallowed Cost

If Proposer's compliance with a County contract has been reviewed by the Department of the Auditor-Controller within the last 10 years, Proposer must not have unresolved questioned costs identified by the Auditor-Controller, in an amount over $100,000.00, that are confirmed to be disallowed costs by the contracting County department, and remain unpaid for six months or more from the date of disallowance, unless such disallowed costs are the subject of current good faith negotiations to resolve the disallowed costs, in the opinion of the County.

1.50 Compliance with the County Policy of Equity

The consultant acknowledges that the County takes its commitment to preserving the dignity and professionalism of the workplace very seriously, as set forth in the County Policy of Equity (CPOE) (https://ceop.lacounty.gov/). The consultant further acknowledges that the County strives to provide a workplace free from discrimination, harassment, retaliation and inappropriate conduct based on a protected characteristic, and which may violate the CPOE. The consultant, its employees and subconsultants acknowledge and certify receipt and understanding of the CPOE. Failure of the consultant, its employees or its subconsultants to uphold the County's expectations of a workplace free from harassment and discrimination, including inappropriate conduct based on a protected characteristic, may subject the consultant to termination of contractual agreements as well as civil liability.

1.51 Integrated Pest Management (IPM) Program Compliance

1.51.1 The County of Los Angeles is a permittee to a National Pollutant Discharge Elimination System Permit (NPDES Permit) issued by the Los Angeles Regional Water Quality Control Board to reduce or eliminate pollutants moved into surface water through storm water management systems and facilities. One of the conditions of the NPDES Permit is the implementation of an Integrated Pest Management Program (IPM Program) crafted to reduce the impact of pesticides and fertilizers to surface water.

1.51.2 The prospective contract is subject to the requirements of the County's IPM Program. Two main components of the Program include a training component for contractor employees who apply pesticides on County owned or maintained property, as well as monthly and annual reporting to the Los Angeles County Department of Agricultural Commissioner/ Weights and Measures (ACWM).

1.51.3 Proposers are required to complete Integrated Pest Management Program Compliance Certification in Required Forms, acknowledging and certifying compliance with the County's Integrated Pest Management Program, Compliance with County's Integrated Pest Management Program in Sample Contract. Further, contractors are required to comply with the requirements under said provision for the term of any contract awarded pursuant to this solicitation.

1.52 COVID-19 Vaccinations of County Contractor Personnel

When applicable and required by the County, the Contractor shall comply with all other applicable local, departmental, State, and federal laws, regulations, and requirements for COVID-19.

1.53 Contractor Development and Bonding Program

Contractor Development and Bonding Program (CDABP) - Administered by the Chief Executive Office of the County of Los Angeles for all County Construction Contracting Departments. The CDABP provides a broad range of contractor technical assistance, training, and support in qualifying for bonds, as well as contract financing for County awarded contracts. CDABP assistance is available to prime and subcontractors. The CDABP is a County funded resource designed to reduce the barriers to small and diverse firms seeking to bid and contract on County projects. For information on the CDABP, please contact Contract Analyst.

1.54 Application of Countywide Community Workforce Agreement

The Countywide Community Workforce Agreement (CWA) with the Los Angeles/Orange Counties Building and Construction Trades Council and its respective unions was fully executed on June 7, 2023. A copy of the Countywide CWA is included as **Exhibit __** of the Project Manual and will become an Exhibit in the final contract for this project. Countywide CWA will apply to this Project. The Contractor shall comply with all terms therein and shall be bound by the terms and conditions of the Countywide CWA applicable to the contractors for all Work on the Project for the entire duration of the Project. Countywide CWA shall be deemed incorporated in full into this agreement including, but not limited to, the provisions regarding the hiring of workers for the Project by the Contractor and all of its subcontractors of all tiers. Contractor shall execute and return to the County the Letter of Assent, attached to the Countywide CWA as Attachment A to the **Exhibit __**, at the time of contract execution and shall cause each of its subcontractors of all tiers to also execute and return to the County a copy of the Letter of Assent.

1.55 Contribution and Agent Declaration

Government Code Section 84308 requires a party to a contract proceeding to disclose any contribution of more than $250 made to a County officer within the preceding twelve (12) months by the party or their agent. State regulations require this disclosure to be made at the time an application is filed, and, if a contribution is made during the contract proceeding, within 30 days of making a contribution or on the date on which the party first appears before or communicates with the agency regarding the proceeding after making the contribution, whichever is earliest. All Bidders are advised that they and all of their Subcontractors must complete and return as part of the bid, the **Contribution and Agent Declaration Form**. Bidders are further advised that they and their Subcontractors must update the Contribution and Agent Declaration Form throughout the pendency of the solicitation if a contribution is made after the initial disclosure when the proposal is submitted, and as requested at any time by the County prior to contract award. Failure by the Bidder or any Subcontractor(s) to complete and submit the required **Contribution and Agent Declaration Form**, and failure by the

Bidder or any Subcontractor(s) to update the declaration as required by law or as otherwise requested by the County, may eliminate the proposal from further consideration and/or the Proposer may be disqualified from a contract award, as determined in the County's sole discretion. Further, all Bidders and their Subcontractors are prohibited under Government Code Section 84308 from making a contribution of more than $250 to a County officer for twelve (12) months after the date a final decision is made in the contract proceeding involving this solicitation.

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## Americans with Disabilities Act (ADA) Information



Individuals requiring reasonable accommodations may request written materials in alternate formats, physical accessibility accommodations, sign language interpreters or other reasonable accommodations by contacting our departmental Americans with Disabilities Act Coordinator at (626) 458-7337, from 7:30 a.m. to 5:00 p.m., Monday through Thursday (excluding holidays). Persons who are hearing impaired may make contact by first dialing the California Relay Service at 7-1-1. Requests should be made at least one week in advance to ensure availability. When making a reasonable accommodation request, please reference Business Relations and Contracts Division **[BRC-2]**.

* * *

_____ _____

Name of Bidder (Firm Name) Vendor Identification Number

## SECTION 00 03 00

## FORM OF BID TO BE USED BY BIDDERS

The undersigned proposes to furnish all materials, labor, and equipment required for the construction to complete the Huntington Park Library Refurbishment Project, in accordance with Drawings and Specifications 7963, including addenda thereto, if any, adopted by the Board of Supervisors, and on file in the office of the Board of Supervisors, as follows:

**The lowest bid price shall be determined by adding the following items: Lump Sum Bid in Words (1) + Bid Alternate (1) + Bid Alternate (2) + [Extended Overhead Daily Rate (3) x Multiplied by 30 days] = Total Lump Sum Bid. The preference as stated in Section 00 01 00, 1.30, will be applied to the Total Lump Sum Bid, if applicable, to determine the final total bid amount.**

### 1. LUMP SUM BID:

The lump sum bid for the work, including Best Management Practices (BMP) and Construction and Demolition Debris Recycling, and Mandatory Jobs Coordinator requirements complete according to the Drawings and Specifications, will be:

($_____) (_____)

Lump sum bid in figures Lump sum bid in words

### 2. EXTENDED OVERHEAD DAILY RATE:

The daily rate for the sum of the Contractor's field office and home office overhead applicable to this project, for each day of compensable delay will be:

($_____) (_____)

Daily rate in figures Daily rate in words

**3. BID ALTERNATE 1:**

The amount to be added to the Lump Sum Bid for inclusion of the work of Additive Alternate 1:

($_____) (_____)
Daily rate in figures Daily rate in words

**3. BID ALTERNATE 2:**

**The amount to be added to the Lump Sum Bid for inclusion of the work of Additive Alternate 2:**

**($_____) (_____)**
**Daily rate in figures Daily rate in words**

**4. COUNTY PROGRAM PREFERENCE:**

The Local Small Business Enterprise Program Preference is provided by the County for purposes of bid evaluation only, as specified in Article 1.30 of Section 00 01 00. If Bidder is a qualifying Local Small Business Enterprise, check "yes" in the box below. Section 00 04 38 Request for County Program Preference Consideration must be submitted at the time of bid with a copy of the certification letter issued by the County of Los Angeles Department of Consumer and Business Affairs. If non-qualifying, check "no" in the appropriate box.

LSBE Yes ☐ No ☐

NOTE: Any alteration or addition to the Form of Bid may invalidate same. All blank spaces shall be filled out completely. Line out nonapplicable blanks. An incomplete form may invalidate bid. The County reserves the right to waive any informalities or to reject any or all bids or to accept any alternatives when called for.

I (We) certify that on _____, 20____, License No. _____, license classification(s) _____, was issued to me (us), in the name of _____, by the Contractors' State License Board, pursuant to California Statutes of 1929, as amended, and that said license has not been revoked.

Firm Ownership Information
Check where applicable:

1. ( ) Minority-Owned
   ( ) Woman-Owned
   ( ) Disadvantaged-Owned
   ( ) Disabled Veteran-Owned
   ( ) LGBTQQ-Owned

2. ( ) An individual
   ( ) A corporation. Name state or territory of Incorporation
   _____
   ( ) A copartnership
   ( ) A joint venture

Race/Ethnic Composition
For statistical purposes only.

( ) Black/African American
( ) Hispanic/Latino
( ) Asian or Pacific Islander
( ) Native Americans
( ) Subcontinent Asian
( ) White

If a copartnership or joint venture, list names of individuals comprising same below

_____
_____
_____

Date signed _____, 20_____

Place _____
City and State

Respectfully submitted,

_____
Firm Name (if applicable)

Bidder's address, E-mail address, and telephone:

_____
Number and Street

_____
City and State Zip Code

_____
Telephone

_____
Fax

_____
Signature and Print Name

_____
Title and E-mail Address

_____
Signature and Print Name

_____
Title and E-mail Address

## SECTION 00 03 10

## BEST MANAGEMENT PRACTICES (BMP) REQUIREMENTS

Best Management Practices (BMPs) shall be defined as any program, technology, process, siting criteria, operating method, measure or device which controls, prevents, removes, or reduces Storm Water pollution. The Contractor shall comply with the Los Angeles County Department of Public Works Construction Site Best Management Practices (BMP's) Manual, latest edition.

BMPs for contractor activities shall be continuously implemented throughout the year. BMPs for erosion and sediment control shall be implemented as required in Section 01 57 00. BMPs for erosion and sediment control shall also be implemented prior to the commencement of any contractor activity or construction operation.

The County, as a permittee, is subject to enforcement actions by the State Water Resources Control Board, Environmental Protection Agency, and private citizens. The County will assess the Contractor a penalty of $1,000 for each calendar day that the Contractor has not fully implemented the BMPs specified for the Contract and/or is otherwise in noncompliance with these provisions in accordance with Section 01 57 00. In addition, the County will deduct from the final payment due the Contractor, the total amount of any fines levied on the County, plus legal and staff costs, as a result of the Contractor's lack of compliance with these provisions and/or less than complete implementation of the specified BMPs.

Full compensation for the implementation of BMPs, including the construction, deployment, maintenance, removal, and the furnishing of all necessary labor, equipment, and materials, shall be considered as included in the bid price of the total lump sum price bid in Section 00 03 00.

The lump sum bid for the IMPLEMENTATION OF BMPs for construction work according to Sections 01 00 00, 01 57 00, and 01 74 23 Specifications, will be:

($_____) (_____)

BMP's lump sum bid in figures BMP's lump sum bid in words

## SECTION 00 03 11

## CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING REQUIREMENTS

Contractor shall submit a Construction and Demolition Recycling and Reuse Plan (RRP) for any work done for or on behalf of the County to the Los Angeles County Department of Public Works, Environmental Programs Division in accordance with Part 2.2 of Section 01 74 19.

Full compensation for complying with the Construction and Demolition Debris Recycling Requirements, including the construction, removal, and the furnishing of all necessary labor, equipment, and materials, shall be included in the lump sum price bid.

The lump sum bid for COMPLYING WITH THE CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING REQUIREMENTS according to Section 01 74 19, will be:

($_____) (_____)

Lump sum bid in figures  Lump sum bid in words

_____
Name of Bidder (Firm Name)

## SECTION 00 03 12

## INSURANCE REQUIREMENTS

The premium for the Builders Risk shall be included with the Lump Sum Bid, Section 00 03 00, and shall not be in addition to it.

Builders Risk:

Such coverage is required for this Project and shall supersede Section 00 07 00, Builder's Risk Course of Construction Insurance, Article 45, and shall:

1. Insure against damage from perils covered by the Causes-of-Loss Special Form (ISO form CP 10 30), and the perils of earthquake, flood, risk of transit loss, loss during storage (both onsite and offsite), and collapse during construction (without restricting collapse coverage to specified perils).

2. If Contractor's work involves testing air conditioning systems, boilers, pressure vessels, major machinery or major electrical panels, policy shall include coverage for such testing.

3. Be written on a completed-value basis and cover the entire value of the construction Project, including County-furnished materials and equipment, against loss or damage until completion and acceptance by the County.

   The amount for Builders Risk according to Section 00 08 00 of the Specifications, will be:

($_____) (_____)

Amount in figures Amount in words

_____
Name of Bidder (Firm Name)

## SECTION 00 03 13

## LOCAL AND TARGETED WORKER HIRE PROGRAM – MANDATORY JOBS COORDINATOR

The fee for the mandatory jobs coordinator shall be included with the Lump Sum Bid, Section 00 03 00, and shall not be in addition to it.

Mandatory Jobs Coordinator:

The County of Los Angeles has implemented a **mandatory** Local and Targeted Worker Hire Policy (LTWHP) which can be located in Section 00 09 12. There shall be a **mandatory** requirement to use a Jobs Coordinator to be hired directly by the contractor, prior to the start of work on the project. The Jobs Coordinator is an independent third-party individual, entity, or employee with whom the Prime Contractor enters into a contract or employs to facilitate the implementation of the Local and Targeted Worker Hiring Requirements of this Agreement.

($_____) (_____)
Fee Amount in figures Amount in words

Name of Jobs Coordinator_____

Address_____

Phone Number & Email_____

## SECTION 00 04 00

## ATTESTATION OF CONTRACTOR'S QUALIFICATIONS

General Contractor's Firm Name (as shown on bid): _____

**As specified in the bidding documents, in order to qualify to bid on this project, the General Contractor must satisfy at least one of the following two minimum requirements for qualifying experience:**

### OPTION 1 – LIBRARY PROJECT EXPERIENCE

The general contractor shall have completed as a prime contractor, a minimum of one Public Library (as defined by Section 18810 (p) of the California Education Code) project (new or refurbishment) within the last 10 years, where the final contract value of work was at least $5 million; OR

### OPTION 2 – PUBLIC WORKS PROJECT EXPERIENCE

The general contractor shall have completed as a prime contractor, within the last 5 years, at least one new building project or refurbishment project for a public entity at a construction value of at least $5 million and a total square footage of at least 7,000 square feet, which included at least three of the following construction elements: low voltage and telecommunication systems, wall paneling work, curved drywall work, or custom millwork. The general contractor shall submit verification of such qualifying experience on the County-provided form at the time of bid submittal.

By checking the applicable box below, the general contractor hereby certifies to the County of Los Angeles that it possesses the qualifying experience under:

☐ OPTION 1 OR ☐ OPTION 2

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct to the best of my knowledge.

Executed this _____ day of _____, 2025 at _____
(Month) (City and State)

By: _____
(Signature of owner or officer of the General Contractor)

_____
(Title)

SECTION 00 04 00

ATTESTATION OF CONTRACTOR'S QUALIFICATIONS

The general contractor shall submit verification and justification of its qualifying experience on this County provided form as part of its bid submittal. Failure to submit the information at the time of bid and to meet requirements for qualifying experience may result in a determination by the County that the Bidder is non-responsive and/or not qualified.

The County will determine, in its sole discretion, whether or not the information provided meets the requirements for qualifying experience in order for the general contractor to be considered a qualified bidder for this project.

**Option 1:**

| | |
|---|---|
| Project Name | |
| Owner | |
| Owner Contact Name | |
| Address | |
| Owner's Phone | |
| Email Address | |
| Final Contract Value | |
| Date Completed | |

Project description:

**Option 2:** The Project scope contained the following construction elements, must check 3 or more boxes below. Include a brief description of the selected work in the project description below for each box checked.

- □ low voltage
- □ telecommunication systems
- □ wall paneling work
- □ curved drywall work
- □ custom millwork

| | |
|---|---|
| Project Name | |
| Owner | |
| Owner Contact Name | |
| Address | |
| Owner's Phone | |
| Email Address | |
| Final Contract Value | |
| Date Completed | |

Project description:

Public Works
LOS ANGELES COUNTY

# SECTION 00 04 10
# BID BOND

KNOW ALL PERSONS BY THESE PRESENTS:

That we, _____
(Bidder and Address)

as Principal and _____
(Surety and Address)
as Surety, as held and firmly bound unto the County of Los Angeles, hereinafter called the County, in the penal sum of ten percent (10%) of the total amount of the bid of the Principal above named, submitted by said Principal to the County, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION of this obligation of such that:

WHEREAS, the Principal has submitted the above-mentioned Bid to the County, for certain construction specifically described as follows, for which bids are to be opened on _____

_____ for _____
(date of bid opening) (description of work, including location, project name, and project ID as it appears on the bid)

Now, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the bidding or contract documents, after prescribed forms are presented to him for signature, enters into written contract, in the prescribed form, in accordance with the bids, and files the two bonds with the County, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by the law, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

In the event suit is brought upon this bond by the County and judgment is recovered, the Surety shall pay all costs incurred by the County in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____ day of _____, 20_____.

_____
Principal

(SEAL)

_____
Signature and Title

(SEAL)

_____
Surety

_____
Signature and Title

## SECTION 00 04 30

## SUBCONTRACTOR LISTING AND SUBCONTRACTING

Prime Contractors shall be governed by the provisions of Sections 4100 to 4113, inclusive, of the Public Contract Code of the State of California and shall set forth in their bids, on forms provided for same, the name and California contractor license number of each Subcontractor who will perform work or labor or render service to the prime Contractor in or about the construction of the work or improvement in amount in excess of one-half (1/2) of one percent (1%) of the prime Contractor's total bid.

Failure by a prime Contractor to specify a Subcontractor for any portion of the work in excess of one-half (1/2) of one percent (1%) of the total bid constitutes an agreement between the prime Contractor and the County that he is fully qualified to perform that portion of the work himself and will perform that portion of the work himself.

No prime Contractor whose bid is accepted shall substitute any person as subcontractor in place of the subcontractor listed, nor shall any subcontract be assigned or transferred except as provided for in the above Sections of the Public Contract Code of the State of California.

Prime Contractors in violation of any of the provisions of Sections 4100 to 4113, inclusive, of the Public Contract Code of the State of California are subject to possible cancellation of contract and monetary penalties as well as disciplinary action by the Contractors' State License Board.

### LIST OF SUBCONTRACTORS

The following is a list of the proposed subcontractors to whom I (we) propose to sublet a portion or portions of this work.

| NAME | LICENSE NUMBER | LOCATION OF THE PLACE OF BUSINESS | CLASSIFICATION OF WORK TO BE EXECUTED | DIR REGISTRATION NUMBER AND EXPIRATION DATE |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| NAME | LICENSE NUMBER | LOCATION OF THE PLACE OF BUSINESS | CLASSIFICATION OF WORK TO BE EXECUTED | DIR REGISTRATION NUMBER AND EXPIRATION DATE |
|---|---|---|---|---|
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## SECTION 00 04 35

## COMMUNITY BUSINESS ENTERPRISES (CBE) PARTICIPATION FORM

Contractors are required to indicate their good faith effort in CBE participation by indicating on this form their proposed involvement on this project. CBEs are Minority/Women/Disadvantaged/Disabled Veteran/Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning owned Business Enterprises (MBE/WBE/DBE/DVBE/LGBTQQ).

## LIST OF CBE PARTICIPATION

The following is a list of certified CBE subcontractors or suppliers to whom I (we) propose to sublet or procure a portion or portions of this work.

| NAME/ADDRESS | TYPE OF WORK OR PRODUCT | INDICATE MBE/ WBE/DBE/ DVBE/LGBTQQ | PERCENTAGE OF TOTAL CONTRACT VALUE |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| NAME/ADDRESS | TYPE OF WORK OR PRODUCT | INDICATE MBE/ WBE/DBE/ DVBE/LGBTQQ | PERCENTAGE OF TOTAL CONTRACT VALUE |
|---|---|---|---|
| | | | |
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## SECTION 00 04 38

## REQUEST FOR PREFERENCE CONSIDERATION–LOW BID SOLICITATION

**INSTRUCTIONS**: Bidders requesting preference consideration must complete and include this form in their bid. **In order to qualify for preference, firm must be certified by the County of Los Angeles Department of Consumer and Business Affairs (DCBA). Please reference and ATTACH your Certification Letter issued by DCBA to determine Federal/Non-Federal preference eligibility.**

| ☐ PREFERENCE NOT REQUESTED |
|---|

**OR**

| ☐ PREFERENCE REQUESTED (SELECT ALL THAT APPLY) Preference | |
|---|---|
| **Program** | **Reference** |
| ☐ Request for **Local Small Business Enterprise (LSBE) Program** Preference<br>☐ Certification for Non-Federally Funded County Solicitations<br>☐ Certification for Federally Funded County Solicitations | **LACC 2.204**<br>**PCC 2002** |
| | _____ |
| | _____ |

**DECLARATION**: **I DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE INFORMATION IS TRUE AND CORRECT.**

**PRIMARY FIRM NAME**:_____

**PRINT NAME**: _____ **TITLE**: _____

**SIGNATURE**: _____ **DATE**: _____

## LOS ANGELES COUNTY COMMUNITY BUSINESS ENTERPRISE (CBE) INFORMATION

| TITLE | REFERENCE |
|---|---|
| 1 FIRM/ORGANIZATION INFORMATION | The information requested below is for statistical purposes only. On final analysis and consideration of award, contractor/vendor will be selected without regard to race/ethnicity, color, religion, sex, national origin, age, sexual orientation or disability. |

| | |
|---|---|
| **Total Number of Employees in California:** | |
| **Total Number of Employees** (including owners). If the firm has more than one office location, all personnel from all offices must be included**:** | |

**Race/Ethnic Composition of Firm.** Enter the make-up of Owners/Partners/Associate Partners into the following categories:

| Race/Ethnic Composition | Owners/Partners/ Associate Partners | | Percentage of how ownership of the firm is distributed | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Black/African American | | | % | % |
| Hispanic/Latino | | | % | % |
| Asian or Pacific Islander | | | % | % |
| Native Americans | | | % | % |
| Subcontinent Asian | | | % | % |
| White | | | % | % |

| TITLE | REFERENCE |
|---|---|
| 2 CERTIFICATION AS MINORITY, WOMEN, DISADVANTAGED, DISABLED VETERAN, AND LESBIAN, GAY, BISEXUAL, TRANSGENDER, QUEER, AND QUESTIONING-OWNED (LGBTQQ) BUSINESS ENTERPRISE | If your firm is currently certified as a minority, women, disadvantaged, disabled veteran or lesbian, gay, bisexual, transgender, queer, and questioning-owned business enterprise by a public agency, complete the following.<br><br>☐ **Check if not applicable** |

| Agency Name | Minority | Women | Disadvantaged | Disabled Veteran | LGBTQQ |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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## SECTION 00 04 38 A Subconsultant Certification Form

1. Certification as Minority, Women, Disadvantaged, Disabled Veteran, and Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning-Owned Business Enterprises: If any of your subconsultants/subcontractors is currently certified as these certifications by a public agency, complete the following and attach a copy of the proof of certification. Also include County of Los Angeles Local Small Business Enterprise/Social Enterprise/Disabled Veteran Business Enterprise certified subconsultants/subcontractors. All Subcontractors/Subconsultants listed in the bid/proposal shall be listed below. (Make a copy of this form, if necessary).

| | Subconsultant Name | Local Small Business Enterprise | Small Business Enterprise | Minority | Women-Owned | Disadvantaged Business | Disabled Veteran Business Enterprise | Social Enterprise | Lesbian, Gay, Bisexual, Transgender, Queer, and Questioning-Owned Business Enterprise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
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| 9 | | | | | | | | | |
| 10 | | | | | | | | | |

2. Declaration: I declare under penalty of perjury under the laws of the State of California that the above information is true and accurate.

| Print Name: | Authorized Signature | Title | Date |
|---|---|---|---|
| | | | |

| | | | |
|---|---|---|---|
| | | | |

**SECTION 00 04 40**
**EQUALS**

The undersigned desires to use the material, product, thing, or service described below, as "an equal" to such items as specified. In accordance with the General Conditions, Paragraph 2, Sub-paragraph D, the first, second, and third apparent low bidder will have two (2) calendar days after the bid opening to submit their list of equals and ten (10) calendar days after the bid opening to submit all substantiating data and test results. In accordance with Sub-paragraph E, the County, in its sole discretion, shall determine whether the substantiating data demonstrates that “an equal” submittal(s) is equal in all respects to the item specified in the bid documents. If the County determines that “an equal” submittal(s) has not been substantiated to be equal in all respects, the item specified in the bid documents shall be furnished and/or installed by Contractor without modification of the bid amount or contract documents. If the County finds that “an equal” submittal(s) is equivalent to the respective item(s) specified in the bid documents, then the undersigned may furnish such item(s), together with all necessary labor, materials, equipment, and incidentals required to perform and complete the work.

Date _____, 20____

_____
Contractor's Name

Phone No. _____

_____
Contractor’s Address

| | Materials, apparatus, or equipment specified for which Bidder proposes "an equal." (Indicate where specified and page number.) | Complete description of the materials, apparatus, or equipment the Bidder desires to use as "an equal" and name of Subcontractor if different. |
|---|---|---|
| 1. | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |
| 2. | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |
| | _____ | _____ |

3.

4.

5.

6.

## SECTION 00 04 50

## NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER

State of California

ss.

County of

_____, being first duly sworn, deposes and says that he or she is _____ of _____ the party making the foregoing bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____[date], at _____[city], _____[state].”

_____
Signature

_____
Date

# SECTION 00 04 60

## ATTESTATION OF WILLINGNESS TO CONSIDER GAIN/GROW PARTICIPANTS

As a threshold requirement for consideration for contract award, Bidder/Proposer shall demonstrate a proven record for hiring GAIN/GROW participants or shall attest to a willingness to consider GAIN/GROW participants for any future employment opening if they meet the minimum qualifications for that opening. Additionally, Bidder/Proposer shall attest to a willingness to provide employed GAIN/GROW participants access to the Bidder/Proposer's employee mentoring program, if available, to assist these individuals in obtaining permanent employment and/or promotional opportunities.

To report all job openings with job requirements to obtain qualified GAIN/GROW participants as potential employment candidates, Bidder/Proposer shall email: GAINGROW@DPSS.LACOUNTY.GOV and BSERVICES@WDACS.LACOUNTY.GOV.

**Bidder/Proposers unable to meet this requirement shall not be considered for contract award.**

Bidder/Proposer shall complete all of the following information, sign where indicated below, and return this form with their proposal.

A. Bidder/Proposer has a proven record of hiring GAIN/GROW participants.

_____ YES (subject to verification by County) _____ NO

B. Bidder/Proposer is willing to provide DPSS with all job openings and job requirements to consider GAIN/GROW participants for any future employment openings if the GAIN/GROW participant meets the minimum qualifications for the opening. "Consider" means that Proposer is willing to interview qualified GAIN/GROW participants.

_____ YES _____ NO

C. Bidder/Proposer is willing to provide employed GAIN/GROW participants access to its employee-mentoring program, if available.

_____ YES _____ NO _____ N/A (Program not available)

Proposer's Organization: _____

Signature: _____

Print Name: _____

Title: _____ Date: _____

Telephone No: _____ Email: _____

# SECTION 00 04 65 3-YEAR CONTRACTING HISTORY

LIST ALL CURRENT AND COMPLETED CONTRACTS WITH THE COUNTY FOR THE PAST THREE YEARS (Begin with the most recent project)

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

Contract Type/Description _____ Contract Number

Type of Work _____ _____

Department _____ Contract Amount

Address _____ $ _____

County Contact Name/Phone _____ / _____ Date of Contract

IF CONSTRUCTION
Architect Name/Phone _____ / _____ _____

Type of Facility _____

## SECTION 00 04 70

## FALSE CLAIMS

Bidders/Proposers shall provide either the certification requested below or the information requested on the next page. **Failure to certify or provide the requested information may result in a determination that the Bidder/Proposer is non-responsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.**

"False Claims Act", as used herein, is defined as either or both the Federal False Claims Act, 31 U.S.C. Sections 3729 et seq., and the California False Claims Act, Government Code Sections 12650 et seq.

### FALSE CLAIMS ACT CERTIFICATION

If the Bidder/Proposer has no False Claims Act violations as described above, complete the following:

I,_____, hereby certify that neither
(print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

_____
(Bidder/Proposer name as shown on Bid/Proposal)

nor_____
(name of responsible managing person licensed by Contractors' State License Board)

**has been determined by a court or tribunal of competent jurisdiction to have violated the False Claims Act as defined above.**

I declare under penalty of perjury that the foregoing is true and correct.

Executed this_____ day _____at_____
(month and year) (city and state)

by_____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

---

### FALSE CLAIMS ACT VIOLATIONS

With regard to any determinations by a tribunal or court of competent jurisdiction that the False Claims Act, as defined above, has been violated by (1) the Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) the qualifying person licensed by the State Contractors' License Board to perform the work described in the Bid/Proposal, including any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal, Bidder/Proposer shall provide on the following page labeled "False Claim Act Violations Information:" (1) the date of the determination of the violation, (2) the identity of tribunal or court and the case name or number, if any, (3) the identity of government contract or project involved, (4) the identity of government agency involved, 5) the amount of fine imposed, and (6) any exculpatory information of which the County should be aware.

## FALSE CLAIMS ACT VIOLATIONS INFORMATION

(1) Date of determination of the violation:

_____

(2) Identity of tribunal or court and the case name or number, if any: _____

_____

(3) Government contract or project involved: _____

_____

_____

(4) Government agency involved: _____

_____

_____

(5) Amount of fine imposed: _____

(6) Exculpatory information: _____

_____

_____

_____

_____

_____

_____

_____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by_____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

**SECTION 00 04 71**
**CIVIL LITIGATION HISTORY**

Bidder/Proposer shall provide either the certification requested below or information requested on the next page. **Failure to provide such certification or information may result in a determination that the Bidder/Proposer is nonresponsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.**

For the two (2) years preceding the date of submittal of this Bid/Proposal, identify any civil litigation arising out of the performance of a construction contract within the State of California in which the (1) Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) the qualifying person licensed by the State Contractors' License Board to perform the work described in this Bid/Proposal, including any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal, was a named plaintiff or defendant in a lawsuit brought by or against the Owner. Do not include litigation which is limited solely to enforcement of mechanics' liens or stop notices. Provide on the following page labeled "Civil Litigation History Information:" (1) the name and court case identification number of each case, (2) the jurisdiction in which it was filed, and (3) the outcome of the litigation, e.g., whether the case is pending, a judgment was entered, a settlement was reached, or the case was dismissed. If a settlement was reached within the two years preceding the date of submittal of this Bid/Proposal, please provide the dollar value of the settled claim(s). The dollar value may be marked as confidential if Bidder/Proposer does not want the settlement information to be public record.

**CIVIL LITIGATION CERTIFICATION**

**If the Bidder/Proposer has no civil litigation history to report as described above, complete the following:**

I, _____, hereby certify that neither
(print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

_____
(Bidder/Proposer name as shown on Bid/Proposal)

nor _____
(name of responsible managing person licensed by the Contractors' State License Board)

has been involved in civil litigation as described above.

**I declare under penalty of perjury that the foregoing is true and correct.**

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## CIVIL LITIGATION HISTORY INFORMATION

(1) Name of Case: _____

_____

Court case identification number: _____

(2) Jurisdiction in which case was filed: _____

_____

(3) Outcome of the case: _____

_____

_____

_____

_____

(1) Name of Case: _____

_____

Court case identification number: _____

(2) Jurisdiction in which case was filed: _____

_____

(3) Outcome of the case: _____

_____

_____

_____

_____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## SECTION 00 04 72

## CRIMINAL CONVICTIONS

Bidder/Proposer shall provide either the certification requested below or information requested on the next page. **Failure to provide such certification or information may result in a determination that the Bidder/Proposer is nonresponsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.**

For the five (5) years preceding the date this Bid/Proposal is due, identify on the following page any criminal conviction in any jurisdiction of the United States for a violation of law arising out of the performance of a construction contract (1) by the Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) by the qualifying person licensed by the State Contractors' License Board to perform the work described in the Bid/Proposal, including any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal. Provide on the following page labeled "Criminal Convictions Information:" (1) the date of conviction, (2) the name and court case identification number, (3) the identity of the law violated, (4) the identity of the prosecuting agency, (5) the contract or project involved, (6) the punishment imposed, and (7) any exculpatory information of which the Agency should be aware.

### CRIMINAL CONVICTION CERTIFICATION

If the Bidder/Proposer has no criminal convictions to report as described above, complete the following:

I, _____, hereby certify that neither
(print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

_____
(Bidder/Proposer name as shown on Bid/Proposal)

nor _____
(name of responsible managing person licensed by the Contractors' State License Board)

has been convicted of a criminal violation as described above.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this _____day of _____at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## CRIMINAL CONVICTIONS INFORMATION

(1) Date of conviction: _____

(2) Name of case: _____

Court case identification number: _____

(3) Identity of the law violated: _____

_____

(4) Identity of the prosecuting agency: _____

_____

(5) Contract or project involved: _____

_____

(6) Punishment imposed: _____

_____

_____

(7) Exculpatory information: _____

_____

_____

_____

_____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## SECTION 00 04 73

## DEBARMENTS

Bidder/Proposer shall provide either the certification requested below or the information requested on the next page. **Failure to provide such certification or information may result in a determination that the Bidder/Proposer is nonresponsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.**

For the ten (10) years preceding the date this Bid/Proposal is due, identify on the following page any debarment by any Federal, State, or local public agency arising out of the performance of a construction contract (1) by the Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) by the qualifying person licensed by the Contractors' State License Board to perform the work described in the Bid/Proposal, including any debarment of any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal. Provide on the following page labeled "Debarment Information:" (1) the date of debarment and the duration of the debarment, (2) the project name or contract from which the debarment arose, (3) the identify of the debarring agency, (4) stated reason for debarment, and (5) any exculpatory information of which the Agency should be aware.

### HISTORY OF DEBARMENT CERTIFICATION

If the Bidder/Proposer has no debarments to report as described above, complete the following:

I, _____, hereby certify that neither
(print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

_____
(Bidder/Proposer name as shown on Bid/Proposal)

nor _____
(name of responsible managing person licensed by Contractors' State License Board)

has been debarred as described above.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

**DEBARMENT INFORMATION**

(1) Date and duration of debarment: _____

_____

(2) Project name or contract involved: _____

_____

(3) Debarring agency: _____

_____

(4) Stated reason for debarment: _____

_____

_____

_____

_____

(5) Exculpatory information: _____

_____

_____

_____

_____

_____

_____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by_____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## SECTION 00 04 74

## LABOR LAW/PAYROLL VIOLATIONS

Bidder/Proposer shall provide the certification requested below or the information requested on the next page. **Failure to provide such certification or information may result in a determination that the Bidder/Proposer is nonresponsive. Failure to fully and accurately provide the requested certification or information may result in a determination that the Bidder/Proposer is not responsible.**

"Labor law/payroll violation" means for purposes of this disclosure a violation of the Davis-Bacon Act (40 USC section 276a) and/or a violation of California Labor Code sections 1720 through 1861 concerning the payment of prevailing wages, employment of apprentices and hours and working conditions.

For the three (3) years preceding the date this Bid/Proposal is due, identify on the following page any determination made by any Federal, State, or local public agency of a labor law/payroll violation arising out of the performance of a construction contract (1) by the Bidder/Proposer submitting this Bid/Proposal, including any person who is an officer of, or in a management position with, or has an ownership interest in the contracting entity which is submitting this Bid/Proposal, or (2) by the qualifying person licensed by the Contractors' State License Board to perform the work described in the Bid/Proposal, including any such person when they were an officer, manager, owner, or responsible managing employee of a construction contractor other than the Bidder/Proposer submitting this Bid/Proposal. Provide on the following page labeled "Labor Law/Payroll Violations Information:" (1) the date of the determination of the violation, (2) the case number, if any, or other identifying information for the proceeding, (3) the identity of the government contract or project involved, (4) the identity of the government agency involved, (5) the description of violation, (6) the amount of any civil wage and penalty assessment, and (7) any exculpatory information of which the Agency should be aware.

### LABOR LAW/PAYROLL VIOLATION CERTIFICATION

If the Bidder/Proposer has no labor law/payroll violations to report as described above, complete the following:

I, _____, hereby certify that neither
(print name of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

_____
(Bidder/Proposer name as shown on Bid/Proposal)

nor_____
(name of responsible managing person licensed by Contractors' State License Board)

has been determined to have violated any Federal, State, or local labor laws as described above.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

## LABOR LAW/PAYROLL VIOLATIONS INFORMATION

(1) Date of violation determination: _____

(2) Case number: _____

(3) Government contract or project involved: _____

_____

_____

(4) Government agency involved: _____

_____

(5) Description of the violation (attach disposition letter): _____

_____

_____

_____

_____

(6) Amount of any civil wage and penalty assessment: _____

_____

_____

(7) Exculpatory information: _____

_____

_____

_____

_____

Declaration: I declare under penalty of perjury that the above information is true and correct.

Executed this _____ day of _____ at _____
(month and year) (city and state)

by _____
(signature of owner, officer, manager, or licensee responsible for submission of Bid/Proposal)

**SECTION 00 04 75**

## INTEGRATED PEST MANAGEMENT PROGRAM COMPLIANCE CERTIFICATION

| | | |
|---|---|---|
| Company Name: | | |
| Company Address: | | |
| City: | State: | Zip Code: |
| Telephone Number: | Email address: | |
| Solicitation/Contract for | Services | |

## PROPOSER CERTIFICATION

The County of Los Angeles is a permittee to a National Pollutant Discharge Elimination System Permit (NPDES Permit) issued by the Los Angeles Regional Water Quality Control Board to reduce or eliminate pollutants moved into surface water through storm water management systems and facilities. One of the conditions of the NPDES Permit is the Integrated Pest Management Program (IPM Program) which was developed to reduce the impact of pesticides and fertilizers to surface water. Among other things, the IPM Program imposes requirements to County Purchasing and Contracting, which are outlined in Integrated Pest Management Program Compliance of the proposed Contract. The entire Countywide IPM Program is available at Los Angeles County Department of Agricultural Commissioner/ Weights and Measures (ACWM) and Home Page - Current - Integrated Pest Management (lacounty.gov)

Proposer acknowledges and certifies compliance with Integrated Pest Management Program Compliance of the proposed Contract and agrees that proposer or a member of its staff performing work under the proposed Contract will be in compliance, when applicable. Proposer further acknowledges that noncompliance with the County's IPM Program may result in rejection of any proposal, or cancellation of any resultant Contract, at the sole judgment of the County.

**I declare under penalty of perjury under the laws of the State of California that the information herein is true and correct and that I am authorized to represent this company.**

| | |
|---|---|
| Print Name: | Title: |
| Signature: | Date: |

**SECTION 00 04 76**

# CHARITABLE CONTRIBUTIONS CERTIFICATION

_____
Company Name

_____
Address

_____
Internal Revenue Service Employer Identification Number

_____
California Registry of Charitable Trusts "CT" number (if applicable)

The Nonprofit Integrity Act (SB 1262, Chapter 919) added requirements to California's Supervision of Trustees and Fundraisers for Charitable Purposes Act which regulates those receiving and raising charitable contributions.

**Check the Certification below that is applicable to your company.**

☐ Proposer or Contractor has examined its activities and determined that it does not now receive or raise charitable contributions regulated under California's Supervision of Trustees and Fundraisers for Charitable Purposes Act. If Proposer engages in activities subjecting it to those laws during the term of a County contract, it will timely comply with them and provide County a copy of its initial registration with the California State Attorney General's Registry of Charitable Trusts when filed.

**OR**

☐ Proposer or Contractor is registered with the California Registry of Charitable Trusts under the CT number listed above and is in compliance with its registration and reporting requirements under California law. Attached is a copy of its most recent filing with the Registry of Charitable Trusts as required by Title 11 California Code of Regulations, sections 300-301 and Government Code sections 12585-12586.

_____ _____
Signature Date

_____
Please Print Name and Title of Signer

# PROSPECTIVE CONTRACTOR LIST OF TERMINATED CONTRACTS

## Contractor's Name: _____

**Proposer must list all contracts that have been terminated within the past three years. Terminated contracts are those contracts terminated by an agency or firm before the contract's expiration date. Any and all terminated contracts should be accompanied with "Reason for termination". It should be noted that contracts that naturally expired need not be listed. The County is only seeking information on contracts that were terminated prior to expiration.**

| **1. Name of Firm** | **Address of Firm** | **Contact Person** | **Telephone #** ( ) | **Email** |
|---|---|---|---|---|
| Name or Contract No. | Reason for Termination: | | | |
| **2. Name of Firm** | **Address of Firm** | **Contact Person** | **Telephone #** ( ) | **Email** |
| Name or Contract No. | Reason for Termination: | | | |
| **3. Name of Firm** | **Address of Firm** | **Contact Person** | **Telephone #** ( ) | **Email** |
| Name or Contract No. | Reason for Termination: | | | |
| **4. Name of Firm** | **Address of Firm** | **Contact Person** | **Telephone #** ( ) | **Email** |
| Name or Contract No. | Reason for Termination: | | | |

**REQUIRED FORM**

# CONTRIBUTION AND AGENT DECLARATION FORM

This form must be completed separately by all bidders/proposers, including all prime contractors and subcontractors, and by all applicants for licenses, permits, and other entitlements for use issued by the County of Los Angeles ("County").

Pursuant to the Levine Act (Government Code section 84308), a member of the Board of Supervisors, other elected County officials (the Sheriff, Assessor, and the District Attorney), and other County employees and/or officers ("County Officers") are disqualified and not able to participate in a proceeding involving contracts, franchises, licenses, permits and other entitlements for use if the County Officer received more than $250 in contributions in the past 12 months from the bidder, proposer or applicant, any paid agent of the bidder, proposer, or applicant, or any financially interested participant who actively supports or opposes a particular decision in the proceeding.

**State law requires you to disclose information about contributions made by you, your company, and lobbyists and agents paid to represent you. Failure to complete the form in its entirety may result in significant delays in the processing of your application and potential disqualification from the procurement or application process.**

**You must fully answer the applicable questions below. You ("Declarant"), or your company, if applicable, including all entities identified below (collectively, "Declarant Company") must also answer the questions below. The term "employee(s)" shall be defined as employees, officers, partners, owners, or directors of Declarant Company.**

**An affirmative response to any questions will not automatically cause the disqualification of your bid/proposal, or the denial of your application for a license, permit or other entitlement. However, failure to answer questions completely, in good faith, or providing materially false answers may subject a bidder/proposer to disqualification from the procurement.**

***This material is intended for use by bidders/proposers, including all prime contractors and subcontractors, and by all applicants for licenses, permits, and other entitlements for use issued by the County of Los Angeles and does not constitute legal advice****. If you have questions about the Levine Act and how it applies to you, you should call your lawyer or contact the Fair Political Practices Commission for further guidance.*

**REQUIRED FORM**
**CONTRIBUTION AND AGENT DECLARATION FORM**

*Complete each section below. State "none" if applicable.*

A. COMPANY OR APPLICANT INFORMATION

1) Declarant Company or Applicant Name:

a) If applicable, identify all subcontractors that have been or will be named in your bid or proposal:

b) If applicable, variations and acronyms of Declarant Company's name used within the past 12 months:

c) Identify all entities or individuals who have the authority to make decisions for you or Declarant Company about making contributions to a County Officer, regardless of whether you or Declarant Company have actually made a contribution:

**[IF A COMPANY, ANSWER QUESTIONS 2 - 3]**

2) Identify only the Parent(s), Subsidiaries and Related Business Entities that Declarant Company has controlled or directed, or been controlled or directed by. "Controlled or directed" means shared ownership, 50% or greater ownership, or shared management and control between the entities.

a) Parent(s):

b) Subsidiaries:

c) Related Business Entities:

3) If Declarant Company is a closed corporation (non-public, with under 35 shareholders), identify the majority shareholder.

4) Identify all entities (proprietorships, firms, partnerships, joint ventures, syndicates, business trusts, companies, corporations, limited liability companies, associations, committees, and any other organization or group of persons acting in concert) whose contributions you or Declarant Company have the authority to direct or control.

5) Identify any individuals such as employees, agents, attorneys, law firms, lobbyists, and lobbying firms who are or who will act on behalf of you or Declarant Company and who will receive compensation to communicate with a County Officer regarding the award or approval of **this** contract or project, license, permit, or other entitlement for use.

   *(Do **not** list individuals and/or firms who, as part of their profession, either (1) submit to the County drawings or submissions of an architectural, engineering, or similar nature, **or** (2) provide purely technical data or analysis, **and** who will not have any other type of communication with a County agency, employee, or officer.)*

6) If you or Declarant Company are a 501(c)(3) non-profit organization, identify the compensated officers of your organization and the compensated members of your board.

B. CONTRIBUTIONS

1) Have you or the Declarant Company solicited or directed your employee(s) or agent(s) to make contributions, whether through fundraising events, communications, or any other means, to a County Officer in the past 12 months? If so, provide details of each occurrence, including the date.

| **Date** (contribution solicited, or directed) | **Recipient Name** (elected official) | **Amount** |
|---|---|---|
| | | |
| | | |
| | | |

*Please attach an additional page, if necessary.

2) Disclose all contributions made by you or any of the entities and individuals identified in Section A to a County officer in the past 12 months.

| **Date** (contribution made) | **Name** (of the contributor) | **Recipient Name** (elected official) | **Amount** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

*Please attach an additional page, if necessary.

**REQUIRED FORM**

**CONTRIBUTION AND AGENT DECLARATION FORM**

C. DECLARATION

By signing this Contribution and Agent Declaration form, you (Declarant), or you and the Declarant Company, if applicable, attest that you have read the entirety of the Contribution Declaration and the statements made herein are true and correct to the best of your knowledge and belief. (Only complete the one section that applies.)

There are _____ additional pages attached to this Contribution Declaration Form.

**COMPANY BIDDERS OR APPLICANTS**

I, _____ (Authorized Representative), on behalf of _____(Declarant Company), at which I am employed as _____ (Title), attest that after having made or caused to be made a reasonably diligent investigation regarding the Declarant Company, the foregoing responses, and the explanation on the attached page(s), if any, are correct to the best of my knowledge and belief. Further, I understand that failure to answer the questions in good faith or providing materially false answers may subject Declarant Company to consequences, including disqualification of its bid/proposal or delays in the processing of the requested contract, license, permit, or other entitlement.

**IMPORTANT NOTICE REGARDING FUTURE AGENTS AND FUTURE CONTRIBUTIONS:**

By signing this Contribution and Agent Declaration form, you also agree that, if Declarant Company hires an agent, such as, but not limited to, an attorney or lobbyist during the course of these proceedings and will compensate them for communicating with the County about this contract, project, permit, license, or other entitlement for use, you agree to inform the County of the identity of the agent or lobbyist and the date of their hire. You also agree to disclose to the County any future contributions made to members of the County Board of Supervisors, another elected County officer (the Sheriff, Assessor, and the District Attorney), or any other County officer or employee by the Declarant Company, or, if applicable, any of the Declarant Company's proposed subcontractors, agents, lobbyists, and employees who have communicated or will communicate with the County about this contract, license, permit, or other entitlement after the date of signing this disclosure form, and within 12 months following the approval, renewal, or extension of the requested contract, license, permit, or entitlement for use.

_____ _____

Signature Date

**REQUIRED FORM**

## CONTRIBUTION AND AGENT DECLARATION FORM

### INDIVIDUAL BIDDERS OR APPLICANTS

I, _____, declare that the foregoing responses and the explanation on the attached sheet(s), if any, are correct to the best of my knowledge and belief. Further, I understand that failure to answer the questions in good faith or providing materially false answers may subject me to consequences, including disqualification of my bid/proposal or delays in the processing of the requested license, permit, or other entitlement.

**IMPORTANT NOTICE REGARDING FUTURE AGENTS AND FUTURE CONTRIBUTIONS:**

If I hire an agent or lobbyist during the course of these proceedings and will compensate them for communicating with the County about this contract, project, permit, license, or other entitlement for use, I agree to inform the County of the identity of the agent or lobbyist and the date of their hire. I also agree to disclose to the County any future contributions made to members of the County Board of Supervisors, another elected County official (the Sheriff, Assessor, and the District Attorney), or any other County officer or employee by me, or an agent such as, but not limited to, a lobbyist or attorney representing me, that are made after the date of signing this disclosure form, and within 12 months following the approval, renewal, or extension of the requested contract, license, permit, or entitlement for use.

_____ _____

Signature Date

**SECTION 00 04 85**
**COUNTY OF LOS ANGELES CONTRACTOR EMPLOYEE JURY SERVICE PROGRAM**
**APPLICATION FOR EXCEPTION AND CERTIFICATION FORM**

The County's solicitation for this contract/purchase order (Request for Proposal or Invitation for Bid) is subject to the County of Los Angeles Contractor Employee Jury Service Program (Program), Los Angeles County Code, Chapter 2.203. All bidders or proposers, whether a contractor or subcontractor, must complete this form to either: 1) request an exception from the Program requirements; or 2) certify compliance. Upon review of the submitted form, the County department will determine, in its sole discretion, whether the bidder or proposer is exempted from the Program.

| | | |
|---|---|---|
| **Company Name:** | | |
| **Company Address:** | | |
| **City:** | **State:** | **Zip Code:** |
| **Telephone Number:** | | |
| **Solicitation For (Type of Goods or Services):** | | |

***If you believe the Jury Service Program does not apply to your business, check the appropriate box in Part I (attach documentation to support your claim); or, complete Part II to certify compliance with the Program. Whether you complete Part I or II, please sign and date this form below.***

**Part I: Jury Service Program is not Applicable to my Business**

- ❑ My business does not meet the definition of "contractor," as defined in the Program as it has not received an aggregate sum of $50,000 or more in any 12-month period under one or more County contracts or subcontracts (this exception is not available if the contract/purchase order itself will exceed $50,000). I understand that the exception will be lost and I must comply with the Program if my revenues from the County exceed an aggregate sum of $50,000 in any 12-month period.

- ❑ My business is a small business as defined in the Program. It: 1) has ten or fewer employees; and, 2) has annual gross revenues in the preceding 12 months which, if added to the annual amount of this contract, are $500,000 or less; and 3) is not an affiliate or subsidiary of a business dominant in its field of operation as defined below. I understand that the exemption will be lost and I must comply with the Program if the number of employees in my business and my gross annual revenues exceed the above limits.

  "**Dominant in its field of operation**" means having more than ten employees, including full-time and part-time employees, and annual gross revenues in the preceding 12 months, which, if added to the annual amount of the contract awarded, exceed $500,000.

  "**Affiliate or subsidiary of a business dominant in its field of operation"** means a business which is at least 20 percent owned by a business dominant in its field of operation, or by partners, officers, directors, majority stockholders, or their equivalent of a business dominant in that field of operation.

- ❑ My business is subject to a Collective Bargaining Agreement (attach agreement) that expressly provides that it supersedes all provisions of the Program.

**OR**

**Part II: Certification of Compliance**

- ❑ My business has and adheres to a written policy that provides, on an annual basis, no less than five days of regular pay for actual jury service for full-time employees of the business who are also California residents, **or** my company will have and adhere to such a policy prior to award of the contract.

***I declare under penalty of perjury under the laws of the State of California that the information stated above is true and correct.***

| | |
|---|---|
| **Print Name:** | **Title:** |
| **Signature:** | **Date:** |

To be submitted with each Bid for a contract

Project Identification_____

_____

Bid Date_____

This information must include all construction work undertaken in the State of California by the Bidder and any partnership, joint venture, or corporation that any principal of the Bidder participated in as a principal or owner for the last five calendar years and the current calendar year prior to the date of Bid submittal. Separate information shall be submitted for each particular partnership, joint venture, corporate, or individual Bidder. The Bidder may attach any additional information or explanation of data which he would like taken into consideration in evaluating the safety record. An explanation must be attached of the circumstances surrounding any and all fatalities.

**SECTION 00 04 90**

**CONTRACTOR'S INDUSTRIAL SAFETY RECORD**

5-Calendar Years Prior to Current Year

| | 2020 | 2021 | 2022 | 2023 | 2024 | TOTAL | CURRENT YEAR (2024) |
|---|---|---|---|---|---|---|---|
| 1. No. of Contracts | | | | | | | |
| 2. Total dollar amount of contracts (in thousands of dollars) | | | | | | | |
| *3. No. of fatalities | | | | | | | |
| *4. No. of lost workdays due to injuries | | | | | | | |
| *5. No. of days of restricted work activity due to injuries | | | | | | | |
| *6. Injuries without lost workdays | | | | | | | |

*The information required for these items is the same as required for columns 1, 4, 5, and 6, Log and Summary of Occupational Injuries and Illnesses, CAL/OSHA Form 200.

The above information was compiled from the records that are available to me at this time and I declare under penalty of perjury that the information is true and accurate within the limitations of those records.

_____ _____

Name of Bidder (Print) Signature

_____ _____

Address Contractors' State License No. & Classification

_____ _____

City Telephone

## SECTION 00 04 91

## INJURY AND ILLNESS PREVENTION PLAN (IIPP) AND CODE OF SAFE PRACTICES (CSP) AFFIDAVIT

The apparent low Bidder shall submit this form to the County which states that the Bidder has an IIPP which complies with Cal/OSHA Regulations and CSP, that all subcontractors supplying employees to the jobsite will be required to prove to the Contractor that they have an IIPP which complies with Cal/OSHA Regulations and a CSP, and that their jobsite employees have been trained on IIPP and CSP.

**Failure to submit this affidavit as required may result in a determination that the successful Bidder is nonresponsive and/or nonresponsible.**

I, _____, hereby certify to the County

of Los Angeles on behalf of _____ the following:

1. The Contractor identified above has an injury and illness Prevention Plan (IIPP) and a Code of Safe Practices (CSP) which comply with Cal/OSHA Regulations.

2. The employees of the Contractor identified above who will be assigned to the jobsite have been trained on the IIPP and CSP.

3. All subcontractors supplying employees to the jobsite will be required to prove to the Contractor that they have an IIPP and a CSP which comply with Cal/OSHA Regulations and their jobsite employees have been trained on the IIPP and CSP.

I declare under penalty of perjury under the law of the State of California that the foregoing is true and correct.

Executed this_____day of _____
(month and year)

at _____

By_____

## SECTION 00 04 92

## BIDDER'S ORGANIZATION QUESTIONNAIRE/AFFIDAVIT

Please complete, date and sign this form and place it in your Bid. The person signing the form must be authorized to sign on behalf of the Bidder and to bind the applicant in a Contract.

1. If your firm is a corporation, state its legal name (as found in your Articles of Incorporation) and State of Incorporation:

   _____ _____ _____
   Name State Year Inc.

2. If your firm is a partnership or a sole proprietorship, state the name of the proprietor or managing partner:

   _____

3. If your firm is doing business under one or more DBA's, please list all DBA's and the County(ies) of registration:

   | Name | County of Registration | Year Became DBA |
   |---|---|---|
   | _____ | _____ | _____ |
   | _____ | _____ | _____ |

4. Is your firm wholly or majority owned by, or a subsidiary of, another firm: _____ if yes,

   Name of parent firm: _____

   State of incorporation or registration of parent firm: _____

5. Please list any other names your firm has done business as within the last five (5) years.

   | Name | Year of Name Change |
   |---|---|
   | _____ | _____ |
   | _____ | _____ |

6. Indicate if your firm is involved in any pending acquisition/merger, including the associated company name. If not applicable, so indicate below.

   _____

   _____

Bidder acknowledges that if any false, misleading, incomplete, or deceptively unresponsive statements in connection with this Bid are made, the Bidder may be rejected. The evaluation and determination in this area shall be at the Director's sole judgment and his/her judgment shall be final:

Bidder's Name

---

Address:

_____

_____

e-mail address:_____ Telephone number:_____

Fax number: _____

On behalf of _____(Bidder's name), I _____ (Name of Bidder's authorized representative), certify that the information contained in this Bidder's Organization Questionnaire/Affidavit is true and correct to the best of my information and belief.

_____ Signature

_____ Internal Revenue Service Employer Identification Number

_____ Title

_____ California Business License Number

_____ Date

_____ County WebVen Number

**SECTION 00 04 93**

## CERTIFICATION OF COMPLIANCE WITH THE COUNTY'S DEFAULTED PROPERTY TAX REDUCTION PROGRAM

| | | |
|---|---|---|
| Company Name: | | |
| Company Address: | | |
| City: | State: | Zip Code: |
| Telephone Number: | Email address: | |
| Solicitation/Contract For_____ | Services: | |

The Proposer/Bidder/Contractor certifies that:

☐ It is familiar with the terms of the County of Los Angeles Defaulted Property Tax Reduction Program, Los Angeles County Code Chapter 2.206; **AND**

To the best of its knowledge, after a reasonable inquiry, the Proposer/Bidder/ Contractor is not in default, as that term is defined in Los Angeles County Code Section 2.206.020.E, on any Los Angeles County property tax obligation; **AND**

The Proposer/Bidder/Contractor agrees to comply with the County's Defaulted Property Tax Reduction Program during the term of any awarded contract.

**– OR –**

---

☐ I am exempt from the County of Los Angeles Defaulted Property Tax Reduction Program, pursuant to Los Angeles County Code Section 2.206.060, for the following reasons:

_____

_____

***I declare under penalty of perjury under the laws of the State of California that the information stated above is true and correct.***

| | |
|---|---|
| Print Name: | Title: |
| Signature: | Date: |

# SECTION 00 04 94

# AVOIDANCE OF CONFLICT OF INTEREST

The Los Angeles County Code, Section 2.180.010, provides as follows:

**CONTRACTS PROHIBITED**

Notwithstanding any other section of this Code, the County shall not contract with, and shall reject any proposals submitted by, the persons or entities specified below, unless the Board of Supervisors finds that special circumstances exist which justify the approval of such contract:

1. Employees of the County or of public agencies for which the Board of Supervisors is the governing body;

2. Profit-making firms or businesses in which employees described in number 1 serve as officers, principals, partners, or major shareholders;

3. Persons who, within the immediately preceding 12 months, came within the provisions of number 1, and who:

    a. Were employed in positions of substantial responsibility in the area of service to be performed by the contract; or

    b. Participated in any way in developing the contract or its service specifications; and

4. Profit-making firms or businesses in which the former employees, described in number 3, serve as officers, principals, partners, or major shareholders.

Contracts submitted to the Board of Supervisors for approval or ratification shall be accompanied by an assurance by the department submitting, district or agency that the provisions of this section have not been violated.

_____

Proposer Name (please print)

_____

Proposer's Official Title (please print)

_____

Proposer's Signature

# SECTION 00 04 95

## FAMILIARITY WITH THE COUNTY LOBBYIST ORDINANCE CERTIFICATION

The Proposer certifies that it is familiar with the terms of the County of Los Angeles Lobbyist Ordinance, Los Angeles Code Chapter 2.160. The Proposer also certifies that all persons acting on behalf of the Proposer organization have and will comply with it during the proposal process.

Signature:_____

Date:_____

# SECTION 00 04 96

# PROPOSER'S EEO CERTIFICATION

_____
Company Name

_____
Address

_____
Internal Revenue Service Employer Identification Number

## GENERAL

In accordance with provisions of the County Code of the County of Los Angeles, the Proposer certifies and agrees that all persons employed by such firm, its affiliates, subsidiaries, or holding companies are and will be treated equally by the firm without regard to or because of race, religion, ancestry, national origin, or sex and in compliance with all anti-discrimination laws of the United States of America and the State of California.

| CERTIFICATION | YES | NO |
|---|---|---|
| 1. Proposer has written policy statement prohibiting discrimination in all phases of employment. | ( ) | ( ) |
| 2. Proposer periodically conducts a self-analysis or utilization analysis of its work force. | ( ) | ( ) |
| 3. Proposer has a system for determining if its employment practices are discriminatory against protected groups. | ( ) | ( ) |
| 4. When problem areas are identified in employment practices, Proposer has a system for taking reasonable corrective action to include establishment of goal and/or timetables. | ( ) | ( ) |

_____ _____
Signature Date

_____
Name and Official Title (please print)

**00 04 97**
**COMPLIANCE WITH FAIR CHANCE EMPLOYMENT HIRING PRACTICES CERTIFICATION**

| | | |
|---|---|---|
| Company Name: | | |
| Company Address: | | |
| City: | State: | Zip Code: |
| Telephone Number: | Email address: | |
| Solicitation/Contract for _____ Services | | |

## PROPOSER/CONTRACTOR CERTIFICATION

The Los Angeles County Board of Supervisors approved a Fair Chance Employment Policy in an effort to remove job barriers for individuals with criminal records. The policy requires businesses that contract with the County to comply with fair chance employment hiring practices set forth in California Government Code Section 12952, Employment Discrimination: Conviction History (California Government Code Section 12952), effective January 1, 2018.

Proposer/Contractor acknowledges and certifies compliance with fair chance employment hiring practices set forth in California Government Code Section 12952 and agrees that Proposer/Contractor and staff performing work under the Contract will be in compliance. Proposer/Contractor further acknowledges that noncompliance with fair chance employment practices set forth in California Government Code Section 12952 may result in rejection of any proposal, or termination of any resultant Contract, at the sole judgment of the County.

**I declare under penalty of perjury under the laws of the State of California that the information herein is true and correct and that I am authorized to represent this company.**

| | |
|---|---|
| Print Name: | Title: |
| Signature: | Date: |

**00 04 98**

# ZERO TOLERANCE HUMAN TRAFFICKING POLICY CERTIFICATION

| | | |
|---|---|---|
| Company Name: | | |
| Company Address: | | |
| City: | State: | Zip Code: |
| Telephone Number: | Email address: | |
| Solicitation/Contract for _____ Services | | |

## PROPOSER CERTIFICATION

Los Angeles County has taken significant steps to protect victims of human trafficking by establishing a zero tolerance human trafficking policy that prohibits contractors found to have engaged in human trafficking from receiving contract awards or performing services under a County contract.

Proposer acknowledges and certifies compliance with (Compliance with County's Zero Tolerance Human Trafficking Policy) of the proposed Contract and agrees that proposer or a member of his staff performing work under the proposed Contract will be in compliance. Proposer further acknowledges that noncompliance with the County's Zero Tolerance Human Trafficking Policy may result in rejection of any proposal, or cancellation of any resultant Contract, at the sole judgment of the County.

**I declare under penalty of perjury under the laws of the State of California that the information herein is true and correct and that I am authorized to represent this company.**

| | |
|---|---|
| Print Name: | Title: |
| Signature: | Date: |

**00 04 99**

## DISALLOWED COST ATTESTATION

| | | |
|---|---|---|
| Company Name: | | |
| Company Address: | | |
| City: | State: | Zip Code: |
| Telephone Number: | Email address: | |
| Solicitation/Contract for _____ Services | | |

## PROPOSER ATTESTATION

If Proposer's compliance with a County contract has been reviewed by the Department of the Auditor-Controller within the last 10 years, Proposer must not have unresolved questioned costs identified by the Auditor-Controller, in an amount over $100,000.00, that are confirmed to be disallowed costs by the contracting County department, and remain unpaid for six months or more from the date of disallowance, unless such disallowed costs are the subject of current good faith negotiations to resolve the disallowed costs, in the opinion of the County.

Proposer acknowledges and certifies compliance with the above paragraph.

**I declare under penalty of perjury under the laws of the State of California that the information herein is true and correct and that I am authorized to represent this company.**

| | |
|---|---|
| Print Name: | Title: |
| Signature: | Date: |

**SECTION 00 05 00**

AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of_____ 2XXX, by and between the COUNTY OF LOS ANGELES, State of California (hereinafter called the County), and

CONTRACTOR
A California Corporation
ADDRESS
CITY, STATE, ZIP
TELEPHONE

(hereinafter called the Contractor),

WITNESSETH:

1. Contractor's Services

That the Contractor, in consideration of the promises of the County hereinafter set forth, hereby agrees to furnish all tools, equipment, labor, and material necessary to perform and complete in a good and workmanlike manner,

PROJECT NAME
ADDRESS
SPECS NO.

within the time and in accordance with the recommendation of the Director of the Los Angeles County Public Works, dated month-day, 2XXX, Plans and Specifications Number, the Notice Inviting Bids, Notice to Bidders A, etc. (if any), and the lump sum bid of the Contractor, including Additive Alternates 1, all of which are incorporated herein as though fully set forth, and are hereby agreed by the parties to constitute the Contract documents.

2. Consideration

That the County agrees, in consideration of the performance of this Contract, to pay to the Contractor, and the Contractor agrees to accept in full satisfaction for the work done hereunder, a sum of amount in words Dollars ($ amount: base bid amount minus schedule fee minus extended overhead and minus unit, if applicable) which



SAMPLE

sum shall be paid to the Contractor at the time and in the manner set forth in the specifications.

3. Extended Overhead Daily Rate

The Contractor's Extended Overhead Daily Rate is $XXX, as set forth in the Contractor's Form of Bid, Section 00 03 00, which Extended Overhead Daily Rate shall be payable to the Contractor for each day of Compensable Delay to fully compensate the Contractor for any damages resulting from or associated with Compensable Delay, including, but not limited to, home office and field office overhead, as specified in Specification Section 00 01 00, Instructions to Bidders, 1.14c and in accordance with Specification Section 00 07 00, General Conditions, Article 17, Time Extensions and Compensation for Delay.

4. Notice to Employees Regarding the Federal Earned Income Credit

Contractor shall notify its employees, and shall require each subcontractor to notify its employees, that they may be eligible for the Federal Earned Income Credit under the Federal income tax laws. Such notice shall be provided in accordance with the requirement set forth in Internal Revenue Service Notice 1015.

5. County Rights

The County may employ, either during or after performance of this Contract, any right of recovery the County may have against the Contractor by any means it deems appropriate including, but not limited to, set-off, action at law or in equity, withholding, recoupment, or counterclaim. The rights and remedies of the County under this Contract are in addition to any right or remedy provided by California law.

6. Fair Labor Standards Act

Contractor shall comply with all applicable provisions of the Federal Fair Labor Standards Act, and shall indemnify, defend, and hold harmless County, its agents, officers, and employees from any and all liability including, but not limited to, wages, overtime pay, liquidated damages, penalties, court costs, and attorneys' fees arising under any wage and hour law including, but not limited to, the Federal Fair Labor Standards Act for services performed by Contractor's employees for which County may be found jointly or solely liable.

7. Prevailing Wage Requirements

a. Prevailing Wages



SAMPLE

The services provided in this Contract constitute "public works" as defined in California Labor Code 1720, and are therefore subject to payment of prevailing wages, compliance monitoring and enforcement by the Department of Industrial Relations (DIR).

The Director of the DIR has established the general prevailing rate of per diem wages for each craft, classification, type of worker, or mechanic needed to execute public works and improvements. The current general prevailing wage rate determinations are available at www.dir.ca.gov/dlsr/pwd/index.htm. The Contractor is required to pay its agents and employees the applicable, current prevailing wage rate and is responsible for selecting the classification of workers required to perform this service.

The Contractor agrees to comply with the provisions of Section 1775 of the California Labor Code relating to the payment of prevailing wages, the utilization of apprentices in accordance to LC 1777.5, and the assessment of penalties determined by the California Labor Commissioner. Pursuant to Section 1773.2 of the California Labor Code, copies of the prevailing rate of per diem wages are on file at the Los Angeles County Public Works, Construction Division, and will be made available for inspection by request to the Contract Analyst. Future effective wage rates will be on file with the Department of Industrial Relations. The new wage rates shall become effective on the day following the expiration date of the current determinations and apply to the Contract in the same manner as if they had been included or referenced in the Contract.

b. Work Records

The Contractor shall comply with the requirements of Section 1812 of the Labor Code. The Contractor shall maintain an accurate written record of all employees working on the project each calendar day. The record shall include each employee's name, Social Security number, job classification, and the actual number of hours worked.

c. Posting of Notices

The Contractor shall comply with the provisions of Section 1773.2 of the Labor Code. The Contractor shall post a copy of the prevailing wage rates at the worksite and comply with applicable law including posting of jobsite notices required by 8 California Code Reg. §16451(d):

*"This public works project is subject to monitoring and investigative activities by the Compliance Monitoring Unit (CMU) of the Division of Labor Standards*



SAMPLE

*Enforcement, Department of Industrial Relations, State of California. This Notice is intended to provide information to all workers employed in the execution of the Contract for public work and to all contractors and other persons having access to the jobsite to enable the CMU to ensure compliance with and enforcement of prevailing wage laws on public works projects.*

*The prevailing wage laws require that all workers be paid at least the minimum hourly wage as determined by the Director of Industrial Relations for the specific classification (or type of work) performed by workers on the project. These rates are listed on a separate jobsite posting of minimum prevailing rates required to be maintained by the public entity, which awarded the public works Contract. Complaints concerning nonpayment of the required minimum wage rates to workers on this project may be filed with the CMU at any office of the Division of Labor Standards Enforcement (DLSE).*

*Local Office Telephone Number:*

*Division of Labor Standards Enforcement Office*
*320 West Fourth Street, Suite 450*
*Los Angeles, CA 90013*
*(213) 620-6330*

*Complaints should be filed in writing immediately upon discovery of any violations of the prevailing wage laws due to the short period of time following the completion of the project that the CMU may take legal action against those responsible.*

*Complaints should contain details about the violations alleged (for example, wrong rate paid, not all hours paid, overtime rate not paid for hours worked in excess of 8 hours per day or 40 hours per week, etc.) as well as the name of the employer, the public entity which awarded the public works Contract, and the location and name of the project.*

*For general information concerning the prevailing wage laws and how to file a complaint concerning any violation of these prevailing wage laws, you may contact any DLSE office. Complaint forms are also available at the Department of Industrial Relations website found at* http://www.dir.ca.gov/Public-Works/PublicWorks.html*."*

d. Certified Payroll Records

SAMPLE

The Contractor shall comply with the requirements of Section 1776 of the Labor Code. Contractor and Subcontractors, if any, must furnish certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement) in a format prescribed by the Labor Commissioner.

e. When requested by the County, electronic certified payroll records must be submitted to the County, through an online system designated by the County.

8. Mental Health Services for Critical Incidents

In the event of a serious accident on the Project site, the Los Angeles County Department of Mental Health (DMH) will, if requested, respond. The response may be within a few hours or as long as a few days after the incident, depending on when the request was made. The services DMH will provide include crisis intervention, normalization of the stress response that survivors may be experiencing, stress management techniques and resources if the stress reactions increase in frequency or intensity. Requests for services may be made by calling the DMH Emergency Outreach Bureau Deputy Director, (213) 738-4924, during normal business hours or the ACCESS Center, (800) 854-7771, evenings, holidays, and weekends.

9. Employment Eligibility Verification

Contractor warrants that it fully complies with all Federal statutes and regulations regarding employment of aliens and others, and that all its employees performing services hereunder meet the citizenship or alien status requirements contained in Federal statutes and regulations. Contractor shall obtain, from all covered employees performing services hereunder, all verifications and other documentation of employment eligibility status required by Federal statutes and regulations as they currently exist and as they may be hereafter amended. Contractor shall retain such documentation for all covered employees for the period prescribed by law. Contractor shall indemnify, defend, and hold harmless County, its officers, and employees from employer sanctions and any other liability which may be assessed against Contractor or County in connection with any alleged violation of Federal statutes or regulations pertaining to the eligibility for employment of persons performing services under this Agreement.

10. Contractor Responsibility and Debarment

a. A responsible Contractor is a Contractor who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity, and experience to satisfactorily perform the Contract. It is the County's policy to conduct business only with responsible contractors.



SAMPLE

b. The Contractor is hereby notified that, in accordance with Chapter 2.202 of the County Code, if the County acquires information concerning the performance of the Contractor on this or other Contracts which indicates that the Contractor is not responsible, the County may, in addition to other remedies provided in the Contract, debar the Contractor from bidding or proposing on, or being awarded, and/or performing work on County Contracts for a specified period of time, which generally will not exceed five years but may exceed five years or be permanent if warranted by the circumstances, and terminate any or all existing Contracts the Contractor may have with the County.

c. The County may debar a Contractor if the Board of Supervisors finds, in its discretion, that the Contractor has done any of the following: (1) violated a term of a Contract with the County or a nonprofit corporation created by the County; (2) committed an act or omission which negatively reflects on the Contractor's quality, fitness or capacity to perform a Contract with the County, any other public entity, or a nonprofit corporation created by the County, or engaged in a pattern or practice which negatively reflects on same; (3) committed an act or offense which indicates a lack of business integrity or business honesty, or (4) made or submitted a false claim against the County or any other public entity.

d. If there is evidence that the Contractor may be subject to debarment, the Department will notify the Contractor in writing of the evidence which is the basis for the proposed debarment and will advise the Contractor of the scheduled date for a debarment hearing before the Contractor Hearing Board.

e. The Contractor Hearing Board will conduct a hearing where evidence on the proposed debarment is presented. The Contractor and/or the Contractor's representative shall be given an opportunity to submit evidence at that hearing. After the hearing, the Contractor Hearing Board shall prepare a tentative proposed decision, which shall contain a recommendation regarding whether the Contractor should be debarred, and, if so, the appropriate length of time of the debarment. The Contractor and the Department shall be provided an opportunity to object to the tentative proposed decision prior to its presentation to the Board of Supervisors.

f. After consideration of any objections, or if no objections are submitted, a record of the hearing, the proposed decision and any other recommendation of the Contractor Hearing Board shall be presented to the



SAMPLE

Board of Supervisors. The Board of Supervisors shall have the right to modify, deny or adopt the proposed decision and recommendation of the Hearing Board.

g. If the Contractor has been debarred for a period longer than five years, that Contractor may, after the debarment has been in effect for at least five years, submit a written request for review of the debarment determination to reduce the period of debarment or terminate the debarment. The County may, in its discretion, reduce the period of debarment or terminate the debarment if it finds that the Contractor has adequately demonstrated one or more of the following: (1) elimination of the grounds for which the debarment was imposed; (2) a bona fide change in ownership or management; (3) material evidence discovered after debarment was imposed; or (4) any other reason that is in the best interests of the County.

h. The Contractor Hearing Board will consider a request for review of a debarment determination only where (1) the Contractor has been debarred for a period longer than five years; (2) the debarment has been in effect for at least five years; and (3) the request is in writing, states one or more of the grounds for reduction of the debarment period or termination of the debarment and includes supporting documentation. Upon receiving an appropriate request, the Contractor Hearing Board will provide notice of the hearing on the request. At the hearing, the Contractor Hearing Board shall conduct a hearing where evidence on the proposed reduction of debarment period or termination of debarment is presented. This hearing shall be conducted and the request for review decided by the Contractor Hearing Board pursuant to the same procedures as for a debarment hearing.
The Contractor Hearing Board's proposed decision shall contain a recommendation on the request to reduce the period of debarment or terminate the debarment. <u>The Contractor Hearing Board shall present its proposed decision and recommendation to the Board of Supervisors. The Board of Supervisors shall have the right to modify, deny, or adopt the proposed decision and recommendation of the Contractor Hearing Board.</u>

i. These terms shall also apply to subcontractors of County Contractors.

11. <u>Compliance with Jury Service Program</u>

This Contract is subject to provisions of the County's ordinance entitled Contractor Employee Jury Service (Jury Service Program) as codified in Sections 2.203.010 through 2.203.090 of the Los Angeles County Code.

a. Unless Contractor has demonstrated to the County's satisfaction either that



SAMPLE

Contractor is not a Contractor as defined under the Jury Service Program (Section 2.203.020 of the County Code) or that Contractor qualifies for an exception to the Jury Service Program (Section 2.203.070 of the County Code), Contractor shall have and adhere to a written policy that provides that its employees shall receive from the Contractor, on an annual basis, no less than five days of regular pay for actual jury service. The policy may provide that Employees deposit any fees received for such jury service with the Contractor or that the Contractor deduct from the employee's regular pay the fees received for jury service.

b. For purposes of this Section, Contractor means a person, partnership, corporation or other entity which has a Contract with the County or a subcontract with a County contractor and has received or will receive an aggregate sum of $50,000 or more in any 12-month period under one or more County Contracts or Subcontracts. Employee means any California resident who is a full-time employee of Contractor. Full-time means 40 hours or more worked per week, or a lesser number of hours if: (1) the lesser number is a recognized industry standard as determined by the County, or (2) Contractor has a long-standing practice that defines the lesser number of hours as full-time. Full-time employees providing short-term, temporary services of 90 days or less within a 12-month period are not considered full-time for purposes of the Jury Service Program. If Contractor uses any subcontractor to perform services for the County under the Contract, the subcontractor shall also be subject to the provisions of this Section. The provisions of this Section shall be inserted into any such subcontract Agreement and a copy of the Jury Service Program shall be attached to the Agreement.

c. If Contractor is not required to comply with the Jury Service Program when the Contract commences, Contractor shall have a continuing obligation to review the applicability of its exception status from the Jury Service Program, and Contractor shall immediately notify County if Contractor at any time either comes within the Jury Service Program's definition of Contractor or if Contractor no longer qualifies for an exception to the Program. In either event, Contractor shall immediately implement a written policy consistent with the Jury Service Program. The County may also require, at any time during the Contract and at its sole discretion, that Contractor demonstrate to the County's satisfaction that Contractor either continues to remain outside the Jury Service Program's definition of Contractor and/or that Contractor continues to qualify for an exception to the Program.

d. Contractor's violation of this Section of the Contract may constitute a material breach of the Contract. In the event of such material breach, County may, in

its sole discretion, terminate the Contractor and/or bar Contractor from the award of future County Contracts for a period of time consistent with the seriousness of the breach.

12. No Payment for Services Provided Following Expiration/Termination of Agreement

Contractor shall have no claim against County for payment for any money or reimbursement, of any kind whatsoever, for any service provided by Contractor after the expiration or other termination of this Agreement. Should Contractor receive any such payment it shall immediately notify County and shall immediately repay all such funds to County. Payment by County for services rendered after expiration/termination of this Agreement shall not constitute a waiver of County's right to recover such payment from Contractor. This provision shall survive the expiration or other termination of this Agreement.

13. Notice to Employees Regarding the Safely Surrendered Baby Law

a. The Contractor shall notify and provide to its employees and shall require each subcontractor to notify and provide to its employees, a fact sheet regarding the Safely Surrendered Baby Law, its implementation in the County of Los Angeles, and where and how to safely surrender a baby. The fact sheet is available on the Internet at www.babysafela.org for printing purposes.

b. The Contractor acknowledges that the County places a high priority on the implementation of the Safely Surrendered Baby Law. The Contractor understands that it is the County's policy to encourage all County Contractors to voluntarily post the County's Safely Surrendered Baby Law in a prominent position at the Contractor's place of business. The Contractor will also encourage its Subcontractors, if any, to post this poster in a prominent position in the Subcontractor's place of business. The County's Department of Children and Family Services will supply the Contractor with the poster to be used.

14. Assignment by Contractor/Mergers or Acquisitions

a. The Contractor shall notify the County of any pending acquisitions/mergers of its company unless otherwise legally prohibited from doing so. If the Contractor is restricted from legally notifying the County of pending acquisitions/mergers, then it should notify the County of the actual acquisitions/mergers as soon as the law allows and provide to the County the legal framework that restricted it from notifying the County prior to the actual acquisitions/mergers.

SAMPLE

b. The Contractor shall not assign, exchange, transfer, or delegate its rights or duties under this Contract, whether in whole or in part, without the prior written consent of County, in its discretion, and any attempted assignment, delegation, or otherwise transfer of its rights or duties, without such consent shall be null and void. For purposes of this sub-paragraph, County consent shall require a written amendment to the Contract, which is formally approved and executed by the parties. Any payments by the County to any approved delegate or assignee on any claim under this Contract shall be deductible, at County's sole discretion, against the claims, which the Contractor may have against the County.

c. Any assumption, assignment, delegation, or takeover of any of the Contractor's duties, responsibilities, obligations, or performance of same by any person or entity other than the Contractor, whether through assignment, subcontract, delegation, merger, buyout, or any other mechanism, with or without consideration for any reason whatsoever without County's express prior written approval, shall be a material breach of the Contract which may result in the termination of this Contract. In the event of such termination, County shall be entitled to pursue the same remedies against Contractor as it could pursue in the event of default by Contractor.

15. Contractor's Warranty of Compliance with County's Defaulted Property Tax Reduction Program

Contractor acknowledges that County has established a goal of ensuring that all individuals and businesses that benefit financially from County through contract are current in paying their property tax obligations (secured and unsecured roll) in order to mitigate the economic burden otherwise imposed upon County and its taxpayers.

Unless contractor qualifies for an exemption or exclusion, contractor warrants and certifies that to the best of its knowledge it is now in compliance, and during the term of this contract will maintain compliance, with Los Angeles County Code Chapter. 2.206.

16. Termination for Breach of Warranty to Maintain Compliance with County's Defaulted Property Tax Reduction Program

Failure of contractor to maintain compliance with the requirements set forth in Article X "Contractor's Warranty of Compliance with County's Defaulted Property Tax Reduction Program" shall constitute default under this contract. Without limiting the rights and remedies available to County under any other provision of this contract, failure of contractor to cure such default within 10 days of notice shall be grounds upon which County may terminate this contract and/or pursue debarment of contractor, pursuant to County Code Chapter 2.206.

17. Time Off for Voting

The Contractor shall notify its employees and shall require each subcontractor to notify and provide to its employees, information regarding the time off for voting law (Elections Code Section 14000). Not less than 10 days before every statewide election, every Contractor and Subcontractors shall keep posted conspicuously at the place of work, if practicable, or elsewhere where it can be seen as employees come or go to their place of work, a notice setting forth the provisions of Section 14000.

18. Contractor CARD Track/Monitoring Database

The County maintains the Contractor Alert Reporting Database (CARD), which is used to track/monitor poorly performing contractors. When a County department identifies a significant performance/non-compliance issue(s) with a contractor, the department will provide notice to the contractor and will give the contractor an opportunity to correct the issue(s). If the contractor does not take any appropriate steps to correct the issue(s), the County department will enter the contractor, along with any other relevant information pertaining to the contractor's performance issue(s), into CARD.

The information entered into CARD can be accessed by all County departments, and will be used, along with any other relevant information not included in CARD, in determining bidder responsibility. If a department reviews this information and determines that a finding of non-responsibility should be pursued, the department will adhere to the guidelines specified in the Los Angeles County Code Chapter 2.202, and the County's implementation Procedures for Determinations of Contractor Non-Responsibility and Contractor Debarment.

The County maintains databases that track/monitor contractor performance history. Information entered into such databases may be used for a variety of purposes, including determining whether a bidder is responsible for the purposes of a future County contract.

19. Contractor Independence/**Prohibition from Participation in Future Solicitation(s)**

**The County Board of Supervisors has adopted a countywide policy that prohibits any person, or any firm [collectively "firm"] or any subsidiary of a firm from submitting a bid or proposal in any County solicitation process where the person or firm, assisted in the development of the solicitation document(s).**

**A Proposer, or a Contractor or its subsidiary or Subcontractor ("Proposer/Contractor"), is prohibited from submitting a bid or proposal in a County solicitation if the Proposer/Contractor has provided advice or consultation for the solicitation. A Proposer/Contractor is also prohibited from submitting a bid or proposal in a County solicitation if the Proposer/Contractor has developed or prepared any of the solicitation materials on behalf of the County. A violation of this provision shall result in the disqualification of the Contractor/Proposer from participation in the County solicitation or the termination or cancellation of any resultant County Contract. This provision shall survive the expiration, or other termination of this Agreement.**

20. Background and Security Investigations

20.1 Each of Contractor's staff performing services under this Contract, who is in a designated sensitive position, as determined by County in County's sole discretion, shall undergo and pass a background investigation to the satisfaction of County as a condition of beginning and continuing to perform services under this Contract. Such background investigation must be obtained through fingerprints submitted to the California Department of Justice to include State, local, and federal-level review, which may include, but shall not be limited to, criminal conviction information. The fees associated with the background investigation shall be at the expense of the Contractor, regardless of whether the member of Contractor's staff passes or fails the background investigation.

20.2 If a member of Contractor's staff does not pass the background investigation, County may request that the member of Contractor's staff be removed immediately from performing services under the Contract. Contractor shall comply with County's request at any time during the term of the Contract. County will not provide to Contractor or to Contractor's staff any information obtained through the County's background investigation.

20.3 County, in its sole discretion, may immediately deny or terminate facility access to any member of Contractor's staff that does not pass such investigation to the satisfaction of the County or whose background or conduct is incompatible with County facility access.

20.4 Disqualification of any member of Contractor's staff pursuant to this Paragraph shall not relieve Contractor of its obligation to complete all work in accordance with the terms and conditions of this Contract.

SAMPLE

21. Local Small Business Enterprise/Social Enterprise/Disabled Veterans Business Enterprise Utilization

Local Small Business Enterprise means a business that is certified by the County of Los Angeles as a Local Small Business Enterprise (Local SBE), consistent with Chapter 2.204 of the Los Angeles County Code.

21.1 When requested by the County, the contractor shall provide to the County via methods specified by the County, such as submission of electronic live (or dynamic) data on invoices for the prime and all Subcontractors using County-designated third party software system or to a County approved website, or other means of submitting expenditure information on Subcontractors, including but not limited to the following information: the name, business address, California Contractor License number and telephone number/email address of each subcontractor who will perform work or labor for the contractor on the Project in an amount in excess of one-half of 1 percent of the Contractor's total bid. In addition, the Contractor shall be required to provide each of the specified Subcontractors' Local SBE status (i.e., whether any of the listed Subcontractors are Local SBE's), Social Enterprise status, and Disabled Veterans Business Enterprise status and the proposed monetary amount of the work the subcontractor will perform on the Project. In addition, at the time of submittal of the final invoice, the Contractor shall indicate, via methods specified by the County, the actual dollar amounts paid to each listed Subcontractor who performed work on the project.

21.2 Contractor's failure to comply with the provisions of this Article is a material breach of the Agreement. The parties agree that it will be impracticable or extremely difficult to fix the extent of actual damages resulting from the failure to the Contractor to comply with this Article. The parties agree that under the current circumstances a reasonable estimate of such damages is specified in the Schedule for Liquidated Damages for Local Small Business Enterprise Utilization hereunder, and that the Contractor shall be liable to the County for said amounts.

If in the judgment of the Director, or his/her designee, the Contractor is deemed to be in non-compliance with the terms and obligations assumed hereby, the Director or his/her designee, at his/her option, in addition to, or in lieu of, other remedies provided herein in this Agreement, may deduct and withhold liquidated damages from County's final payment to the Contractor as follows:

SAMPLE

SCHEDULE FOR LIQUIDATED DAMAGES FOR LOCAL SMALL BUSINESS ENTERPRISE/SOCIAL ENTERPRISE/DISABLED VETERANS BUSINESS ENTERPRISE UTILIZATION

| Final Invoice Price | Liquidated Damages |
|---|---|
| Up to $100,000 | $50.00 plus 0.1% of contract amount |
| $100,001 to $500,000 | $150.00 plus 0.07% of all over 100,000 |
| Over $500,000 | $430.00 plus 0.05% of all over $500,000 |

22. Compliance with County's Zero Tolerance Human Trafficking

Contractor acknowledges that the County has established a Zero Tolerance Human Trafficking Policy prohibiting Contractors from engaging in human trafficking.

If a Contractor or member of Contractor's staff is convicted of a human trafficking offense, the County shall require that the Contractor or member of Contractor's staff be removed immediately from performing services under the Contract. County will not be under any obligation to disclose confidential information regarding the offenses other than those required by law.

Disqualification of any member of Contractor's staff pursuant to this paragraph shall not relieve Contractor of its obligation to complete all work in accordance with the terms and conditions of this Contract.

23. Claims

Notwithstanding Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, Section 9204 of the Public Contract Code shall apply to any claim by the Contractor in connection with the Project.

a. Upon receipt of a claim pursuant to Section 9204 of the Public Contract Code, the County will conduct a reasonable review of the claim and, within a period not to exceed 45 Days, provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, the Contractor and the County may, by mutual agreement, extend the aforementioned time period.

b. The Contractor shall furnish reasonable documentation to support the claim.

c. If Board approval is needed to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the Board does not meet within the 45 Days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the County will have up to 3 Days

following the next duly publicly noticed meeting of the Board after the 45-Day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

d. Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the County issues its written statement. If the County fails to issue a written statement, paragraph (j) shall apply.

e. If the Contractor disputes the County's written response, or if the County fails to respond to a claim issued pursuant to Section 9204 within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the County will schedule a meet and confer conference within 30 Days for settlement of the dispute.

f. Within 10 business days (Monday-Thursday) following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the County will provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 Days after the County issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the County and the Contractor sharing the associated costs equally. The County and the Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside those established in Section 9204.

g. Mediation shall include any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in Section 9204.

h. Unless otherwise agreed to by the County and the Contractor in writing, the mediation conducted pursuant to Section 9204 shall excuse any further

obligation under Section 20104.4 to mediate after litigation has been commenced.

i. Section 9204 does not preclude the County from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under Section 9204 does not resolve the parties' dispute.

j. Failure by the County to respond to a claim from the Contractor within the time periods described in this subdivision or to otherwise meet the time requirements of Section 9204 shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the County's failure to have responded to a claim, or its failure to otherwise meet the time requirements of Section 9204, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

k. Amounts not paid in a timely manner as required by Section 9204 will bear interest at 7 percent per annum.

l. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a claim against the County because privity of the Contract does not exist, the Contractor may present to the County a claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on its own behalf or on behalf of a lower tier Subcontractor, that the Contractor present a claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the claim be presented to the County shall furnish reasonable documentation to support the claim. Within 45 Days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the claim to the County and, if the original Contractor did not present the claim, provide the Subcontractor with a statement of the reasons for not having done so.

m. A waiver of the rights granted by Section 9204 is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the Contractor and the County may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) the County may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of Section 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in Section 9204.

24. Compliance with Fair Chance Employment Practices

Contractor, and its subcontractors, must comply with fair chance employment hiring practices set forth in California Government Code Section 12952. Contractor's violation of this paragraph of the Contract may constitute a material breach of the Contract. In the event of such material breach, County may, in its sole discretion, terminate the Contract.

25. Default Method of Payment: Direct Deposit or Electronic Funds Transfer

25.1 The County, at its sole discretion, has determined that the most efficient and secure default form of payment for goods and/or services provided under an agreement/ contract with the County shall be Electronic Funds Transfer (EFT) or direct deposit, unless an alternative method of payment is deemed appropriate by the Auditor-Controller (A-C).

25.2 The Contractor shall submit a direct deposit authorization request via the website https://directdeposit.lacounty.gov with banking and vendor information, and any other information that the A-C determines is reasonably necessary to process the payment and comply with all accounting, record keeping, and tax reporting requirements.

25.3 Any provision of law, grant, or funding agreement requiring a specific form or method of payment other than EFT or direct deposit shall supersede this requirement with respect to those payments.

25.4 At any time during the duration of the agreement/contract, a Contractor may submit a written request for an exemption to this requirement. Such request must be based on specific legal, business or operational needs and explain why the payment method designated by the A-C is not feasible and an alternative is necessary. The A-C, in consultation with the contracting department(s), shall decide whether to approve exemption requests.

26. Disallowed Cost

If Proposer's compliance with a County contract has been reviewed by the A-C within the last 10 years, Proposer must not have unresolved questioned costs identified by the A-C, in an amount over $100,000.00, that are confirmed to be disallowed costs by the contracting County department, and remain unpaid for six months or more from the date of disallowance, unless such disallowed costs are the subject of current good faith negotiations to resolve the disallowed costs, in the opinion of the County.



SAMPLE

27. Compliance with the County Policy of Equity

The consultant acknowledges that the County takes its commitment to preserving the dignity and professionalism of the workplace very seriously, as set forth in the County Policy of Equity (CPOE) (https://ceop.lacounty.gov/). The contractor further acknowledges that the County strives to provide a workplace free from discrimination, harassment, retaliation and inappropriate conduct based on a protected characteristic, and which may violate the CPOE. The contractor, its employees and subcontractors acknowledge and certify receipt and understanding of the CPOE. Failure of the Contractor, its employees or its Subcontractors to uphold the County's expectations of a workplace free from harassment and discrimination, including inappropriate conduct based on a protected characteristic, may subject the contractor to termination of contractual agreements as well as civil liability.

28. Integrated Pest Management Program Compliance

Contractor acknowledges that County has established an Integrated Pest Management Program (the Program) which aims to reduce or eliminate pollutants moved into surface water through storm water management systems and facilities. Contractor certifies compliance on Integrated Pest Management Program Compliance Certification in Required Forms, that contractor has reviewed, understands, and will adhere to the County's IPM Program requirements as set forth in Integrated Pest Management Program Compliance and at: www.lacountyipm.org

Contractor must ensure and certify that its employees who apply pesticides on County owned or maintained property are appropriately trained. The training, which must be conducted on an annual basis, but no later than June 30th of each calendar year, must meet the County's minimum requirements under the Program.

Employee training may be self-certified by Contractors, provided the County has the ability to audit the training, and must include, at a minimum, the following:

- The potential for pesticide-related surface water toxicity;
- Proper use, handling, and disposal of pesticides;
- Least toxic methods of pest prevention and control, including IPM; and
- Reduction of pesticide use.

All users of commercial pesticides are required by State law to provide a monthly pesticide report to the Los Angeles County Department of Agricultural Commissioner/ Weights and Measures (ACWM). In addition to the



SAMPLE

mandatory monthly reporting requirement, Contractor shall provide to the Department, with a copy to the ACWM, an annual summary of the pesticides used outdoors on County-owned or maintained property by Fiscal Year (July 1 to June 30). For each pesticide, the summary shall include all of the following:

- Product trade name
- Active ingredient(s)
- EPA Registration Number
- Total amount used

The units reported shall be appropriate to the product (gallons, ounces, pounds, etc.).

29. Termination for Improper Consideration

County may, by written notice to Contractor, immediately terminate the right of Contractor to proceed under this Agreement if it is found that consideration, in any form, was offered or given by Contractor, either directly or through an intermediary, to any County officer, employee, or agent with the intent of securing the Agreement or securing favorable treatment with respect to the award, amendment, or extension of the Agreement or the making of any determinations with respect to Contractor's performance pursuant to the agreement. In the event of such termination, County shall be entitled to pursue the same remedies against Contractor as it could pursue in the event of default by Contractor.

Contractor shall immediately report any attempt by a County officer or employee to solicit such improper consideration. The report shall be made either to County manager charged with the supervision of the employee or to County A-C's Employee Fraud Hotline at (213) 974-0914 or (800) 544-6861.

Among other items, such improper consideration may take the form of cash, discounts, service, the provision of travel or entertainment, or tangible gifts.

30. Gratuities

Contractor is advised that it is improper for any County officer, employee, or agent to solicit consideration, in any form, from Contractor with the implication, suggestion, or statement that Contractor's provision of the consideration, or failure to provide consideration, may cause favorable or unfavorable treatment, respectively, for the Contractor relating to the amendment or extension of the Contract or the making of any determinations with respect to Contractor's performance under this Contract. A Contractor shall not offer or give, either directly or through an intermediary, such



SAMPLE

improper consideration, in any form, to a County officer, employee, or agent for the purpose of securing favorable treatment as described herein.

A Contractor shall immediately report any attempt by a County officer, employee, or agent to solicit such improper consideration. The report shall be made either to the County manager charged with the supervision of the employee or to the County Auditor-Controller's Employee Fraud Hotline at (800) 544-6861.

Among other items, such improper consideration may take the form of cash; discounts; services; and the provision of travel, entertainment, or tangible gifts.

Note that Contractor's failure to adhere to this requirement could subject this Contract to Termination for Improper Consideration paragraph in this Agreement.

31. Facsimile/Electronic Representations

The County and the Contractor hereby agree to regard facsimile/electronic representations of original signatures of authorized officers of each party, when appearing in appropriate places on the Agreement, Change Orders and amendments prepared, and received via communications facilities, as legally sufficient evidence that such original signatures have been affixed to amendments to this Contract, such that the parties need not follow up facsimile/electronic transmissions of such documents with subsequent (non-facsimile/electronic) transmission of “original” versions of such documents. Electronic signatures include facsimile or e-mail electronic signatures. Each executed counterpart shall be deemed an original. All counterparts, taken together, constitute the executed Agreement. The parties hereby acknowledge and agree that electronic records and electronic signatures, as well as facsimile signatures, used in connection with the execution of this Agreement and electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called pdf format shall be legal and binding and shall have the same full force and effect as if a paper original of this Agreement had been delivered had been signed using a handwritten signature. Contractor and County (i) agree that an electronic signature, whether digital or encrypted, of a party to this Agreement is intended to authenticate this writing and to have the same force and effect as a manual signature, (ii) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent or delivered by facsimile or, electronic mail, or other electronic means, (iii) are aware that the other party will rely on such signatures, and (iv) hereby waive any defenses to the enforcement of the terms of this Agreement based on the foregoing forms of signature. If this Agreement has been executed by electronic signature, all parties executing this document are expressly consenting under the United States Federal Electronic Signatures in Global and National Commerce Act of 2000 ("E-SIGN") and California Uniform Electronic Transactions Act ("UETA")(Cal. Civ. Code § 1633.1,



SAMPLE

et seq.), that a signature by fax, e-mail or other electronic means shall constitute an Electronic Signature to an Electronic Record under both E-SIGN and UETA with respect to this specific transaction.

32. Advertising and Other External Communications About the Project

Consultant/Contractor shall obtain the County's prior written approval before disclosing or communicating any information concerning the award of the contract, the progress of the work, or the completion of the work, to any non-party, including but not limited to outside media and news organizations. This requirement includes, but is not limited to: (1) a Consultant/Contractor's, application for an award or any other recognition of the project; and (2) any advertising or promotion of the project and/or the Consultant/Contractor's role on the project. The County retains the sole discretion as to the release of such information, including the right to deny the request for disclosure, the right to direct the timing of the disclosure, and/or the right to direct Consultant/Contractor to make revisions to the information prior to disclosure.

33. COVID-19 Requirement for County Contractor Personnel

When applicable and required by the County, the Contractor shall comply with all other applicable local, departmental, State, and federal laws, regulations, and requirements for COVID-19.

***CONTRACT ANALYSTS: IF YOUR PROJECT IS FOR DHS AND DPH, REFER TO ERAYNA CHANG'S EMAIL ON 12/20/21 WITH 1) SPECIAL LANGUAGE 2) PDF OF GUIDANCE FOR COVID-19 VACCINE, BADGING AND ACCESS FOR ISD & DPW CONTRACTORS CONDUCTING WORK AT DHS FACILITIES AND 3) PDF ATTESTATION & MEMORANDUM OF UNDERSTANDING MAINTENANCE OF COVID-19 VACCINATION RECORDS.***

33. COVID-19 Vaccinations of County Contractor Personnel

1. At Contractor's sole cost, Contractor shall comply with Chapter 2.212 (COVID-19 Vaccinations of County Contractor Personnel) of County Code Title 2 - Administration, Division 4. All employees of Contractor and persons working on its behalf, including but not limited to, Subcontractors of any tier (collectively, "Contractor Personnel"), must be fully vaccinated against the novel coronavirus 2019 ("COVID-19") prior to (1) interacting in person with County employees, interns, volunteers, and commissioners ("County workforce members"), (2) working on County owned or controlled property while performing services under this Contract,



SAMPLE

and/or (3) coming into contact with the public while performing services under this Contract (collectively, “In-Person Services”).

2. Contractor Personnel are considered “fully vaccinated” against COVID-19 two (2) weeks or more after they have received (1) the second dose in a 2-dose COVID-19 vaccine series (e.g. Pfizer-BioNTech or Moderna), (2) a single-dose COVID-19 vaccine (e.g. Johnson and Johnson [J&J]/Janssen), or (3) the final dose of any COVID-19 vaccine authorized by the World Health Organization ("WHO").

3. Prior to assigning Contractor Personnel to perform In-Person Services, Contractor shall obtain proof that such Contractor Personnel have been fully vaccinated by confirming Contractor Personnel is vaccinated through any of the following documentation: (1) official COVID-19 Vaccination Record Card (issued by the Department of Health and Human Services, CDC or WHO Yellow Card), which includes the name of the person vaccinated, type of vaccine provided, and date of the last dose administered ("Vaccination Record Card"); (2) copy (including a photographic copy) of a Vaccination Record Card; (3) Documentation of vaccination from a licensed medical provider; (4) a digital record that includes a quick response ("QR") code that when scanned by a SMART HealthCard reader displays to the reader client name, date of birth, vaccine dates, and vaccine type, and the QR code confirms the vaccine record as an official record of the State of California; or (5) documentation of vaccination from Contractors who follow the CDPH vaccination records guidelines and standards. Contractor shall also provide written notice to County before the start of work under this Contract that its Contractor Personnel are in compliance with the requirements of this section. Contractor shall retain such proof of vaccination for the document retention period set forth in this Contract, and must provide such records to the County for audit purposes, when required by County.

4. Contractor shall evaluate any medical or sincerely held religious exemption request of its Contractor Personnel, as required by law. If Contractor has determined that Contractor Personnel is exempt pursuant to a medical or sincerely held religious reason, the Contractor must also maintain records of the Contractor Personnel’s testing results. The Contractor must provide such records to the County for audit purposes, when required by County. The unvaccinated exempt Contractor Personnel must meet the following requirements prior to (1) interacting in person with County workforce members, (2) working on County owned or controlled

SAMPLE

property while performing services under this Contract, and/or (3) coming into contact with the public while performing services under this Contract:

a. Test for COVID-19 with either a polymerase chain reaction (PCR) or antigen test has an Emergency Use Authorization (EUA) by the FDA or is operating per the Laboratory Developed Test requirements by the U.S. Centers for Medicare and Medicaid Services. Testing must occur at least weekly, or more frequently as required by County or other applicable law, regulation or order.

b. Wear a mask that is consistent with CDC recommendations at all times while on County controlled or owned property, and while engaging with members of the public and County workforce members.

c. Engage in proper physical distancing, as determined by the applicable County department that the Contract is with.

5. In addition to complying with the requirements of this section, Contractor shall also comply with all other applicable local, departmental, State, and federal laws, regulations and requirements for COVID-19. A completed Exhibit C (COVID-19 Vaccination Certification of Compliance) is a required part of any agreement with the County.

(INCLUDE ONLY **IF APPLICABLE**-CHECK WITH YOUR SUPERVISOR)

34. Countywide Community Workforce Agreement

On February 28, 2023, the County Board of Supervisors authorized the County to execute the Countywide Community Workforce Agreement (CWA) with the Los Angeles/Orange Counties Building and Construction Trades Council and its respective unions, attached as Exhibit XXX of this agreement. Pursuant to the Board's direction and executed Countywide CWA, Countywide CWA will apply to this Project. The Contractor shall comply with all terms therein and shall be bound by the terms and conditions of the Countywide CWA applicable to the contractors for all Work on the Project for the entire duration of the Project. Countywide CWA shall be deemed incorporated in full into this agreement including, but not limited to, the provisions regarding the hiring of workers for the Project by the Contractor and all of its subcontractors of all tiers. Contractor shall execute and return to the County the Letter of Assent, attached to the Countywide CWA as Attachment A, at the time of contract execution and shall cause each of its subcontractors of all tiers to also execute and return to the County a copy of the Letter of Assent.



SAMPLE

35. **Campaign Contribution Prohibition Following Final Decision in Contract Proceeding**

Pursuant to Government Code Section 84308, Contractor and its Subcontractors, are prohibited from making a contribution of more than $250 to a County officer for twelve (12) months after the date of the final decision in the proceeding involving this Contract. Failure to comply with the provisions of Government Code Section 84308 and of this paragraph, may be a material breach of this Contract as determined in the sole discretion of the County.

SAMPLE

36. Federally Funded Work

This provision will apply when federally funded or potentially federally funded work is needed by County. In accordance with Federal Executive Order 12549 and 12689 (Debarment and Suspension), individuals or entities that have been debarred by the Federal government may not receive work under this Contract as a Contractor or Subcontractor. Contractors and/or Subcontractors listed on the governmental exclusions in the System for Award Management (SAM) are not eligible to receive federally funded work under this contract. See Office of Management and Budget guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension". The SAM exclusions contains the names of parties debarred, suspended, or otherwise excluded by Federal agencies as well as parties declared ineligible under statutory or regulatory authority.

For federally funded work, the Project Manager will, before assigning work or Notice to Proceed to the Contractor, verify that the Contractor is not listed on the governmental exclusions in the SAM as a party excluded or ineligible by Federal agencies to participate in federally funded projects. For your reference, a List of Debarred Contractors by U.S. Department of Labor's (DOL) Office of Federal Contract Compliance Programs (OFCCP) may be obtained by going to the following website: https://sam.gov/content/home.

If the Contractor is listed on the governmental exclusions in the SAM as a party excluded or ineligible by Federal agencies to participate in federally funded projects, then said Contractor will not be offered the work. The Project Manager will notify the Contractor of their negative standing in the SAM. The Project Manager will also notify the Contractor of their ineligibility to receive any federally funded work under this contract, until the Contractor is able to satisfactorily correct the issue. The Contractor shall notify the Project Manager when the Contractor has corrected their negative standing in the SAM, and the Contractor is no longer listed on the governmental exclusions in the SAM.

If the Contractor is not listed on the governmental exclusions in the SAM as a party excluded or ineligible by Federal agencies to participate in federally funded projects, Public Works may offer said Contractor the federally funded work. In addition, if applicable, the Contractor is required to verify that its subcontractors/subconsultants are not listed on the governmental exclusions in the SAM, before assigning federally funded work to its subcontractors/subconsultants.

SAMPLE

IN WITNESS WHEREOF, the County has, by order of its Board of Supervisors, caused these presents to be subscribed by the Director of the Los Angeles County Public Works, and the Contractor has hereunto subscribed its corporate name and affixed its corporate seal by its duly authorized officers the day, month, and year herein first above written.

COUNTY OF LOS ANGELES

By_____
Deputy Director
Los Angeles County Public Works

NAME OF CONTRACTOR

By_____
President

_____
Type/Print Name

By_____
Secretary

_____
Type/Print Name

_____ _____
CLASSIFICATION LICENSE NO.
Contractor

APPROVED AS TO FORM:

DAWYN R. HARRISON
County Counsel

By_____
Senior Deputy County Counsel

_____
Type/Print Name

SAMPLE

SAMPLE

BOND FOR FAITHFUL PERFORMANCE

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Contractor, a California Corporation, as principal, and

_____

_____

(name and address)

as surety, are held and firmly bound unto the County of Los Angeles, State of California, in the sum of AMOUNT IN WORDS DOLLARS ($ amount ), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that whereas said principal has been awarded and is about to enter into the annexed Contract with the County of Los Angeles, State of California, for

PROJECT
PLACE
SPECS.

and is required by said County to give this bond in connection with the execution of said Contract.

NOW, THEREFORE, if the said principal shall well and truly do and perform all of the covenants and obligations of said Contract on its part to be done and performed at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment. The surety hereby waives notice of any change, including changes of time, to said Contract or related subcontractors, purchase orders and other obligations.

SAMPLE

WITNESS our hands this _____ day of _____, 2XXX.

NAME OF Contractor

_____
President

_____
Type/Print Name

_____
Secretary

_____
Type/Print Name

APPROVED AS TO FORM:

DAWYN R. HARRISON
County Counsel

By_____
Senior Deputy County Counsel

_____
Type/Print Name

_____
Surety

_____
Attorney-in-Fact

_____
Type/Print Name

SAMPLE

PAYMENT BOND FOR LABOR AND MATERIALS

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Contractor, a California corporation, as principal, and

_____

_____

(name and address)

as surety, are held firmly bound unto the County of Los Angeles, State of California, hereinafter referred to as the County, in the sum of AMOUNT IN WORDS DOLLARS ($XXXXXXX ) lawful money of the United States, for the payment of which sum, well and truly made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that, whereas said principal has been awarded and is about to enter into a written Contract with the County for:

PROJECT
PLACE
SPECS. NO. XXXX

which is hereto attached, made a part hereof, and to which reference is hereby made for all, and is required by said County to give this bond in connection with the execution of said Contract.

NOW, THEREFORE, if said principal, as contractor in said Contract, or principal's Subcontractor, fails to pay any of the persons referred to in Section 9100 of the Civil Code of the State of California for labor performed, skills, or other necessary services bestowed, site improvement made, equipment leased, or appliances, equipment, implements, machinery, materials, power, provender, provisions, teams, or trucks furnished or used in, upon, or about the performance of this work contracted to be done, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed by such claimant, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Contractor and Subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with Respect to such work and labor, said surety shall pay for the same in an amount not exceeding the sum specified above, and if suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond is executed pursuant to Chapter 7 of Division 3, Part 4, Title 15 of the Civil Code of the State of California, and shall inure to the benefit of any of the persons referred to in said Civil Code Section 9100, as it now exists or



SAMPLE

may hereafter be amended, so as to give a right of action to such persons or their assigns in any suit brought upon this bond. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time and it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment.

It is agreed that any alterations in the work to be done or increase or decrease of the materials to be furnished, which may be made pursuant to the terms of said Contract shall not in any way release either the principal or surety hereunder, nor shall any extensions of time granted under the provisions of said Contract release either the principal or surety, and notice of such alterations or extensions of this Contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 2XXX

NAME OF Contractor

_____
President

_____
Type/Print Name

_____
Secretary

_____
Type/Print Name

APPROVED AS TO FORM:

DAWYN R. HARRISON
County Counsel

_____
Surety

By_____
Senior Deputy County Counsel

_____
Attorney-in-Fact

_____
Type/Print Name

_____
Type/Print Name



SAMPLE

CERTIFICATION

SUBJECT: PROJECT
ADDRESS
CITY, STATE
SPECS. NO.

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.

NAME OF Contractor

_____
Contractor's Signature

_____
Print Name

_____
Date

SAMPLE

STATEMENT OF UNDERSTANDING

SUBJECT: PROJECT
ADDRESS
CITY, STATE
SPECS.

As the Contractor of the project, I have reviewed the Best Management Practices Handbooks, California Storm Water Quality Association, Menlo Park, CA and have proposed the implementation of the Best Management Practices (BMPs) applicable to effectively minimize the negative impacts of this Project's construction activities on the surrounding water quality. The selected BMPs will be installed, monitored, and maintained to ensure their effectiveness. The BMPs that I have not chosen for implementation are redundant or deemed not applicable to the proposed construction activities. If at any time, site conditions and/or the County official warrant re-evaluation and revisions of the chosen BMPs, the appropriate changes will be made without unnecessary delay. I am aware that failure to properly implement and maintain the BMPs necessary to prevent the discharge of pollutants from this project could result in significant penalties and/or delays.

NAME OF Contractor

_____
Signature

_____
Print Name

_____
Date

SAMPLE

**SECTION 00 06 10**
**BOND FOR FAITHFUL PERFORMANCE**

KNOW ALL PERSONS BY THESE PRESENTS:

That we, CONTRACTOR, a California Corporation, as principal, and _____, as surety, are held and firmly bound unto the COUNTY OF LOS ANGELES, State of California, in the sum of XXX DOLLARS ($ ), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that whereas said principal has been awarded and is about to enter into the annexed contract with the County of Los Angeles, State of California, for

PROJECT
PLACE
SPECS. NO.

SAMPLE

and is required by said County to give this bond in connection with the execution of said contract;

NOW, THEREFORE, if the said principal shall well and truly do and perform all of the covenants and obligations of said contract on its part to be done and performed at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment. The surety hereby waives notice of any change, including changes of time, to said contract or related subcontracts, purchase orders and other obligations. The surety hereby waives notice of any change, including changes of time, to said contract or related subcontractors, purchase orders and other obligations.

WITNESS our hands this _____ day of _____, 20

CONTRACTOR

_____
President

APPROVED AS TO FORM:

_____
Secretary

DAWYN R. HARRISON
County Counsel

_____
Surety

By_____
Senior Deputy County Counsel

_____
Attorney-in-Fact

**SECTION 00 06 20**
**PAYMENT BOND FOR LABOR AND MATERIALS**

KNOW ALL PERSONS BY THESE PRESENTS:

That we, CONTRACTOR, a California corporation, as principal, and _____ as surety, are held firmly bound unto the COUNTY OF LOS ANGELES, State of California, hereinafter referred to as the County, in the sum of DOLLARS ($ ) lawful money of the United States, for the payment of which sum, well and truly made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that, whereas said principal has been awarded and is about to enter into a written contract with the County for:

NAME OF PROJECT
PLACE
SPECS. NO.

which is hereto attached, made a part hereof, and to which reference is hereby made for all particulars, and is required by said County to give this bond in connection with the execution of said contract.

NOW, THEREFORE, if said principal, as contractor in said contract, or principal's subcontractor, fails to pay any of the persons referred to in Section 9100 of the Civil Code of the State of California for labor performed, skills or other necessary services bestowed, site improvement made, equipment leased, or appliances, equipment, implements, machinery, materials, power, provender, provisions, teams, or trucks furnished or used in, upon, or about the performance of this work contracted to be done, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed by such claimant, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, said surety shall pay for the same in an amount not exceeding the sum specified above, and if suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond is executed pursuant to Chapter 7 of Division 3, Part 4, Title 15 of the Civil Code of the State of California, and shall inure to the benefit of any of the persons referred to in said Civil Code Section 9100, as it now exists or may hereafter be amended, so as to give a right of action to such persons or their assigns in any suit brought upon this bond. No premature payment by said County to said principal shall exonerate any surety unless the Board of Supervisors of said County shall have actual notice that such payment is premature at the time and it is ordered by said Board, and then only to the extent that such payment shall result in loss to such surety, but in no event more than the amount of such premature payment.

It is agreed, that any alterations in the work to be done, or increase or decrease of the materials to be furnished, which may be made pursuant to the terms of said contract shall not in any way release either the principal or surety hereunder, nor shall any extensions of time granted under the provisions of said contract release either the principal or surety, and notice of such alterations or extensions of this contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 20

CONTRACTOR

_____
President

APPROVED AS TO FORM:

_____
Secretary

DAWYN R. HARRISON
County Counsel

_____
Surety

By_____
Senior Deputy County Counsel

_____
Attorney-in-Fact

# SECTION 00 07 00

# GENERAL CONDITIONS

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3. Additional Sets of Drawings and Project Manual

**B. Drawings & Specifications**

4. Drawings and Specifications
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61. Conflict of Interest
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# SECTION 00 07 00

# GENERAL CONDITIONS

1. BID FORMS:

One copy of the Bid Forms accompany this Project Manual for Bidder's use.

Should these specifications be issued without the Bid Forms, or should the copy be lost or damaged, the Bidder must notify the Department of Public Works, in order that he/she may receive the forms or he/she may copy the forms bound into the Project Manual. All bids must be submitted on these forms or a facsimile thereof.

The Bidder shall not attach his bid to the returned Project Manual, nor use the Bid Forms, which are bound therein.

2. EQUALS:

A. Except as may be provided in the Proprietary Specification Section of these General Conditions, whenever any material, product, thing or service is specified or indicated in the Bid Documents by brand, trade, patent or proprietary name and/or by the name of the manufacturer, the item so specified or indicated shall be deemed to be followed by the words "or equal."

B. While preparing the bid, the Bidder may, at its own risk, submit an item not specified in the Bid Documents as an "or equal" for consideration by the County. Failure to do so within the time frame described in Subparagraph D below shall bar the Bidder from proposing or substituting an "or equal" item for an item specified in the Bid Documents.

C. If the Bidder includes an "or equal" item with the bid, the Bidder must submit sufficient data to the County to substantiate the specific characteristics and qualities which make the "or equal" item the equivalent in all respects of the item specified in the Bid Documents as described in Subparagraph D below. The Bidder shall furnish such substantiating data or arrange for any necessary tests to verify the equivalent qualities of the "or equal" item at the Bidder's sole expense.

D. The first, second and third apparent low bidder will have two (2) calendar days after the bid opening to submit their list of Equals (Section 00 04 40) and ten (10) calendar days after the bid opening to submit all substantiating data and test results. No list of Equals will be accepted after the close of

business two (2) calendar days after bids are opened. Likewise, no substantiating data and test results will be accepted after the close of business ten (10) calendar days after bids are opened.

E. The County, in its sole discretion, shall determine whether the substantiating data demonstrates that an "or equal" item is equal in all respects to the item specified in the Bid Documents. If the County determines that the "or equal" item has not been substantiated to be equal in all respects, the item specified in the Bid Documents shall be furnished and/or installed by Contractor without modification of the bid amount or Contract Documents.

F. The Contract Time for completion of the Work specified in the Contract Documents shall not be affected by any circumstances whatsoever arising from the provisions of this article.

G. The Contract Documents, Drawings, and Specifications have been prepared to complement and accommodate certain specified equipment, products, or systems and any modifications, adjustment, or redesign required to assimilate any County approved substitution or "or equal" equipment, products, or systems shall be at the Contractor's expense. Contractor shall provide a complete and workable application and shall satisfy design criteria and aesthetic values to the sole satisfaction of the County.

3. ADDITIONAL SETS OF DRAWINGS AND PROJECT MANUAL:

Upon award of contract, the Contractor will be furnished with eigh full-size sets of Drawings. Project Manuals will be issued with each set of Drawings for construction use.

4. DRAWINGS AND SPECIFICATIONS:

Specifications are intended to establish the standards for quality, performance, and technical requirements for all labor, workmanship, material, methods, and equipment necessary to complete the Work shown or reasonably implied on the Drawings and Specifications. The Drawings are intended to establish the scope, arrangement, graphic detail, and to illustrate the contract requirements. The Drawings and Specifications are intended to compliment and supplement one another, and any part of the Work that may be mentioned or indicated in the one and not represented in the other shall be done the same as if it had been mentioned or represented in both. Work, materials, or equipment of a minor nature which may not be specifically mentioned in the specifications or indicated on the Drawings, but which may be reasonably assumed as necessary for the completeness of the Work,

shall be performed and or supplied by the Contractor the same as if it were shown on the Drawings or described in the Specifications. In case of discrepancy either in the figures, on the drawings, or in the specifications, the matter shall be promptly submitted to the Director, or the Director's representative, who shall promptly make a determination in writing.

5. CONTRACT DOCUMENTS AND ORDER OF PRECEDENCE:

A. In the event that any provision(s) in any component part of the Contract Documents conflicts with any provision(s) of any other component part, the following order of precedence among the Contract Documents' component parts shall govern:

1. Written Amendments and Change Orders to the Contract in reverse chronological order
2. Addenda and Notices to Bidders in reverse chronological order
3. County-Contractor Agreement
4. Project Manual and Drawings
5. Performance Bond
6. Labor and Material Payment Bond

B. In the event there is a conflict between or among any provisions within one of the component parts of the Contract Documents, the higher standard or the more stringent requirement shall govern.

6. INTERPRETATION OF DRAWINGS AND SPECIFICATIONS:

A. The Director, or his/her authorized representative, will interpret the meaning of any part of the Drawings and Specifications about which any misunderstanding may arise. Should there appear to be any inconsistency or discrepancy in or between the Drawings and Specifications, the Contractor shall refer the matter to the Director, and then proceed without delay to complete the Work under question after the matter has been resolved by the Director. Should the Contractor proceed with the Work without referring the matter to, or obtaining resolution from the Director, Contractor does so on Contractor's own responsibility and without recourse to the County or County's employees, agents, etc.

B. If the Contractor disagrees with the interpretation of the Director, or his/her authorized representative, they shall promptly, and within ten (10) days after receipt of the interpretation, file a written request for a hearing before the Disputes Review Board as provided herein. Such written request shall

outline in detail areas and scope of the Contractor's disagreement with the interpretation. The Contractor shall continue with the Work in accordance with the Director's interpretation, maintaining accurate and complete records of all cost and time impacts related to the Work involved in the disputed interpretation. These records shall be filed with the Director in a timely manner as the Work progresses.

C. The Disputes Review Board selected by the Director is composed of three County personnel having a grade of Section Head or higher. The Board will convene to hear all matters related to the dispute within forty-five (45) calendar days after receipt of an acceptable request to convene. An acceptable "request for hearing" is defined as a request that outlines in detail the following:

1. Areas and scope of disagreement with the interpretation.

2. All areas of inconsistency/discrepancy in the drawings and/or specifications related to the dispute. Cite the specific drawings, details, specification sections, and paragraphs.

The Director shall determine whether a hearing will be conducted and may reject the request for hearing on the basis of information presented in the request.

D. The hearing will be informal and formal rules of evidence will not apply. The Board will submit its recommendation within a reasonable period of time following conclusion of the hearing. The Director will promptly render an interpretation notice to the Contractor.

7. PROJECT MANUAL:

A. The Project Manual is divided for convenience into divisions and sections as set forth in the Table of Contents preceding these General Conditions. Format is based upon the CSI Master Format for Construction Specifications. Schedules of Work included in these sections are given for convenience and shall not be considered as a comprehensive list of items necessary to complete the Work of any section.

B. Where devices or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items, or parts as are required to properly complete the Work.

8. STANDARD SPECIFICATIONS:

A. Where these Specifications or the Building Code stipulate that a material shall conform to the American Society for Testing Materials (ASTM) specifications or other recognized standards, the Contractor shall, when so required, deliver to the Department an affidavit or certificate in triplicate, signed by the manufacturer or supplier that the material furnished conforms to specifications or standards mentioned. When tests are required, the results of such tests shall be delivered to the Department.

B. References to the "Building Code" are to the edition of the applicable Building Code listed on the drawings, including any amendments thereto.

9. SUBSTITUTIONS REQUIRED BECAUSE OF FEDERAL GOVERNMENT RESTRICTIONS OR LACK OF PRODUCT AVAILABILITY:

A. In the event that certain materials or equipment specified are entirely unobtainable or not obtainable in sufficient quantities or within a reasonable time, due to Federal Government restrictions or other causes growing out of the national defense or war programs, the awarding entity may permit the use of equal and equivalent materials of other type of manufacture in their place. Before such substitutions can be made, the Contractor shall submit a written statement to the awarding entity setting forth in full the reasons why the materials specified are unobtainable and describing in full the materials which he proposed to supply in their place. Substitutions shall not be made until the approval of the awarding entity, in writing, has first been obtained.

B. Should a specified item not be obtainable due to product unavailability, the awarding entity may permit the use of equal and equivalent materials of other type of manufacture in their place. Contractor shall follow the procedure identified in Paragraph A above in order to obtain approval.

10. AS-BUILT DRAWINGS:

A. The Contractor shall keep one (1) complete and up-to-date set of prints at all times on the job, reserved for use as a record set of changes from the bid set. Throughout the duration of the construction work, this set of prints shall be the responsibility of the Contractor to maintain as a record of all field changes including underground runs, which are installed in locations other than those indicated on the Contract Drawings and those that have been indicated as to be field run as located. The lines shall be located on the Drawing dimensionally from a fixed point, such as a street-curb line, or

centerline, or a permanent structure. A copy of the updated as-built prints and as-built specifications shall be made available to the County Project Manager with the monthly progress payment requests.

B. Contractor progress payment will be contingent upon the as-built drawings and specifications being maintained in current status, and the County Inspector will not approve progress payments unless these as-built drawings and specifications are current.

C. As a condition to certifying the final payment under this Contract, within 30 calendar days after substantial completion, the Contractor will submit to the Project Manager the original set of as-built prints as well as the set of as-built specifications. If needed, a complete set of blue line prints of the Drawings will be furnished to the Contractor for which the as-built drawings are required. All variations from the Contract Drawings and any additional information required by the Specifications shall be entered on the as-built drawings and specifications as they occur, neatly and legibly, in ink of a contrasting color or otherwise marked as approved by the County. Each set of as-built drawings and specification shall be signed and dated before being accepted by the County representative at the completion of the Work.

11. REFERENCE MATERIALS:

The Contractor shall furnish and maintain on-site reference material including at least one copy of all applicable codes referenced in the Contract Documents as necessary for the performance of the Work specified.

12. CONSTRUCTION SCHEDULE:

A. All time limits stated in the Contract Documents are of the essence of the Contract. The Contractor shall prosecute the Work at such time and in such manner that Substantial Completion of the Work shall occur in accordance with the Contract and the Contract Time, including authorized adjustments thereto.

B. The Contractor shall provide a Contract Schedule for the Work in accordance with the requirements of Section 01 32 00, Construction Schedule.

C. The term "day" when used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

13. COUNTY'S RIGHT TO DELAY COMMENCEMENT OF THE WORK:

The Department, on behalf of the County, shall have the right to direct that the Contractor shall withhold actual commencement of the Work of construction until sufficient material, in the opinion of the Department, has been delivered to the site of the Work to insure completion of the Work without interruption, and the Contractor shall comply with such instructions when issued. The Contractor shall be granted an extension of the completion time of the contract equal to the number of working days delay caused to Contractor pursuant to Contractor's compliance with such instructions.

14. UPDATED SCHEDULES:

Updated schedules shall be attached with the Contractor's request for payment and shall be a condition required prior to payment. Each schedule shall include a narrative report defining problem areas, anticipated delays, and their impact on the schedule, and the corrective action that shall be taken by the Contractor and its affect.

15. CHANGES IN THE WORK:

A. Written Changes

1. The County may, at any time, without notice to the Surety, make changes in the Work within the general scope of the Contract, including changes:

a. in the Specifications and the Drawings;

b. in the method or manner of performance of the Work;

c. in the facilities, equipment, materials, services, or site to be furnished by the County;

d. directing acceleration in the performance of the Work; or

e. directing the Contractor to suspend, delay, or interrupt all or any part of the Work for such period of time as the County may determine to be appropriate for the convenience of the County.

2. Such changes shall be made in accordance with either of the following methods:

a. By a written Supplemental Agreement ordered by the County (or awarding authority if other than the County) in the manner specified by Public Contract Code Sections 20136, 20137, 20138, or 20145, or other successor statues.

b. By written Change Order, signed by the Director, in the manner and amounts specified by Public Contract Code Section 20142 or its successor statutes.

3. If any change or proposed change under this paragraph causes or would cause an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the Work, whether changed or not changed by any such order, the Contractor may request an equitable adjustment under the terms of this paragraph and under "Construction Schedule," Section 01 32 00. At County's option, the County may negotiate an equitable adjustment for the price and time impact for the proposed changed Work either prior to, or after, directing the Contractor to proceed.

4. In the event the County elects to evaluate a bid prior to directing the Contractor to proceed, the County will issue a notice describing the proposed Change Order in the form of a Request for "Quotations" (RFQ). If the Contractor does not respond within fourteen (14) days after receipt of the notice, or such other time as agreed upon, with an equitable adjustment requested in accordance with Paragraph B.5.(b) under "Equitable Adjustments," the County may issue a Change Order with no change in the Contract Amount or Contract Time. The Contractor shall not proceed with any aspect of the proposed changed Work, or delay, suspend, or interrupt any unchanged Work until the County issues the Change Order.

5. If, in the opinion of the Director, it is in the County's best interest and it is deemed necessary to proceed with a required change in the Contract Documents, and time precludes thorough analysis of the Contractor's proposal, or the parties fail to reach an agreement, the Director may order the Contractor to proceed (Proceed Order) on the basis of a tentative price based on the best estimate available at the time, with the firm price to be determined later. If a Proceed Order is issued, the Contractor shall submit his proposal for the changes in the Work within thirty (30) days after the Proceed Order or completion of the changed Work, whichever is later. All charges arising out of a

Proceed Order are to be documented and verified in a manner acceptable to the Director.

6. In the event that the County requires certain Work to be accomplished and the Contractor fails in the discharge of any or all of his responsibilities described hereinbefore, the County may issue a Unilateral Change Order which is a change order issued by or at the direction of the County without the full and timely agreement of the Contractor.

    a. A Unilateral Change Order may be issued before, during or after the changed Work is physically accomplished under the following conditions:

        1. The Contractor fails to submit price and/or time extension proposal for the changed Work within thirty (30) days of receipt of the request for "Quotations" or within a reasonable time thereafter as specified by the County.

        2. The Contractor fails or refuses to execute a Change Order by affixing his signature thereto within thirty (30) days of receipt or within a reasonable time thereafter as specified by the County.

        3. The County notifies the Contractor in writing that the Change Order is considered to be unilateral and is to be an effective change to the Contract. A notation will be made on the face of the Change Order that it is unilateral and the effective date thereof. Normal distribution of copies will then be made.

7. Any other written order including direction, instruction, interpretation, or determination from the County that causes a change in the Contractor's obligations may be treated as a proposed Change Order as provided in Part B of this Article, "Constructive Changes."

8. Except as provided in this Article, no order, statement, or conduct of the County shall be treated as a Change Order under this clause or entitle the Contractor to an equitable adjustment.

9. No equitable adjustment request by the Contractor shall be allowed if asserted after Final Payment of the Contract.

B. Constructive Changes

1. Notice: The primary purpose of this paragraph is to obtain prompt reporting of County conduct or changed conditions either caused by an act of God (Public Contract Code Section 7105) or digging trenches or other excavations that extend deeper than four feet below the surface (Public Contract Code Section 7104) that the Contractor considers to constitute a change to this Contract. Except for changes identified as such in writing and signed by the County or the Director, the Contractor shall notify the County in writing within fourteen (14) days from the date of County conduct (including actions, inactions, and written communications) that the Contractor regards as a change to the Contract. On the basis of the most accurate information available to the Contractor, the notice shall state:

a. The date, nature, and circumstances of the conduct regarded as a change;

b. The name, function, and activity of each Contractor official, agent, or employee involved in or knowledgeable about such conduct;

c. The identification of any documents and the substance of any communication involved in such conduct;

d. In the instance of alleged acceleration of scheduled performance or delivery, the basis upon which it arose;

e. The particular elements of Contract performance for which the Contractor may seek an equitable adjustment under this clause, including:

1. What specific Contract Drawings or specific sections of the Specifications have been, or may be, affected by the alleged change;

2. What labor or materials or both have been, or may be, added, deleted, or wasted by the alleged change;

3. To the extent practical, what delay and disruption in the manner and sequence of performance and effect on continued performance have been, or may be, caused by the alleged change in accordance with Section 01 32 00, "Construction Schedule;" and

4. What adjustments to Contract Amount and other provisions affected by the alleged change are estimated;

f. The Contractor's estimate of the time by which the County must respond to the Contractor's notice to minimize cost, delay, or disruption of performance, in accordance with Section 01 32 00, "Construction Schedule."

2. Continued Performance: Following submission of the notice required by Paragraph B.1 of this Article above, the Contractor shall diligently continue performance of this Contract as though not changed by the conduct reported under Paragraph B.1 until notified of the County's response under Paragraph B.3 of this paragraph, below.

3. Response: The County will, within fourteen (14) days after receipt of notice, respond to the notice in writing. In responding, the County will either:

a. Confirm that the conduct of which the Contractor gave notice constitutes a change and, when necessary, direct the mode of further performance in accordance with Part A of this Article, "Written Changes;"

b. Countermand any communication regarded as a change;

c. Deny that the conduct of which the Contractor gave notice constitutes a change, and when necessary, direct the mode of further performance; or

d. In the event the Contractor's notice information is inadequate to make a decision under A, B, or C above, advise the Contractor what additional information is required, and establish the date by which it should be furnished and the date thereafter by which the County will respond.

4. Appeals: In the event the Contractor does not agree with the County's response under B.3 above, the Contractor may submit a request to the Disputes Review Board.

5. Equitable Adjustment:

   a. If the County confirms that the County's conduct effected a change as alleged by the Contractor, the Contract will be modified in writing accordingly in conformance with Part A of this Article, "Written Changes". Except for a proposed change to the Drawings or Specifications, no request for equitable adjustment under this paragraph shall be allowed for any costs incurred more than fourteen (14) days before the Contractor gives written notice under Part B of this Article.

   b. In the case of a necessary change to the Drawings or Specifications for which the County is responsible, the equitable adjustment shall include the cost and time extension for delay reasonably incurred by the Contractor in attempting to comply with the Drawings or Specifications before the necessary change is identified. When the cost of property made obsolete or in excess as a result of a change confirmed by the County under this paragraph is included in the equitable adjustment, the County will have the right to prescribe the manner of disposition of the property or its proceeds. The equitable adjustment shall not include increased costs or time extensions for delay resulting from the Contractor's failure to provide notice or to continue performance as provided respectively in Paragraphs (1) and (2) above of this part.

C. Compensation for Changes in the Work

1. Changes in the Work issued and signed by the Contractor pursuant to the requirements of this Contract represent and constitute full and final settlement for all costs and time (hereinafter referred to as compensation) associated with the Work (or event) described therein. Compensation is defined to include all direct and indirect labor costs, all material and equipment expenses, and all impact costs related to and/or occasioned by the Work described therein, as well as all taxes, insurance, and profit. It is agreed that the basis of compensation to the Contractor for Work either added or deleted by Changes in the Work shall be determined by one or more of the following methods

below. All amounts for overhead, profit, insurance, and all other direct and indirect costs of the changes in the Work (except for bonds as provided in Paragraph C.2 shall be computed in accordance with percentages set forth in Paragraph C.1.c and C.8.c of this Article.

a. Method A

By unit prices for items of Work scheduled to be done under the unit price provisions of the Contract. The cost or credit for such added or omitted Work shall be determined by multiplying the number of units added to or omitted from the Work by the applicable unit price.

b. Method B

By agreed lump sum. All lump sum quotations prepared by the Contractor shall be supported by legible and itemized cost by trades. The itemized breakdown accompanying the quotation shall quantify all added and deleted labor, material, and construction equipment directly involved. The Contractor must also obtain and furnish with quotation, itemized breakdown(s) as described above, signed by each subcontractor or vendor participating in the change regardless of tier. All labor cost, including associated fringe benefits and insurance costs, shall be verified by certified payrolls and/or standard rates in accordance with the Prevailing Wage Scale.

c. Method C

If neither Method A nor Method B are agreed upon before the changes to the Work are commenced, then the Contractor shall be paid as follows:

The actual cost, documented to the satisfaction of the County, of labor, materials, and equipment furnished by the Contractor and/or the actual cost of subcontractor Work incurred by the Contractor as provided in Paragraph C.8, plus the following percentages which are considered fair and reasonable compensation for overhead, profit, insurance, and all other direct and indirect costs of the Changes in the Work (except for bonds as provided in Paragraph C.2:

18% of the cost of labor as provided in Paragraph C.3 where furnished by the Contractor;

15% of the cost of materials as provided in Paragraph C.4 where furnished by the Contractor;

10% of the actual cost of equipment as provided in Paragraph C.5; and

5% of the actual cost of the first tier subcontract Work as provided in Paragraph C.8.

Overhead charges shall include those charges as specified in Paragraph C.3.c below.

d. Unilateral Change Order

1. The terms of a Unilateral Change Order, including the change in Contract price and/or completion date shall, in the County's judgment, be fair and reasonable.

2. When a Unilateral Change Order has been issued, it will have the full force and effect of a Contract modification. It will be included in schedules, payment applications, reports, and all official records of the Contract. The issuance of a Unilateral Change Order will not prejudice any of the Contractor's rights to make claims or appeal disputed matters under other provisions of the Contract.

3. If the Contractor objects to a Unilateral Change Order, Contractor shall state, in writing, specific objections to, or specific points of disagreement with, the Work described in the Unilateral Change Order within thirty (30) days of receipt of such Change Order.

2. To the total additional cost of the Work as computed by any of the three above methods, the Contractor may add, upon furnishing to the County satisfactory evidence of the cost thereof, the actual cost of additional bond premiums incurred by the Contractor as a result of the additional cost to the Work up to a sum not to exceed 1.5 percent (1.5%) of the additional cost to the Work.

3. Labor: The cost of labor used in performing the Work, whether the employer is the Contractor, Subcontractor, or other forces, will be the sum of the following:

   a. The gross actual wages paid including income tax withholdings but not including any employer payments to or on behalf of the workmen for health and welfare, pension, vacation, insurance, and similar purposes.

   b. To the actual gross wages, as defined above, a percentage will be applied based upon current applicable labor rates concerning payments made to or on behalf of workmen other than actual wages. This percentage shall constitute full compensation for all payments other than actual gross wages as specified below. The Contractor shall compute a separate percentage for each craft, or a composite percentage for all crafts if so approved by the County. All computed percentages shall be submitted to the County for approval within thirty (30) days after receipt of Notice to Proceed with the changes to the Work or as directed by the County prior to any changed Work being performed.

   c. The charges for labor shall include all classifications through foremen when engaged in the actual and direct performance of the Work. They shall not include charges for such overhead personnel as superintendents, assistant superintendents, office personnel, timekeepers, and maintenance mechanics.

4. Materials: The cost of materials required for the accomplishment of the Work shall be the delivered cost to the purchaser, whether Contractor, subcontractor, or other forces, from the supplier thereof, except as the following are applicable:

   a. If cash trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the County if such discount was taken.

   b. If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier, to such purchaser, the cost of such materials, including handling, shall be deemed to be the price to the actual supplier as determined by the County.

c. If the materials are obtained from a supply or source owned wholly or in part by the purchaser, payment therefore will not exceed the lesser of the price paid by the purchaser for similar materials furnished from said source on Contract items or the current wholesale price for such materials delivered to the worksite, whichever price is lower.

d. The cost of such materials shall not exceed the lowest current wholesale price at which such materials are available in the quantities concerned, delivered to the job site, less discounts as provided in Subparagraph 4.a.

e. If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof, the cost shall then be determined in accordance with Subparagraph 4.d.

5. Equipment: Equipment rented/leased by the Contractor or subcontractor and utilized on this project for the purposes of this Article shall be paid for on the basis of arms-length rental agreements entered into and invoices paid by the Contractor or subcontractor for that equipment. These invoices shall be submitted as evidence of the expense incurred.

a. The Contractor or subcontractor shall be paid for the use of owned equipment at prices for the use of machinery and equipment determined by using 80 percent (80%) of equipment use costs published by the Associated Equipment Distributors, which edition is in effect at the time of the change. Contractor or subcontractor-owned equipment required to be on stand-by or to be present on the site, even though idle, shall be paid for at 50 percent (50%) of the owned equipment rate established above.

b. The Contractor or subcontractor shall furnish all data which might assist the County in the establishment of such rates.

1. Operators of equipment will be paid for as provided under Subparagraph C.3 above.

2. All equipment shall be in good working condition and suitable for the purpose for which the equipment is to be used. Contractor is responsible for any necessary repairs and ongoing maintenance of said equipment.

3. Unless otherwise specified, manufacturer's ratings and manufacturer modifications shall be used to classify equipment for the determination of applicable equipment rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

4. Individual pieces of equipment or tools having a new value of five hundred dollars ($500.00) or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

6. Equipment Located at the Site: The time to be paid for equipment located at the site shall be the time the equipment is required for the changed Work being performed. Moving time, loading, unloading, and hauling will not be paid for if the equipment is already located at the Site.

7. Equipment Not Located at the Site: For the use of equipment moved to the Site and used exclusively for changed Work, the Contractor will be paid the rates hereinbefore specified, as follows:

   a. The period shall begin at the time the equipment is unloaded at the site; shall include each day that the equipment is at the site, excluding Saturdays, Sundays, and other legal holidays unless the changes to the Work are performed on such days; and shall terminate at the end of the day on which the County directs the Contractor to discontinue the use of such equipment. The maximum time to be paid per day will not exceed eight (8) hours without prior written approval from the Director.

   b. Payment for transporting, loading, and unloading equipment will be made only when such equipment has been moved to the site for the sole and express purpose of accomplishing the changed Work.

8. Subcontracts: The cost for Subcontract work will be the actual cost to the Contractor or subcontractor for Work performed by a Subcontractor as follows:

a. The cost incurred by the first tier subcontractor for labor, materials, and equipment as limited by Paragraphs C.3, C.4, and C.5; plus

b. The following percentages which are considered fair and reasonable compensation for overhead, profit, insurance and all other direct and indirect costs of the changes in the Work (except for bonds as provided in Paragraph C.2:

18% of the cost of labor as provided in Paragraph C.3;

15% of the cost of materials as provided in Paragraph C.4;

10% of the cost of equipment as provided in Paragraph C.5.

c. To the total additional cost to the Work as computed in accordance with Paragraphs 8.a and 8.b above, the subcontractor, upon furnishing satisfactory evidence of the cost thereof, the actual cost of additional bond premiums incurred by the Subcontractor as a result of the additional cost to the Work up to a sum not to exceed 1.5 percent (1.5%) of the additional cost to the Work.

16. PROVISIONS FOR EXTRAS:

No new Work of any kind performed hereunder shall be considered as extra Work outside the scope of the Contract unless a separate estimate is given for said Work before it is commenced, the same is approved by the Department as reasonable and equitable, and it has been ordered under one of the three methods set forth in article, "CHANGES IN THE WORK," Paragraphs A, B, or C. Except for extra Work ordered by the Department according to unit prices or by changes or additions in the Work embraced in a Change Order issued by it, any extra Work performed will not be paid for by the County. The Contractor will prepare and submit change order requests as directed by the County Project Manager.

17. TIME EXTENSIONS AND COMPENSATION FOR DELAY:

A. Adjustments in the Contract Time shall be governed by the principles of this Article and shall be made in accordance with the conditions stated in Specification Section 01 32 00, Construction Schedule.

B. Actions or inactions of the County, or events for which the County has assumed contractual responsibility, which would independently delay the date of Substantial Completion beyond the current Contract Completion Date shall be designated as Compensable delays.

C. Events which are outside the control of, and without the fault or negligence of either the County or the Contractor, which would independently delay the date of Substantial Completion beyond the current Contract Completion Date shall be designated as Excusable delays. Unless the County considers that extreme circumstances warrant consideration, extensions of time because of inclement weather will not be granted.

D. Actions or inactions of the Contractor, or events for which the Contractor has assumed contractual responsibility, which would independently delay the date of Substantial Completion beyond the current Contract Completion Date shall be designated as non-excusable delays.

E. Concurrent delay is any combination of the above three types of delay occurring on a calendar date, except in cases where the combination consists of two or more instances of the same type of delay occurring on a calendar date.

F. Any event, action, inaction, or other cause which may give rise to a delay shall constitute a basis for adjustment in:

1. Contract Time, only if it can be demonstrated that the date of Substantial Completion will be delayed beyond the current Contract Completion Date and that the delay is classified as a Compensable or Excusable delay; and/or

2. Contract Amount, only if it can be demonstrated that the Contractor's time-related costs to complete the Work will be increased and the delay is classified as a Compensable delay.

18. OBSERVATION:

A. All Work shall meet with the approval of the Department and shall be completed in conformity with the Drawings and Project Manual approved by, and on file with, the Los Angeles County Board of Supervisors, such Drawings and the Project Manual will be made part of the Contract to be entered into for the Work referred to herein. The County at its discretion may require the contractor to obtain approval/clearance from the Inspector of Record for certain items to ensure the quality of the work.

B. The Department or its representative will have access to the Work at all times. The Contractor will furnish all facilities for inspection at the construction site, and at shops or yards, and shall not cover up any Work until the same has been approved by the Department. If Work should be covered up before being inspected, the Contractor will be required to remove such portions of the Work as may be necessary to disclose the part in question.

C. The County of Los Angeles or its authorized representatives will be given access to the Work at all times. Such access will not be subject to restrictions which are not directly related to the provision and maintenance of health and safety.

D. The Contractor will be issued a "Notice of Noncompliance" for any portion of the contract Work that does not satisfy the requirements of the Drawings and Specifications. No Work subject to a "Notice of Noncompliance" will be paid for by the County until such Work is brought into full compliance with the Drawings and Specifications to the satisfaction of the County. The Contractor must obtain the County's approval for all corrected deficiencies and/or non-compliant work prior to proceeding with work that may be affected by the deficient and/or non-compliant work. The Contractor shall not build on or conceal work that is deficient and/or non-compliant. Furthermore, work that is built or dependent upon item(s) that are deficient and/or not-compliant will not be approved on the progress payment request.

E. An Inspection Notice will be issued if the contract Work has not been executed in full compliance with the Drawings and Specifications. The Contractor is responsible for bringing all Work subject to an Inspection Notice into full compliance with the Drawings and Specifications at no additional cost to the County.

F. Technical Reports may be generated for the purpose of evaluating the quality, correctness, functionality, etc., of the Contractor's Work or performance under this contract in accordance with the requirements of the Drawings and Specifications.

19. PERMITS, LICENSES, AND INSPECTIONS:

A. The Contractor will obtain and pay for all permits required for the Work except the following "no-fee" permits: building, electrical, mechanical, plumbing, and sewer Work. Further, the Contractor will obtain and pay for all permits incidental to the Work or made necessary by Contractor's operation. This includes Contractor/Manufacturer designated structures such as prefabricated buildings, light poles, special shoring, and the like. The Contractor shall also pay for the plan check of prefabricated buildings.

B. To comply with Section 3800 of the Labor Code of the State of California, the Contractor and all Subcontractors requiring a permit (building, plumbing, grading, electrical, etc.) shall file a Workers' Compensation Certificate with the Department of Public Works, Business Relations and Contracts Division, Contracts Administration Section.

C. Exclusive of off-site inspection specified to be the County's responsibility, the Contractor will arrange and pay for all off-site inspection of the Work including certification thereof required by the specifications, drawings, or by governing authorities.

D. The County will provide on-site inspection of the Work and will arrange for off-site inspection when noted on the drawings and/or when specified in the various technical sections of the Specifications as the responsibility of the County. All other required inspection will be the responsibility of the Contractor.

E. The County will not pay any costs for licenses required in the performance of the Work. The Contractor shall assume this responsibility in total.

20. TESTS:

A. County's Responsibilities

1. The County reserves the right to test or require the Contractor to obtain "called tests" of any materials or performance over and above "required tests" as defined in the following Paragraph B.1, and

provided such "called tests" show the Work meets the specified requirements, the County will pay for the cost of the tests. If the Contractor was required to obtain the test from a third party, the County will reimburse the Contractor on the basis of Contractor's certified statement of the results and costs, with appropriate supporting documentation.

B. Contractor's Responsibilities

1. The Contractor will arrange and pay for all tests of materials or performance as required by the Specifications or by ordinance or governing authority. These are defined as "required tests".

2. The Contractor shall pay for all "called tests" as defined in preceding subparagraph A.1, when the test results show the materials or performance fails to meet the specified requirements. Immediately thereafter, the Contractor, at Contractor's own expense, shall remove the improper Work and replace same with materials or performance meeting the specified requirements. The Contractor shall also bear the expense of any tests required of the replaced Work, and of any subsequent removal, replacement, and testing as may be necessary to obtain materials or performance meeting the specified requirements.

21. SUBSTANTIAL COMPLETION:

A. The date of Substantial Completion of the Work, or designated portion thereof as set forth in the Contract Documents, is the date certified by the County when construction is sufficiently complete, in accordance with the Contract Documents, so the County may occupy or use the Work, or designated portion thereof, for the use for which it is intended.

B. When the Contractor considers that the Work, or designated portion thereof as set forth in the Contract Documents, is substantially complete as defined above, the Contractor shall prepare for submission to the County a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the County determines that the Work or designated portion thereof is substantially complete, it will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion. The Certificate shall state the responsibilities of the County and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall list remaining items to be corrected or

completed. The Work not fully completed or corrected shall be completed to the satisfaction of the County within thirty (30) calendar days after Substantial Completion, or within a period of time mutually agreed upon between the Contractor and the County. In the event the Contractor fails to complete or correct the remaining items within the allotted time, the County may complete or correct the items and deduct the cost thereof from the Contract amount.

C. Warranties required by the Contract Documents, as discussed in Article 40 of the General Conditions, shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

D. Upon Substantial Completion of the Work or designated portions thereof, and upon application of the Contractor, the County, in County's sole discretion, may release and/or reduce the amounts retained subject to the limitations of Public Contract Code Section 9203.

E. In accordance with the General Conditions, the County reserves the right to occupy substantially completed portions of the Work and any such portion shall be subject to the above provisions for Substantial Completion.

22. OCCUPANCY BY THE COUNTY:

A. The Contractor, Contractor's employees, and representatives will be admitted by the County to the premises for the purpose of executing the Work to be performed under this contract, but they shall have no tenancy.

B. It is further understood that the County shall have the right to take temporary possession of, or use any portion of, any substantially completed part of the Work. Before taking possession of any Work, the County shall furnish the Contractor a list of items of Work remaining to be performed or corrected on those portions of the Work that the County intends to take possession of or use. However, a failure of the County to list any item of Work shall not relieve the Contractor of responsibility for complying with the terms of the Contract. The County's possession or use shall not be deemed an acceptance of any Work under the Contract.

C. While the County has such possession or use, the Contractor shall be relieved of the responsibility for the loss of, or damage to, the Work in place resulting from the County's possession or use. If prior possession or use by the County delays the progress of the Work or causes additional expense to the Contractor, an adjustment may be made in the Contract Amount or the

Contract Time, under the applicable scheduling and cost provisions of this Contract.

23. WORKERS:

None but workers skilled in the various trades required on this contract shall be employed upon the Work. Any mechanic or laborer employed upon the Work who, in the opinion of the Department, is non-cooperative or who shall prove careless or incompetent, shall be immediately removed from the Work by the Contractor, when notified to do so, and shall not be re-employed upon the Work.

24. HOURS OF WORK:

Work in excess of eight (8) hours per day will be permitted by employees of contractors under this Contract only so long as Section 1815 of the Labor Code of California is complied with by such contractors.

25. SATURDAY, SUNDAY, HOLIDAY, AND OVERTIME WORK:

A. No construction Work shall be done on Saturdays, Sundays, or holidays recognized by the County government and no Work shall be performed outside of normal Working hours without the consent of the Department, unless required under these specifications. In any event, all Work shall be subject to approval of the Department. Prior to the start of such Work, the Contractor shall arrange with the Department for the continuous or periodical inspection of the Work and tests of materials, when necessary. If requests are made by contractors for permission to Work overtime, nights, Saturdays, Sundays, or holidays, and such requests are granted, the Contractor shall bear all extra expense to the County or the awarding entity for inspection and other incidental expenses caused by such overtime work. If Contractor is requested, in the interest of the awarding entity, to work overtime by the Department; or if overtime Work is specifically required by these Specifications, all extra expense of inspection will be paid by the County. Should the Contractor find it necessary in order to complete the Work according to schedule to perform certain of Contractor's operations on Saturdays, Sundays, holidays or overtime, these operations shall be performed as part of the Work included in the contract price and shall not constitute a basis for additional payments. Refer to above paragraph for the obligations for the Contractor to assume the cost of inspections.

B. The County reserves the right to order in writing Work outside of normal working hours to avoid inconvenience of occupants of existing facilities or to perform special operations that, in the judgment of the Department best serve the intent of the Contract Documents and the orderly prosecution of the Work. If the County elects to order Work outside of normal working hours, the Contractor shall make all arrangements to supply an adequate Work force for the task to be accomplished and will be compensated for the premium portion of the wages paid, plus labor burdens applicable to the premium portion only of the wages paid. Contractor shall submit copies of Contractor's payrolls indicating the premium wages actually paid, and the County will issue a Change Order to reimburse the Contractor for Contractor's actual costs only.

26. PREVAILING WAGE SCALE:

A. The Contractor shall comply with all provisions of the Labor Code of the State of California.

B. Under the provisions of said Labor Code, the State Department of Industrial Relations will ascertain the prevailing hourly rate in dollars and details pertinent thereto for each craft, classification or type of workers, or mechanic needed to execute any contract which may be awarded by the awarding entity.

C. Particulars of the current Prevailing Wage Scale, which are applicable to the Work contemplated under these Specifications, are filed with the awarding entity and the Department and must be posted at the project site.

27. EMPLOYMENT OF INDENTURED APPRENTICES:

A. Contractor shall comply with Section 1777.5 and 1777.7, Labor Code, State of California.

B. All Contractors shall employ registered apprentices at a ratio of not less than one hour of apprentice's work for every five hours of labor performed by a journeyman. Contractors shall be responsible for the compliance of all Subcontractors.

C. Contractor and Subcontractors shall keep an accurate record showing the name of the craft and wage rate of each apprentice and journeyman employed by each entity. Subcontractor shall provide, weekly, such records to the Contractor. Records shall be made available to the Division of

Apprenticeship Standards and the County of Los Angeles or the awarding entity, for the purpose of determining compliance. Failure to comply may result in withholding payments and other penalties as provided by the Labor Code.

28. AFFIRMATIVE ACTION PLAN FOR EQUAL EMPLOYMENT OPPORTUNITY:

A. The following provisions pertaining to equal employment opportunity are incorporated into this Contract. All references herein to "Contractor" shall be deemed to refer to the "general" Contractor.

B. During the performance of any construction Contract in excess of $10,000, the Contractor agrees as follows:

1. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor certifies and agrees that all persons employed by such firm, Contractor's affiliates, subsidiaries, or holding companies are, and will be, treated equally by the firm without regard to or because of race, color, religion, sex, or national origin and in compliance with all anti-discrimination laws of the United States of America and the State of California.

2. In all advertisements for labor or other personnel, or requests for employment of any nature, the Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

3. The Contractor shall deal with Contractor's Subcontractors without regard to or because of race, color, religion, sex or national origin.

4. The Contractor shall comply with current Federal employment and reporting requirements for County-funded construction contracts. Specifically, the Contractor shall make a good faith effort to comply with federal employment goals for minority and female employment and shall report minority and female employment data in a timely manner on the federal form provided by the contract awarding authority.

5. The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract of understanding, a notice, to be provided by the contract

awarding authority, advising the said labor union or workers' representative of the Contractor's commitments under this section.

6. The Contractor shall allow the County access to Contractor's employment records during regular business hours to verify compliance with these provisions when so requested by the County.

7. The Contractor agrees that if the County finds that any of the above provisions has been violated, the same shall constitute a material breach of contract upon which the County may determine to cancel, terminate, or suspend the Contract. While the County reserves the right to determine independently that the anti-discrimination provisions of the Contract have been violated, in addition, a determination by the Federal Equal Employment Opportunity Commission or the California Fair Employment and Housing Commission that the Contractor has violated federal or state anti-discrimination laws may constitute a finding by the County of Los Angeles that the Contractor has violated the anti-discrimination provisions of the Contract.

8. At County's option, and in lieu of canceling, terminating, or suspending the Contract, the County may impose damages for any violation of the anti-discrimination provisions of this paragraph, in the amount of two hundred dollars ($200) for each violation found and determined. The County and Contractor specifically agree that the aforesaid amount shall be imposed as liquidated damages, and not as a forfeiture or penalty. It is further specifically agreed that the aforesaid amount is presumed to be the amount of damages sustained by reason of any such violation, because, from the circumstances and the nature of the violation, it is impracticable and extremely difficult to fix actual damages.

9. The Contractor shall include the provisions of the foregoing Paragraphs B.1. through B.8. in every subcontract, so that such provisions will be binding upon each Subcontractor performing Work required by this contract.

29. PAYROLL RECORDS:

A. The Contractor shall comply with the requirements of Section 1771.4 and Section 1776 of the Labor Code, State of California. The Contractor and its subcontractors shall furnish the records specified in Section 1776 directly to the Labor Commissioner in an electronic format, in the manner prescribed by

the Labor Commissioner, on the Department of Industrial Relations website. The Contractor and its subcontractors shall maintain payroll records as enumerated in Labor Code Section 1776 (a). When requested by the County, the Contractor and its subcontractors shall submit to the County a copy of all weekly certified payrolls, indicating that the wage rates are not less than those determined by the State of California Department of Industrial Relations and the classifications set forth for each laborer or mechanic conform with the Work they performed. Contractor shall submit a weekly payroll report" (Form 347, A-1-131, or similar) shall accompanied by a written declaration, made under penalty of perjury. The Contractor shall be responsible for the submission of copies of payrolls for all subcontractors within ten (10) days after their payroll period. Failure of the Contractor to comply with the Labor Code requirements to pay prevailing wages and to maintain certified payroll records may result in withholding from progress payments amounts for underpaid wages and penalties as authorized by the Labor Code.

B. When requested by the County, the Contractor, all subcontractors, and some subconsultants will be required to submit certain certified payrolls and labor compliance documentation electronically at the discretion of, and in the manner specified by the County.

Electronic submittal will be a web-based system, accessed on the World Wide Web by a web browser. The Contractor, its subcontractors, and certain subconsultants will be given a log on identification and password to access the web-based labor compliance reporting system.

Use of the web-based system will entail additional data entry of weekly payroll information including; employee identification, labor classification, total hours worked and hours worked on this project, wage and benefit rates paid, etc. In addition, the Contractor may use payroll and accounting software that is capable of interfacing with the web-based system. The payroll and accounting software must be capable of generating a 'comma delimited file' or 'comma separated value (CSV) file' that will interface with the web-based system.

This requirement applies to all subcontractors, subconsultants, and vendors required to submit certified payrolls and provide labor compliance documentation. The information may be used to provide statistical informational data to public or jurisdictional agencies.

30. QUALITY OF WORK AND MATERIAL:

A. All materials, parts, and equipment furnished by the Contractor shall be new, first quality, and free from defects and imperfections. Workmanship shall be in accordance with the best standard practices.

B. Any item or Work installed by the Contractor, but not in conformance with the drawings and specifications, shall be removed by and at the Contractor's expense upon written request from the County.

C. If such items or Work are not removed or satisfaction obtained by the County within thirty (30) calendar days of such request, then the County may have such items or Work removed and Work completed to conform to drawings and specifications at the Contractor's expense.

31. RESPONSIBILITY OF CONTRACTOR AND OF CONTRACTOR'S REPRESENTATIVE ON THE WORK:

The Contractor shall give personal attention and supervision to the Work until same is entirely completed. In the absence of the Contractor from the Work, he shall have a representative in charge who shall be competent to superintend and direct the progress of the Work and who shall be authorized to receive instructions and to act for the Contractor on all matters related to the Work. The name of this representative shall be sent by letter to the Department immediately after the awarding of the contract.

32. REPAIRING DAMAGED WORK:

A. All portions of the Work that may be damaged by accident or in the course of or on account of building operations, or by reason of any other cause whatsoever during the progress of the Work, shall be carefully and neatly repaired or reconstructed and the whole left in first-class condition and turned over to the County ready for use.

B. Should any part of the Work of this contract be cut into or damaged by other Contractors, the Contractor and party causing such damage shall make adjustments between themselves relative to reconstruction or repairs and payment for same.

33. LIST OF SUBCONTRACTORS AND SUBLETTING WORK:

A. No part of the construction Work shall be done as piece Work, nor shall it be let to a Subcontractor after the execution of the original contract except as

provided by law. In case part of the Work should be sublet, these General Conditions shall govern each trade insofar as they may apply to the Work of that trade.

B. Where more than one Contractor or where Subcontractors are engaged upon the Work, they shall coordinate their efforts (in accordance with Article 36 of these General Conditions regarding other contractors, or under the control and guidance of the General Contractor), and shall be responsible, one to the other, for any damage or injury to the work.

C. Bidders and Contractor shall be governed by the provisions of Sections 4100 to 4113, inclusive, of the Public Contract Code of the State of California. Bidders shall set forth in their Bids, on forms provided for same, the name and location of the mill, shop, or office of each Subcontractor who shall perform the Work or labor or render service to the Contractor in or about the construction of the Work, and the portion of the Work which shall be done by each Subcontractor.

D. No subcontract shall be assigned or transferred except as provided in the above sections of the Public Contract Code of the State of California.

E. In case any Work is let to a Subcontractor, the Contractor shall be at all times responsible for the Work so done to same extent as if the Contractor were doing or had done the Work.

F. If a Subcontractor is named who shall perform the Work or labor or render service to the Contractor with respect to a material specified or indicated by patent or proprietary name and/or by the name of the manufacturer, and such Subcontractor cannot reasonably act with like respect to the material offered as an equal then, the Bidder shall, in his Bid Form, include with the pertinent data to be listed on the "Equals" page(s), the name and address of the Subcontractor who shall act with respect to the equal material.

G. In accordance with Public Contract Code Sections 4100, et seq., the Bidder must list all subcontractors who shall perform in excess of one-half of one percent of the Work. (See Subcontractors' Section of the Instructions to Bidders.)

34. ADVERTISING:

No advertising matter shall be attached or painted on surfaces of buildings, fences, or canopies, except that names of Contractors and Subcontractors, with their addresses and the designation of their particular branch, may be shown on signs of a removable type. Size and location of such signs shall be subject to approval of

the Department. The Contractor shall provide a project identification signboard as specified.

35. CERTIFICATE AS TO COMPLIANCE WITH CERTAIN REGULATIONS:

A. The Contractor shall file with the Department, prior to the acceptance of the Work, a certificate in form, substantially as follows:

B. I (We) hereby certify that all Work has been performed and materials supplied in accordance with the drawings, specifications, and contract documents for the above Work, and that:

1. Not less than the prevailing rates of wages as ascertained by the Department has been paid to laborers, workers, and mechanics employed on this Work.

2. There have been no unauthorized substitution of Subcontractors; nor have any unauthorized subcontracts been entered into.

3. No subcontract was assigned or transferred or performed by anyone other than the original Subcontractor; except as provided in Sections 4100-4113, inclusive, of the Public Contract Code.

(Signed)_____
Contractor

36. COORDINATION WITH OTHERS AND OTHER CONTRACTS:

A. The County reserves the right to award other contracts for any Work on any portion of the project not included in this Contract.

B. Where coordination with other Contractors is required, the Contractor shall make the appropriate provisions in Contractor's CPM schedule for the access to the site by those Contractors, the schedules of Work developed by them, and any coordination required between any of those Contractors and between any of them and this Contractor.

C. The Contractor shall perform the Work of the Contract so that it will properly coordinate and fit the Work performed by other Contractors. He shall give the other Contractors every reasonable opportunity to perform their Work, store materials, and place equipment thereof, and fit their Work to the Work of other Contractors. They shall furnish to the other Contractors all information necessary in order that they may properly connect and fit their

Work to Contractor's in ample time, so that they may have reasonable opportunity to prepare their Work therefore. They shall make the Work of this Contract ready to receive the Work of the other Contractors at the time fixed thereof, and shall fit this Work to that of the other Contractors at the time fixed therefore.

D. The Contractor shall cooperate with others in the prosecution of all Work and shall not interfere with material, equipment, or workers of the County or other Contractors engaged by the County at the site of the Work.

E. All Contractors engaged in Work at the site shall have, insofar as practical, equal use of the premises and facilities. In case of disagreement regarding such use, the matter shall be referred to the Department, whose decision relative to said use shall govern.

F. If any part of the Contractor's Work depends on proper execution or results upon the Work of any other separate Contractor, the Contractor shall inspect and promptly report to the Director any apparent discrepancies or defects in such Work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report shall constitute an acceptance of the other contractor's Work as fit and proper to receive the Contractor's Work, except as to defects which may develop in the other separate contractor's Work after the execution of the Contractor's Work.

G. Should the Contractor cause damage to the Work or property of any separate Contractor on the project, the Contractor shall, upon due notice, settle with such other Contractor by agreement or arbitration if it will so settle. If such separate Contractor sues the County or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, the County shall notify the Contractor who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the County arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the County for all attorney's fees and court or arbitration costs which the County has incurred.

37. CONTRACTOR'S CONSTRUCTION EQUIPMENT:

The Contractor shall furnish and maintain all equipment such as stairs, ramps, runways, scaffolds, hoists, etc., required for the proper execution of the Work. All such equipment and construction shall meet all requirements of all ordinances and laws applicable thereto.

38. CONTRACTOR PERSONNEL:

A. The Contractor agrees to employ only orderly and competent workers, skillful in the performance of the type of Work required under this Contract, to do the Work and agrees that whenever the County informs the Contractor in writing that any workers on the Site are incompetent or disorderly, such Worker shall be discharged from the Work and shall not again be employed on the Work without the County's written consent.

B. The Contractor shall give adequate attention to the faithful prosecution and completion of this Contract and shall keep on the Site at all times during project's progress, competent personnel superintendent and any necessary assistants to supervise and direct the Work. Grounds for removal of Contractor personnel specifically include (but is not limited to) the failure or refusal of such personnel to adhere to the Contractor's planned Construction Schedule as developed by the Contractor under Section 01 32 00.

39. AUDITS AND RECORDS:

The Contractor shall maintain all data and records pertinent to the Work performed under this Contract, in accordance with generally accepted accounting principles, and shall preserve and make available all data and records until the expiration of four (4) years from the date of final payment under this Contract, or for such longer period, if any, as is required by applicable statute or by other articles of this Contract. The authorized representatives of the County shall have access to all such data and records for such time period to inspect, audit, and make copies thereof during normal business hours. Contractor covenants and agrees that it shall require that any subcontractor utilized in the performance of this Contract shall permit the authorized representatives of the Los Angeles County Department of Public Works to similarly inspect and audit all data and records of said Subcontractors relating to the performance of said Subcontractors under this Contract for the same time period.

40. WARRANTY AND CORRECTIONS TO WORK:

A. In addition to any other warranties in the Contract Documents, the Contractor warrants that Work performed under this Contract conforms to the Contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any Subcontractor or supplier at any tier.

B. Corrections to the Work may be required during construction or any applicable warranty period. At the County's option, the cost of such corrections may be withheld from progress payments.

C. This warranty shall continue for a period of one (1) year from the date of Substantial Completion of the Work. If the County takes occupancy of any part of the Work before Substantial Completion, a warranty covering that specific portion of the Work shall begin for a period of one year from the date the County takes beneficial occupancy. The County will notify the Contractor in writing of the scope of any partial occupancy and the specific items under warranty.

D. The Contractor shall remedy at the Contractor's expense any failure to conform to the requirements of the Contract Documents or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to County-owned or controlled real or personal property, when that damage is the result of:

1. The Contractor's failure to conform to or comply with Contract requirements; or

2. Any defect of Contractor-furnished equipment, material, workmanship, or design.

E. The Contractor shall restore any Work damaged in fulfilling the terms and conditions of this Article. The Contractor's warranty with respect to Work repaired or replaced shall be extended for one (1) year from the date of repair or replacement.

F. The Director shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

G. If the Contractor fails to remedy any failure, defect, or damage within ten (10) working days (or immediately in the case of an emergency where delay would cause serious risk of loss or damage) after receipt of notice, the County shall have the right to remove, replace, repair, or otherwise remedy the failure, defect, or damage, and all direct and indirect costs of such removal, replacement, repair, and correction, including compensation for additional professional services, shall be paid by the Contractor.

H. With respect to all warranties, express or implied, from Subcontractors, manufacturers, or suppliers for Work performed and materials furnished under this contract, the Contractor shall:

1. Obtain all warranties that would be given in normal commercial practice;

2. Require all warranties to be executed, in writing, for the benefit of the County, if directed by the Director; and

3. Enforce all warranties for the benefit of the County, if directed by the Director.

I. In the event the Contractor's warranty has expired, the County may bring suit at County's expense to enforce a Subcontractor's, manufacturer's or supplier's warranty.

J. Unless a defect is caused by the Contractor or Subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the County, nor for the repair of any damage that results from any defect in County-furnished material or design.

K. This warranty shall not limit the County's rights under other articles of this Contract or as provided by law with respect to latent defects, gross mistakes, or fraud.

L. The terms of this Article do not relieve the Contractor of any legal liability for defects discovered after one year from the date of occupancy. The obligations imposed by this article shall survive termination of the Contract.

41. HAZARDOUS MATERIAL

A. Hazardous Material is any product, substance, chemical, crude oil (or any products, by-products, or fractions thereof), whose nature, quantity, and/or intensity of existence, use, manufacture, disposal, transportation, spill, release or effect, either by itself or in combination with other material or materials in, on or about the project site: (a) is or becomes potentially injurious to the public health, safety or welfare, environment, or the project site; (b) is or becomes regulated or monitored by any governmental authority; or (c) may, according to statutory or common law theory, such as nuisance (public or private), waste, trespass, negligence, strict liability, or tort, be a basis for liability in tort, or be a basis for liability to third parties.

B. Contractor shall notify the County when the Contractor has reason to suspect the presence of any Hazardous Material on the project site, whether or not such material was generated by Contractor or the County.

C. In the event the presence of hazardous material is suspected or discovered on the project site, the County shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required.

D. Except as may be otherwise provided herein, the Contractor shall not be obligated to commence or continue Work in the affected area until any known or suspected hazardous material discovered on the project site has been removed, or rendered or determined to be harmless by the County, as certified by an independent testing laboratory and approved by the appropriate government agency.

E. In the event the presence of hazardous materials on the project site is not caused by the Contractor, the County shall pay for all costs of testing and remediation, if any, and shall compensate Contractor any additional costs incurred or project delay in accordance with the applicable provisions of changes in the work herein. In addition, the County shall defend indemnify and hold harmless the Contractor and its agents, officers, directors and employees from and against any and all claims, damages, losses, costs, and expenses incurred in connection with or arising out of relating to the performance of the Work in the area affected by the hazardous material.

F. In the event the presence of hazardous materials on the project site is caused by the Contractor, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the County for any additional costs incurred as a result of Contractor's generation of hazardous material on the project site. In addition, the Contractor shall defend, indemnify, and hold harmless the County and its Special Districts and agents, officers, and employees from and against any and all claims, damages, losses, costs, and expenses incurred in connection with, or arising out of, or relating to, the presence of hazardous material on the project site.

G. The terms of this hazardous material provision shall survive the completion of the Work and/or any termination of this Contract.

42. CONTRACTOR SAFETY REQUIREMENTS:

In the performance of this Contract, the Contractor shall comply with all applicable federal, state, and local laws governing safety, health, and sanitation.

A. **Jobsite Safety:** The Contractor shall be solely responsible for ensuring that all work performed under the Contract is performed in strict compliance with all applicable Federal, State and local occupational safety regulations. The Contractor shall provide at its expense all safeguards, safety devices, and protective equipment, and shall take any and all actions appropriate to providing a safe jobsite.

B. **Project Safety Official:** The Contractor shall designate in writing a Project Safety Official who shall be at the jobsite at all times, and who shall be thoroughly familiar with the Contractor's Injury and Illness Prevention Program (IIPP) and Code of Safe Practices (CSP). The Project Safety Official shall be available at all times to abate any potential safety hazards and shall have the authority and responsibility to shut down an operation, if necessary. Failure by the Contractor to provide the required Project Safety Official shall be grounds for the County to direct the cessation of all work activities and operations at no cost to the County until such time as the Contract is in compliance.

C. **Safety Indemnification:** To the extent allowed by law, the Contractor agrees to defend, indemnify and hold harmless the County and its officers, employees, and agents from and against any and all investigations, complaints, citations, liability, expense (including defense costs and legal fees), claims and/or causes of action for damages of any nature whatsoever, including but not limited to injury or death to employees of the Contractor, its subcontractors or County attributable to any alleged act or omission of the Contractor or its subcontractor which is in violation of any CAL/OSHA regulation. The obligation to defend, indemnify and hold harmless includes all investigations and proceedings associated with purported violations of Section 336.10 of Title 8 of the California Code of Regulations pertaining to multi-employer work sites. The County may deduct from any payment otherwise due the Contractor any costs incurred or anticipated to be incurred by the County, including legal fees and staff costs, associated with any investigation or enforcement proceeding brought by CAL/OSHA arising out of the Project.

43. <u>INDEMNIFICATION</u>:

A. Until the Work is completed and accepted by the awarding entity, the Contractor shall indemnify, defend, and hold harmless the County, its Special Districts, elected and appointed officials, officers, employees, agents, and trustees (the indemnified parties) from and against any and all liability, loss, injury, or damage including (but not limited to) demands, claims, actions,

fees, costs and expenses (including attorney and expert witness fees) arising from or connected with the Contractor's acts and/or errors and omissions arising from and/or relating to the Project. This indemnification does not apply to liability caused by the active negligence of the County.

B. The Contractor shall assume all risks and bear all cost for loss of, damage to, or missing or stolen equipment, tools, vehicles, and materials owned, hired, leased, or used by the Contractor for this Project.

44. GENERAL INSURANCE REQUIREMENTS:

Without limiting the Contractor's indemnification, the Contractor shall provide and maintain, during the term of this Agreement, the insurance specified in this Agreement. Such insurance shall be primary to, and not contributing with, any insurance or self-insurance programs maintained by the County and such coverage shall be provided and maintained at the Contractor's own expense.

A. Evidence of Insurance: Certificate(s) or other evidence of coverage satisfactory to the County shall be delivered to the project contract administrator (as identified in the Invitation for Bids) at Los Angeles County Department of Public Works, Business Relations and Contracts Division, Contracts Administration Section, P.O. Box 1460, Alhambra, CA 91802-1460, prior to commencing services under this Agreement. Such certificate(s) or other evidence shall:

1. Specifically identify this Agreement, including the project name and specification number.

2. Clearly evidence all insurance required in this Agreement.

3. Contain the express condition that the County is to be given written notice by the issuing insurance company by mail at least 30 days in advance of cancellation for all policies evidenced on the certificate of insurance.

4. Include a copy of the additional insured endorsement to the commercial general liability policy, adding the indemnified parties (the County of Los Angeles and its Special Districts) as insureds for all activities arising from this Agreement.

5. Show the Contractor's insurance as primary to the County's insurance and self-insurance programs. This may be evidenced by adding the following statement to the additional insured endorsement, "It is

further agreed that the insurance afforded by this policy is primary to any insurance or self-insurance programs maintained by the additional insureds, and the additional insureds insurance and self-insurance programs are excess and non-contributing to the named insureds insurance."

6. Confirm deductibles or self-insured retentions shall not exceed $25,000, and the deductibles/retentions apply on a "per occurrence" or "per loss" basis. The County retains the right to require the Contractor to provide a bond guaranteeing payment of all such retained losses and costs attributable to the Contractor's retention, or, withhold payment to Contractor in the amount of all or any deductibles/retentions as the County deems appropriate.

B. Insurer Financial Ratings: Insurance is to be provided by an insurance company authorized to do business in California and acceptable to the County, with an A.M. Best rating of not less than A:IX, unless otherwise approved by the County.

C. Waiver of Subrogation: The Contractor agrees to release the indemnified parties and waive its rights of recovery against the indemnified parties under the insurance policies specified in this Agreement.

D. Cancellation of or Changes in Insurance: Contractor shall provide County with, or Contractor's insurance policies shall contain a provision that County shall receive, written notice of cancellation or any change in Required Insurance, including insurer, limits of coverage, term of coverage or policy period. The written notice shall be provided to County at least ten (10) days in advance of cancellation for non-payment of premium and thirty (30) days in advance for any other cancellation or policy change. Failure to provide written notice of cancellation or any change in Required Insurance may constitute a material breach of the Contract, in the sole discretion of the County, upon which the County may suspend or terminate this Contract.

E. Failure to Maintain Insurance: Contractor's failure to maintain or to provide acceptable evidence that it maintains the Required Insurance shall constitute a material breach of the Contract, upon which County immediately may withhold payments due to Contractor, and/or suspend or terminate this Contract. County, at its sole discretion, may obtain damages from Contractor resulting from said breach. Alternatively, the County may purchase the Required Insurance, and without further notice to Contractor, deduct the premium cost from sums due to Contractor or pursue Contractor reimbursement.

F. Sub-Contractor Insurance Coverage Requirements: Contractor shall include all Sub-Contractors as insureds under Contractor's own policies, or shall provide County with each Sub-Contractor's separate evidence of insurance coverage. Contractor shall be responsible for verifying each Sub-Contractor complies with the Required Insurance provisions herein, and shall require that each Sub-Contractor name the County and Contractor as additional insureds on the Sub-Contractor's General Liability policy. Contractor shall obtain County's prior review and approval of any Sub-Contractor request for modification of the Required Insurance.

45. INSURANCE COVERAGE REQUIREMENTS--TYPES AND LIMITS:

The County's insurance requirements specify that Contractors should obtain coverage from insurance companies acceptable to the County who have a current A.M. Best rating of not less than A:IX. A Best rating of A:IX indicates that the company evidences strong financial strength and ability to meet their ongoing financial obligations to policyholders.

A. Builders Risk Course of Construction Insurance: Such coverage shall:

1. Insure against damage from perils covered by the Causes-of-Loss Special Form (ISO form CP 10 30), and be endorsed to include earthquake, flood, ordinance or law coverage, coverage for temporary offsite storage, debris removal, pollutant cleanup and removal, testing, preservation of property, excavation costs, landscaping, shrubs and plants and full collapse coverage during construction (without restricting collapse coverage to specified perils).

2. If Contractor's work involves testing air conditioning systems, boilers, pressure vessels, major machinery or major electrical panels, policy shall include coverage for such testing.

3. Be written on a completed-value basis and cover the entire value of the construction Project, including County-furnished materials and equipment, against loss or damage until completion and acceptance by the County. See Supplementary Conditions, Section 00 08 00, Article 7, Insurance Coverage Requirements—Types and Limits, for additional information regarding replacement value of County-furnished materials and equipment.

B. General Liability Insurance: Such coverage shall be written on ISO policy form CG 00 01 or its equivalent. See Supplementary Conditions, Section 00 08 00, Article 7, Insurance Coverage Requirements—Types and Limits, for

additional information regarding limits, occurrence, policy aggregate, and products/completed operations aggregate.

C. Automobile Liability Insurance: Such coverage shall be written on ISO form CA 00 01 or its equivalent. Such insurance shall include coverage for all "owned," "hired," and "non-owned" automobiles, or coverage for "any auto." See Supplementary Conditions, Section 00 08 00, Article 7, Insurance Coverage Requirements—Types and Limits, for additional information regarding liability limits.

D. Workers Compensation and Employers Liability Insurance: Such coverage shall provide workers compensation benefits, as required by the Labor Code of the State of California. Such policy shall be endorsed to waive subrogation against the County for injury to the Contractor's employees. If the Contractor's employees will be engaged in maritime employment, the coverage shall provide the benefits required by the U.S. Longshore and Harbor Workers Compensation Act, Jones Act, or any other Federal law to which the Contractor is subject.

1. In all cases, the above insurance shall include Employers Liability coverage with limits not less than:

| | | |
|---|---|---|
| a. | Each accident: | $1 million |
| b. | Disease – policy limit: | $1 million |
| c. | Disease – each employee: | $1 million |

E. Performance Security Requirements:

Prior to execution of the Contract, the Contractor shall file surety bonds with the County in the amounts and for the purposes noted below, and on bond forms provided by the County. All bonds issued in compliance with the Contract shall be duly executed by a solvent surety company that is authorized by the State of California, is listed in the U.S. Department of Treasury's Listing of Approved Sureties (Annual Circular 570) and is satisfactory to the County, and it shall pay all premiums and costs thereof and incidental thereto (see http://www.fms.treas.gov/c570/).

1. Materials and Labor Bond (Payment Bond): Shall be in the sum of not less than 100% of the Contract price to assure the payment of claims of material men supplying materials to the Contractor, subcontractors, mechanics, and laborers employed by the Contractor on the Work. This bond shall be so conditioned as to inure to the benefit of persons furnishing materials for or performing labor upon the Work. This bond

shall be maintained by the Contractor in full force and effect until the Work is completed and accepted by the County, and until all claims for materials, labor, and subcontracts are paid.

2. Bond for Faithful Performance: Shall be in the sum of not less than 100% of the Contract price to assure the faithful performance of the Contract. This bond shall be so conditioned as to assure the faithful performance by the Contractor of all Work under said Contract, within the time limits prescribed, including any maintenance and warranty provisions, in a manner that is satisfactory and acceptable to the County, that all materials and workmanship supplied by the Contractor will be free from original or developed defects, and that should original or developed defects or failures appear within a period of one year from the date of acceptance of the Work by the County, the Contractor shall, at Contractor's own expense, make good such defects and failures and make all replacements and adjustments required, within a reasonable time after being notified by the County to do so, and to the approval of the Department of Public Works. This bond shall be maintained by the Contractor in full force and effect during the performance of the Work of the Contract and for a period of one year after acceptance of the Work by the County.

Each bond shall be signed by both the Contractor (as Principal) and the surety.

Should any surety or sureties upon said bonds or any of them become insufficient or be deemed unsatisfactory by the County, the Contractor shall replace said bond or bonds with good and sufficient sureties within ten days after receiving notice from the County that the surety or sureties are insufficient or unsatisfactory. Should any surety or sureties be deemed insufficient or unsatisfactory, no payment(s) shall be deemed due or will be made under this Contract until the new sureties shall qualify and be accepted by the County.

46. Not used.

47. Not used.

48. ASSIGNMENT:

A. The Contractor shall not assign this Contract without the consent of the County. The Contractor shall be bound by and comply with all applicable provisions of the Labor Code of the State of California and shall keep

informed of and observe and comply with and cause all of Contractor's agents and employees to observe and comply with all federal, state, and local laws which in any way affect the conduct of the Work of this Contract.

B. Work performed on County-owned property, irrespective of political subdivision location, shall be governed by the County Building Laws, and Work performed outside the property lines of County-owned property shall be governed by the local laws of the County, city, or other municipal government having jurisdiction.

49. PATENTS:

In the event that any patented article, material, or process is to be installed or used in the performance of the Work as shown on the drawings or particular specifications therefore, the Contractor shall pay the royalty chargeable and shall save, keep, and bear the County harmless from all damage, costs, and expenses by reason of any infringement of the patent therefor, or by reason of the failure to pay the royalty chargeable for use thereof, and any loss to the County or the awarding entity in the event that the County is enjoined from using such patented article or material and the incidental damage caused by the loss of use and damage to County property or awarding entity in removing same, and cost of replacing the article or material the use of which is enjoined. Provided further the Bond for Faithful Performance shall be deemed to expressly apply to this provision of the specifications.

50. SUSPENSION AND/OR TERMINATION OF WORK AND/OR CONTRACT:

A. Suspension of Work

1. The Director may order the Contractor in writing to suspend, delay or interrupt all or any part of the Work for such period of time as he may determine to be appropriate for the convenience of the County.

2. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize incurring costs allocable to the Work covered by the order during the period of Work stoppage.

3. If the performance of all or any part of the Work is, for an unreasonable period of time, suspended, delayed, or interrupted by (a) an act of the County in the administration of this Contract, or (b) by the County's failure to act within the time specified in this Contract (or, if no time is specified, within a reasonable time), an adjustment shall

be made for any increase in cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption, and the Contract modified in writing accordingly. However, no adjustment shall be made under this Article for any suspension, delay, or interruption to the extent (a) that performance would have been suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or (b) for which an adjustment is provided for or excluded under any other provision of this Contract.

4. No claim under this paragraph shall be allowed (a) for any costs incurred more than fourteen (14) calendar days before the Contractor shall have notified the County in writing of the act or failure to act involved, (but this requirement shall not apply as to a claim resulting from a suspension order), and (b) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment. No part of any claim based on the provisions of this clause shall be allowed if not supported by adequate evidence showing that the cost would not have been incurred but for a delay within the provisions of this Article.

B. Termination for Convenience

1. The Director may, whenever the interests of the County so require, terminate this Contract, in whole or in part, for the convenience of the County. The County shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and the date termination becomes effective.

   a. The Contractor shall incur no further obligations in connection with the terminated Work, and, on the date set in the notice of termination, the Contractor shall stop Work to the extent specified. The Contractor shall also terminate outstanding orders and subcontracts as they relate to the terminated Work. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated Work. The County may direct the Contractor to assign the Contractor's right, title, and interest under the terminated orders or subcontracts to the County. The Contractor must still complete the Work not terminated by the notice of termination and may incur obligations as are necessary to do so.

b. The County may require the Contractor to transfer title and deliver to the County in the manner and to the extent directed by the County: (a) the fabricated or unfabricated parts, Work in process, completed Work, supplies, and other material produced or acquired for the Work terminated; and (b) the completed or partially completed plans, drawings, information, and other property that, if the Contract had been completed, would be required to be furnished to the County. The Contractor shall, upon direction of the County, protect and preserve property in the possession of the Contractor in which the County has an interest. If the County does not exercise this right, the Contractor shall use its best efforts to sell such supplies and manufacturing materials for the benefit of the County.

c. If the parties are unable to agree on the amount of a termination settlement, the County shall pay the Contractor the following amounts:

1. For Contract Work performed before the effective date of termination, the total (without duplication of any items) of:

(a) The percentage of the Contract price which equals the percentage (%) of Work completed in accordance with the schedule of values, less prior progress payments, and any applicable Liquidated Damages. The amounts of outstanding Stop Notices shall be withheld until the Stop Notices are resolved as provided by law.

(b) The cost of settling and paying terminated subcontracts and orders that are properly chargeable to the terminated portion of the Work;

2. The reasonable costs of effectuating the settlement of the Work terminated, including:

(a) Accounting, clerical, and other expenses reasonably necessary for the preparation of termination settlement bids and supporting data;

(b) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(c) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

C. Termination for Default

1. If the Contractor refuses or fails (a) to commence the Work within the time required by this Contract, (b) to prosecute the Work or any separable part with the diligence that will ensure completion within the time specified in this Contract, including any authorized extension, (c) to provide sufficient and properly skilled workers or proper materials or equipment to complete the Work in an acceptable manner and without delay, (d) to promptly pay its subcontractors, laborers, and materialmen, (e) to perform any of Contractor's other obligations under this Contract, or (f) to complete the Work within the time specified in this Contract ("events of default"), the County may, by written notice to the Contractor, terminate the right to proceed with the Work (or the separable part of the Work). In this event, the County may take over the Work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the site necessary for completing the Work. The Contractor and Contractor's sureties shall be liable for any damage to the County resulting from events of the default, whether or not the Contractor's right to proceed with the Work is terminated. This liability includes any increased costs incurred by the County in completing the Work.

2. The Contractor's right to proceed shall not be terminated because of delays, nor will the Contractor be charged with damages under this article, if:

a. The delay in completing the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor (examples of such causes include: (i) acts of God, (ii) acts of the public enemy, (iii) acts of the County in either its public or contractual capacity, (iv) acts of another Contractor in the performance of a contract with the County, (v) fires, (vi) floods, (vii) epidemics, (viii) quarantine restrictions, (ix) strikes, (x) freight embargoes, (xi) unusually severe

weather, or (xii) delays of Subcontractors or Suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the Subcontractors or Suppliers); and,

b. The Contractor, within fourteen (14) calendar days from the beginning of any delay (unless extended by the County), notifies the County in writing of the causes of the delay in accordance with Specification Section 001310, Construction Schedule. The County shall ascertain the facts and the extent of the delay. If, in the judgment of the County, the findings warrant such action, the time for completing the Work shall be extended by Change Order. The findings of the County will be final and conclusive on the parties.

3. If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the County.

4. The rights and remedies of the County in this article are in addition to any other rights and remedies provided by law or under this Contract. Time is of the essence for all delivery, performance, submittal, and completion dates in this Contract.

D. Termination for Improper Consideration

1. County may, by written notice to Contractor, immediately terminate the right of Contractor to proceed under this Contract if it is found that consideration, in any form, was offered or given by Contractor, either directly or through an intermediary, to any County officer, employee, or agent with the intent of securing the Contract or securing favorable treatment with respect to the award, amendment, or extension of the Contract or the making of any determinations with respect to the Contractor's performance pursuant to the Contract. In the event of such termination, County shall be entitled to pursue the same remedies against Contractor as it could pursue in the event of default by the Contractor.

2. Contractor shall immediately report any attempt by a County officer or employee to solicit such improper consideration. The report shall be made either to the County manager charged with the supervision of

the employee or to the County Auditor-Controller's Employee Fraud Hotline at (213) 974-0914 or (800) 544-6861.

3. Among other items, such improper consideration may take the form of cash, discounts, services, the provision of travel or entertainment, or tangible gifts.

E. Notice of suspension or termination for any reason shall be given in writing and shall be complete one day after deposit in the United States mail in a sealed envelope with postage prepaid and directed to the Contractor at Contractor's address as filed with the County, or upon personal delivery to any person whose actual knowledge of such suspension or termination would be sufficient notice to the Contractor. Actual knowledge of such suspension or termination by an individual Contractor or by a copartner, if the Contractor be a partnership or by the president, vice-president, secretary or general manager, if the Contractor be a corporation, or by the managing agent regularly in charge of the Work on behalf of said Contractor, shall in any case be sufficient notice.

51. CONTRACTOR'S WARRANTY OF ADHERENCE TO COUNTY'S CHILD SUPPORT COMPLIANCE PROGRAM:

A. Contractor acknowledges that County has established a goal of ensuring that all individuals who benefit financially from County through Contract are in compliance with their court-ordered child, family, and spousal support obligations in order to mitigate the economic burden otherwise imposed upon County and its taxpayers.

B. As required by County's Child Support Compliance Program (County Code Chapter 2.200) and without limiting Contractor's duty under this Contract to comply with all applicable provisions of law, Contractor warrants that it is now in compliance and shall, during the term of this Contract, maintain compliance with employment and wage reporting requirements as required by the Federal Social Security Act (42 USC Section 653a) and California Unemployment Insurance Code Section 1088.5, and shall implement all lawfully serviced Wage and Earnings Withholding Orders or District Attorney Notices of Wage and Earnings Assignment for Child or Spousal Support, pursuant to Code of Civil Procedure Section 706.031 and Family Code Section 5246(b).

C. Failure of Contractor to maintain compliance with these requirements shall constitute a default by Contractor under this Contract. Without limiting the rights and remedies available to County under any other provision of this

Contract, failure to cure such default within ninety (90) days of notice by the Los Angeles County District Attorney shall be grounds upon which the County Board of Supervisors may terminate this Contract.

52. CONTRACTOR'S ACKNOWLEDGMENT OF COUNTY'S COMMITMENT TO CHILD SUPPORT ENFORCEMENT:

Contractor acknowledges that County places a high priority on the enforcement of child support laws and the apprehension of child support evaders. Contractor understands that it is County's policy to encourage all County Contractors to voluntarily post County's L.A.'s Most Wanted: Delinquent Parents poster in a prominent position at Contractor's place of business. County's District Attorney will supply Contractor with the poster to be used.

53. LIMITATION OF LIABILITY:

A. This project may be awarded by or the Contract may be assigned to a joint powers authority or a nonprofit corporation established by the awarding entity. Bonds, certificates of participation, or other evidences of indebtedness will be issued by a joint powers authority or nonprofit corporation or the awarding entity or the County, for the purpose of constructing the Work contemplated by these Drawings and Specifications. The proceeds of said sale shall be the sole source of funds for payment of all Work to be done and all claims of any kind that may be made under the provisions of this Contract. Neither the awarding entity, nor (if different) the issuing entity, nor any individual parties thereto, nor the County, nor the County's agents and Special Districts, shall have any liability whatsoever to the Contractor or others arising out of, or in any way connected with, Work to be performed hereunder, save and except as such liability may be paid and discharged out of said proceeds, and except as specifically provided for in these specifications. Contractor shall look solely to said proceeds for payment of Work to be done or any claims whatsoever that may be asserted hereunder. Contractor expressly releases and discharges the awarding entity, the issuing entity, and the County and each of them from any and all liability, cost, or expenses save and except such liability, cost, and expense as may be paid for out of said proceeds.

B. The issuing entity will adopt a policy to sell and issue bonds, certificates of participation, or other evidences of indebtedness at such times and in sufficient amounts to ensure that funds are provided for the prompt payment, as installments become due, for Work performed hereunder.

54. FORUM SELECTION:

Contractor hereby agrees to submit to the jurisdiction of the courts of the State of California. The exclusive venue of any action brought by Contractor, on Contractor's behalf or on the behalf of any Subcontractor, which arises from this agreement or is concerning or connected with services performed pursuant to this agreement, shall be deemed to be in the courts of the State of California located in Los Angeles County, California.

55. WAIVER:

The waiver by the County of any term, covenant, or condition herein contained shall not be deemed to be a waiver of such term, covenant, or condition on any subsequent breach of the same or any other term, covenant, or condition herein contained.

56. PRIOR AGREEMENTS:

This Contract contains all of the agreements of the parties hereto with respect to any matter covered or mentioned in this agreement and no prior agreements or understanding pertaining to any such matter shall be effective for any purpose. No provision of this Contract may be amended or added to except by an agreement in writing signed by the parties hereto or their respective successor-in-interest.

57. PROGRESS PAYMENTS:

In accordance with Public Contract Code Section 20104.50, the County shall make progress payments within thirty (30) days after receipt of an undisputed and properly submitted payment request from a Contractor on a construction contract. Interest shall be paid to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure if the County fails to make payment within the thirty (30) days. If the payment request is determined not to be a proper payment request suitable for payment, it shall be returned to the Contractor as soon as practicable, but not later than seven (7) days after receipt accompanied by a document setting forth in writing the reasons why the payment request is not proper. The Contractor will prepare and submit progress payments as directed by the County Project Manager.

58. ACCEPTANCE OF FINAL PAYMENT AS RELEASE:

The acceptance by the Contractor of the final payment shall be and shall operate as a release to the County and the awarding entity of all claims and all liability to the Contractor for all things done or furnished in connection with this Work and for every

act and neglect of the County, awarding entity, and others relating to or arising out of this Work. No payment, however final or otherwise, shall operate to release the Contractor or his sureties from any obligation under this contract or the Performance and Payment Bond.

59. SUBSTITUTION OF SECURITIES FOR RETENTION:

In accordance with Public Contracts Code Section 22300 et seq., the Contractor may substitute securities for retention monies to be withheld to ensure performance under this Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld may be deposited with the County, or with an approved State or Federally chartered bank as the escrow agent. The County will then pay such retention moneys to the Contractor. It is the Contractor's obligation to secure the services of a state or federally chartered bank to act as escrow agent. Securities eligible for investment include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit. The Contractor shall be the beneficial owner of any securities substituted for retention monies withheld and shall receive any interest earned by the securities. The standard form of the County's Escrow Agreement is on file at the Business Relations and Contracts Division of the Department of Public Works. The terms of that Agreement are incorporated by reference.

60. RESOLUTION OF CONSTRUCTION CLAIMS:

The provision of Public Contract Code 20104 et seq. relating to the resolution of construction claims of three hundred seventy-five thousand dollars ($375,000) or less which arise between a Contractor and a local agency are hereby incorporated in this Contract.

61. CONFLICT OF INTEREST:

No County employee whose position in County enables him to influence the award of this agreement or any competing agreement, and no spouse or economic dependent of such employee, shall be employed in any capacity by Contractor herein, or have any other direct or indirect financial interest in this Agreement.

62. ANTI-TRUST CLAIMS:

In entering into a public works Contract or a Subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C.

Sec. 15) or under the 44 Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2, Division 7, of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works Contract or Subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the Contractor, without further acknowledgment by the parties.

63. COUNTY'S QUALITY ASSURANCE PLAN:

The County or its agent will evaluate Contractor's performance under this agreement on not less than an annual basis. Such evaluation will include assessing Contractor's compliance with all contract terms and performance standards. Contractor deficiencies which County determines are severe or continuing, and that may place performance of the agreement in jeopardy if not corrected, will be reported to the Board of Supervisors. The report will include improvement/corrective action measures taken by the County and Contractor. If improvement does not occur consistent with the corrective action measures, County may terminate this agreement or impose other penalties as specified in this agreement.

64. LAWS, CODES AND REGULATIONS TO BE OBSERVED:

A. The Contractor shall become familiar and comply with all Federal, State, County and City laws, ordinances or regulations controlling the action or operation of those engaged in the work, or affecting materials used, and operate in accordance therewith.

B. In accordance with this requirement, it has not been considered necessary to enumerate all wiring, plumbing and other requirements covered by the codes. The Contractor, in making a bid, agrees that the requirements of such ordinances will be as carefully adhered to as if they were specifically set forth in the specifications.

C. The Contractor shall hold harmless the County and all of its officers, agents and servants against any claims or liability arising from, or based upon the violation of such laws, by-laws, ordinances, regulations, orders or decrees, whether by the Contractor or the Contractor's employees, except where the instance of violation is done in accordance with the specifications.

D. Work performed on County-owned property, irrespective of political subdivision location, shall be governed by the County Building Laws; and work performed outside the property lines of County-owned property shall be governed by the local laws of the County, City, or other municipal government having jurisdiction.

* * *

# SECTION 00 08 00

# SUPPLEMENTARY CONDITIONS

1. DEFINITIONS:

Whenever the following words appear in the Contract Documents, they will be construed to have the following meanings:

a. "County" means the County of Los Angeles.

b. "Awarding Entity/County" means either the County; the County, as agent for such joint powers authority or nonprofit corporation as may be involved in the issuance of bonds, certificates of participation or other evidences of indebtedness to finance the work contemplated herein; or said joint powers authority or nonprofit corporation.

c. "Board of Supervisors" means the Board of Supervisors, County of Los Angeles, California.

d. "Department" means the Department of Public Works.

e. "Owner" means the County of Los Angeles, represented by the Department of Public Works.

f. "Director" means the Director of the Department of Public Works or his authorized representative.

g. "Architect" means NAC Architecture, or their authorized representative.

h. "Project Manual" means the manual prepared for the project, consisting of the Bid and Contract Requirements, Conditions of the Contract, and Technical Specifications.

I. "Contract" means the agreement which has been executed by the Contractor and the County.

j. "Contract Documents" means those documents identified in Paragraph 5 of the General Conditions.

k. "Contractor" means the Prime Contractor awarded the Contract by the Board of Supervisors.

l. "Award of Contract" means the date the Board of Supervisors awards the construction Contract to the Contractor.

m. "Notice to Proceed" means the date the Director authorizes the Contractor to proceed with the Contract work.

n. "Acceptance of the Project" means Los Angeles County Board of Supervisors or Director's acceptance of the work.

o. "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The work may constitute the whole or a part of the project.

p. "The Project" is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include Work by the County or others.

q. "Substantial Completion" means the Date of Substantial Completion of the Work, or designated portion thereof as set forth in the Contract Documents, certified by the County when construction is sufficiently complete, in accordance with the Contract Documents, so the County may occupy or use the Work, or designated portion thereof, for the use for which it is intended.

r. "Disputes Review Panel" reviews all matters related to disputes over the interpretation of the Drawings and Specifications.

s. "Notice to Bidders" means any written modification to the Contract Documents issued prior to the bid date.

t. "Day" means calendar day unless otherwise specified.

u. "Drawings" means the graphical and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the work, generally including plans, elevations, sections, details, schedules, and diagrams.

v. "Specifications" means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the work, and performance of related services.

w. "Inspection Notice": A sequentially numbered written notice issued to the Contractor for the purpose of, but not limited to, the following:

1) Define items/installations that deviate from the Contract Documents and which payment may be withheld.

2) Alert as to problem areas prior to issuing Noncompliance.

3) Void previously issued Inspection or Noncompliance Notice when corrections have been made.

4) Give notice of approval.

5) Provide general project information.

6) Define delinquent submittals.

7) Advise Contractor of not complying with safety requirements.

x. "Noncompliance Notice": A sequentially numbered written notice issued to the Contractor that defines materials, installations, and/or situations that do not comply with codes or the Contract Documents and which payment cannot be made. The statement "remove and replace" will be included when required.

2. PAYMENTS:

Payments on account of the Work comprising the original Contract shall be made upon demand of the Contractor as follows:

a. A working day of the month shall be selected by the County and the Contractor, which day shall remain constant throughout the life of the project, and vary only as needed to fall on a working day. A payment request equal to ninety-five percent (95%) of the labor performed and material actually installed in the work during the previous thirty (30) days or since the last payment request shall be submitted by the Contractor and presented to the County for payment.

b. A payment request for the 5% withheld from the monthly progress payments shall be submitted by the Contractor to the County upon completion and acceptance by the County of all the work called for under the original Contract.

c. In the event of payment on account of additional work for a Change Order, supplemental agreement, or unit price authorization, the retention shall be as stipulated by the original Contract.

d. When progress payments are to be made, no payment on account of the work and at any time while there is work in progress, will be considered an acknowledgment that any or certain portions of the work have been done in accordance with the Drawings and Specifications. Should there be any balance due the Contractor at the time of the acceptance of the work such balance shall be paid upon said acceptance.

e. All demands for payment shall be itemized and rendered in six (6) copies by the Contractor and shall be certified by the Director when found by him to be correct. Payment will be made to the Contractor within thirty (30) days after the approval by the Director.

f. Cost of bonds or liability insurance shall not be included as an item in the demands for monthly progress payments. In the compilation of demands for progress payments, neither stipulated nor bid unit prices for deductions shall be used as the basis for computing prices for the work completed.

g. When the Contractor has requested payments that would bring his total payment to fifty percent (50%) of the Contract, all subcontractors and material suppliers on record with the Contract Administrator will be notified by U. S. Mail regarding the status of such payment.

Subcontractors and material suppliers of record will be advised to refer to their rights under the Civil Code relating to the "Stop Notices" and other means or methods of securing payment for their work or materials.

3. PAYMENT FOR STORED MATERIAL:

The Department, at its discretion, may authorize "Progress Payments" at the invoiced price, minus retention specified under "Payments", for:

a. Material and equipment delivered to the site but not incorporated in the Work.

b. Material and equipment delivered and stored off the site in a bonded warehouse or other location within Los Angeles County, which warehouse or other location is satisfactory to and has been approved by the Department.

c. The provisions allowing prepayment for materials will be applied to large items of equipment and construction materials of special manufacture or order for the job, such as:

1. Electrical switchgear, generators, and transformers over 15 KVA.

2. Mechanical items including air handlers over 15 horsepower, boilers, chillers, and fabricated ductwork.

3. Reinforcing steel and structural steel when fabricated to job requirements.

4. Carpeting, floor tile or ceiling tiles.

5. Electrical fixtures (less lamps) and light standards.

6. Door and security hardware.

7. Window wall assemblies.

8. Precast concrete members such as wall panels, "tees" or girders.

Contractor must furnish with his Request for Payment acceptable evidence showing such material and/or equipment has been paid for in full, together with a verified statement that same is/are free from all liens and encumbrances and will be utilized in the Work covered by this Contract and a material list sufficient for physical inventory at the storage location. All shop drawings and material submittals must be approved prior to authorizing payments.

All storage, handling and rehandling costs, insurance and responsibility for protection and proper installation of such material and equipment, is the obligation of the Contractor. No payment, pursuant to this provision for material or equipment, shall in any way relieve the Contractor of its responsibility to obtain or provide, at its expense, any such material or equipment, or release the Contractor from any of its obligations under this Contract.

Department may enter upon the premises where the material and/or equipment is stored for inspection, checking, or any other purpose it deems necessary. The Contractor will be reimbursed for any Los Angeles County taxes levied against such material or equipment while so stored, upon presentation of a receipted tax bill for same.

4. EQUIPMENT LAYOUT DRAWINGS:

When any section of the specifications requires the submittal of an "Equipment Layout Drawing", the Contractor shall coordinate all work under various sections of the Specifications to assure that no interferences occur in the rooms or areas for which such drawings have been required and that necessary clearances are provided.

Installation of affected equipment shall not proceed until required drawings have been approved by the Department.

5. AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS:

The following forms and reports are required to be completed by the Contractor and/or Subcontractors according to the instructions furnished for each and at the time shown below for each:

a. Within ten (10) working days of subcontract award:

- Contractor's Notification of Subcontracts Awarded

b. Prior to commencement of work:

- Notice of EEO Commitment

c. During the construction period:

- Monthly Employment Utilization Report (form CC257)

6. SURVEY OPERATIONS:

The Contractor shall be responsible for all survey and layout operations and shall be responsible for the following:

a. Locate elevations of all improvements, establish control points and bench marks adequate for the use of all trades so that all parts of the work are within the specified and indicated tolerances.

b. As the work proceeds, verify all grades, lines, and dimensions indicated on the drawings, and report errors and inconsistencies to the Architect in writing. Do not proceed until errors and inconsistencies are corrected.

c. Maintain staking as required by construction progress and maintain construction progress and maintain control points and benchmarks until final completion of the project.

7. INSURANCE COVERAGE REQUIREMENTS—TYPES AND LIMITS:

A. Builders Risk Course of Construction Insurance:

If new Work involves a major addition/renovation that could affect the structural integrity of the existing structure, Contractor shall insure the new Work and the existing structure for the total cost of the Contract plus the value of the existing structure.

1. Insure against damage from perils covered by the Causes-of-Loss Special Form (ISO form CP 10 30), and the perils of earthquake, flood, risk of transit loss, loss during storage (both onsite and offsite), and collapse during construction (without restricting collapse coverage to specified perils). If Project involves testing air conditioning systems, boilers, pressure vessels, major machinery or major electrical panels, policy shall include coverage for such testing.

2. Cover all property to be installed (including labor) for the full Contract value (without coinsurance) against loss or damage until completion and acceptance by the County.

3. Such coverage shall be equal to the total Contract cost.

B. General Liability Insurance:

Minimum coverage requirements shall provide limits of not less than $2,000,000 per occurrence, $4,000,000 policy aggregate, and $4,000,000 products/completed operations aggregate. The products/completed operations coverage shall continue to be maintained in the amount herein for at least two (2) years from the date the Project is completed and accepted by the County.

C. Automobile Liability Insurance:

Minimum coverage requirements shall provide a limit of not less than $2,000,000 per accident.

D. Workers Compensation and Employers Liability Insurance: Such coverage shall provide workers compensation benefits, as required by the Labor Code of the State of California. Such policy shall be endorsed to waive subrogation against the County for injury to the Contractor's employees. If the Contractor's employees will be engaged in maritime employment, the coverage shall provide the benefits required by the U.S. Longshore and Harbor Workers Compensation Act, Jones Act, or any other Federal law to which the Contractor is subject.

1. In all cases, the above insurance shall include Employers Liability coverage with limits not less than:

| | | |
|---|---|---|
| i. | Each accident: | $1 million |
| ii. | Disease – policy limit: | $1 million |
| iii. | Disease – each employee: | $1 million |

8. CERTIFICATE OF INSURANCE:

a. Refer to General Conditions, Articles 43, 44, and 45, regarding insurance.

b. Certificate of Insurance shall include the following statement:

"It is further understood and agreed that these insurance policies comply with the Contract requirements of this project."

c. The cancellation clause shall be modified to read as follows:

"Should any of the above-described policies be canceled before the expiration date thereof, the issuing company will mail 30 days written notice to the below-named certificate holder.

d. The Certificate of Insurance shall clearly state that the County of Los Angeles and its Special Districts are named as Additional Insured.

e. Include the name of the project and specification number on all insurance certificates.

9. CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT:

The Contractor shall comply with all applicable standards, orders, or regulations issued pursuant to the Clean Air Act of 1970 (42 U.S.C. 1857 et seq.) and the

Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) as amended. Violations shall be reported to the County and the Regional Office of the Environmental Protection Agency.

10. LOBBYING OF COUNTY OFFICIALS:

Contractor and each County lobbyist or County lobbying firm as defined in Los Angeles County Code Section 2.160.010, retained by Contractor, shall fully comply with the County Lobbyist Ordinance, Los Angeles County Code Chapter 2.160. Failure on the part of Contractor or any County lobbyist or County lobbying firm retained by Contractor to fully comply with the County Lobbyist Ordinance shall constitute a material breach of this Contract upon which County may immediately terminate or suspend this Contract.

11. CORRESPONDENCE:

All correspondence shall be addressed to the County of Los Angeles, Department of Public Works, P.O. Box 1460, Alhambra, California 91802-1460, Attention: Project Management Division. This address shall be included in all contracts with subcontractors and suppliers.

12. EMPLOYMENT OF LAID-OFF COUNTY EMPLOYEES - SKILLED TRADES AND OTHERS:

a. Should Contractor, or any Subcontractor performing more than $250,000 of the Contract value, require additional or replacement personnel to perform services under this Contract, other than the performance of a skilled trade, Contractor shall give first consideration for such employment openings to qualified former County employees who are on a re-employment list.

b. Should Contractor, or any Subcontractor performing more than $250,000 of the Contract value, require additional or replacement personnel to perform a skilled trade not covered by an existing union hiring agreement under this Contract, Contractor is encouraged to consider for such employment openings qualified County employees who are targeted for layoff or qualified former County employees who are on a re-employment list. In no event shall the County be liable for any cost, delay, or impact claims arising out of efforts to hire such present and former County employees.

* * *

# SECTION 00 09 12

# COUNTYWIDE LOCAL AND TARGETED WORKER HIRE PROGRAM - MANDATORY

PART 1 – GENERAL

1.01 SUMMARY

This Section 00 09 12 includes:

Part 1 – General
1.01 – Summary
1.02 – Definitions
1.03 – Local and Targeted Worker Hire Program (LTWHP)

Part 2 – Administration
2.01 – Administration & Compliance
2.02 – Jobs Coordinator Minimum Qualifications
2.03 – Responsibilities of the Jobs Coordinator
2.04 – Community Service Providers

Part 3 – Forms
3.01 – Form 00 09 12-A: LTWHP Craft Employee Request Form
3.02 – Form 00 09 12-B: LTWHP Workforce Utilization Plan
3.03 – Form 00 09 12-C: FPL List of Zip Codes
3.04 – Form 00 09 12-D: Local and Targeted Worker Hire Status Report
3.05 – Form 00 09 12-E: Approved Jobs Coordinators List

## 1.01 MANDATORY HIRING GOALS FOR THIS PROJECT

The County of Los Angeles has implemented a Local and Targeted Worker Hire Policy (LTWHP) to facilitate the hiring of Local and Targeted workers. Pursuant to this policy, this project has a ***mandatory goal*** of at least 30 percent of total California Construction Labor Hours worked be performed by a qualified Local Resident and at least 10 percent of total California Construction Labor Hours worked on this project shall be performed by County residents classified as a Targeted Worker. Hours worked by a Targeted Worker who is also a Local Resident may be applied towards both the mandatory 30 percent Local Hire and 10 percent Targeted Worker Hire goals.

Including, a minimum ratio of one apprentice hour for every five journeyman hours shall be enforced, per State Labor code requirement, and the Contractor will strive to obtain half of all apprentice hours on the project be performed by Local and Targeted Workers. In addition, there shall be a **mandatory** requirement to use a Jobs Coordinator to be hired directly by the Contractor, prior to the start of work on the project. The Jobs Coordinator is an independent third-party individual, entity, or employee with whom the Contractor enters into a contract or employs to facilitate the implementation of the Local and Targeted

Worker Hiring Requirements of this Agreement. The Jobs Coordinator may be selected from the approved Jobs Coordinators list available as Form 00 09 12-E. If the Contractor utilizes an employee as a Jobs Coordinator, the Jobs Coordinator must be able to demonstrate or document to the County the minimum qualifications and/or experience to fulfill the duties and responsibilities as outlined in Sections 2.02 and 2.03.

1.02 **DEFINITIONS**

Terms used in the implementation of the LTWHP shall be defined as follows:

A. **California Construction Labor Hours –** Includes all craft worker hours performed on the project by California residents, excluding the hours performed by off-site material fabricators, designers, project office staff, or vendors.

B. **Certified Payroll Reports** – The Contractor shall comply with the requirements of Section 1776 of the Labor Code, State of California for the submission of Certified Payroll Reports (CPR). The Contractor and its subcontractors shall submit a copy of all CPR's to the County on a monthly basis, no later than on the first Monday of the subsequent month. Contractor and its subcontractors shall submit all CPR's to the County electronically if an online system is designated by the County**.**

C. **Community Service Providers –** A network of public and private partners working to support workers and businesses by serving their employment and training needs. These providers include local one-stop job/career centers funded by the Federal Workforce Innovation and Opportunities Act (WIOA). These centers help businesses find skilled workers and connect customers to work related training and education; most services are available at no cost. Examples of Community Service Providers are listed in Section 2.04.

D. **Craft Employee Request Form –** The form used by the Contractor and its subcontractors to request dispatch of craft workers (including, but not limited to, apprentices and journeymen), who are Local Residents or Targeted Workers, from a Community Service Provider or union hiring hall in the event that assistance in obtaining such workers is needed. The request form is submitted by the Contractor/subcontractors, completed and executed by the Community Service Provider or union hiring hall, and a copy retained by the Contractor for auditing purposes.

E. **Jobs Coordinator** – An individual or firm that facilitates implementation of the Targeted Worker hiring requirements of the County of Los Angeles for the Contractor/subcontractors. The Jobs Coordinator must be able to demonstrate or document to the County the requisite qualifications and/or experience to fulfill the duties and responsibilities as outlined in Section 2.02 and 2.03.

F. **Local and Targeted Worker Hire Status Report** – A monthly report required to be submitted to the County as listed on Form 00 09 12-D.

G. **Local Resident** – A Local Resident is defined as an individual whose primary place of residence is within the Tier 1 or Tier 2 ZIP Codes of the County, as listed in Forms 00 09 12-A and 00 09 12-C.

H. **Workforce Utilization Plan** – Form 00 09 12-B submitted by the Contractor on behalf of itself and its subcontractors prior to commencing work, specifying a Workforce Utilization Plan, which contains the workforce plan and schedule for the hiring of qualified Local Residents and Targeted Workers, including the use of the subcontractors' workforce to meet the LTWHP hiring goal. The Contractor shall submit updates of the Workforce Utilization Plan to reflect changes in project conditions, schedules, or subcontractors.

I. **Targeted Worker** - A Targeted Worker is an individual who is a County resident and faces at least one or more of the following barriers to employment:

1. Has a documented annual income at or below 100 percent of the Federal Poverty Level;
2. No high school diploma or GED;
3. A history of involvement with the criminal justice system;
4. Protracted unemployment (receiving unemployment benefits for at least 6 months);
5. Is a current recipient of government cash or food assistance benefits;
6. Is homeless or has been homeless within the last year;
7. Is a custodial single parent;
8. Is a former foster youth; or
9. Is a veteran, or is the eligible spouse of a veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 U.S.C.4215[a]).
10. Eligible Migrant and seasonal farmworkers
11. English Language Learners
12. Older Individuals (55+)
13. Disabled
14. Individuals with Low levels of Literacy
15. Multi-Craft Core Curriculum (MC3) program graduates

J. **Tier 1 Zip Codes** – Tier 1 ZIP Codes are those Zip codes listed in Form 00 09 12-A.

K. **Tier 2 Zip Codes** – Tier 2 ZIP Codes are those Zip codes listed in Form 00 09 12-C.

## 1.03 LOCAL AND TARGETED WORKER HIRE PROGRAM

A. The Contractor and its subcontractors shall meet the following minimum mandatory Local Resident and Target Worker hiring requirements:

1. At least 30 percent of total California Construction Labor Hours worked on the project must be performed by a qualified Local Resident;

2. And at least 10 percent of total California Construction Labor Hours worked on the project shall be performed by a Targeted Worker. The hours worked by a Targeted Worker who is also a Local Resident may also be applied towards the 30 percent Local Resident hiring goal.
3. A minimum ratio of one apprentice hour for every five journeyman hours shall be enforced, per State Labor code requirement, and the Contractor will strive to obtain half of all apprentice hours on the project be performed by Local and Targeted Workers.
4. In addition, there shall be a mandatory requirement to use a Jobs Coordinator, as that term is defined in Section 1.02, to facilitate implementation of the Targeted hiring requirements of this Policy; and the Contractor shall ensure the mandatory hiring requirements provided for Local and Targeted Workers are met in accordance with this Policy.

B. The available pool of Local Residents whose primary place of residence is within Tier 1 ZIP Codes (listed under Form 00 09 12-A), must first be exhausted in the manner specified in Section 2.01G before employing worker(s) from Tier 2 ZIP Codes (listed under Form 00 09 12-C).

C. All California Construction Labor Hours shall be included in the calculation for the percentage requirements set forth in Section 1.03 A.

D. The Contractor and its subcontractors shall not discriminate against or give preference to any particular individual or group based on race, color, gender, sexual orientation, age or disability.

## PART 2 – ADMINISTRATION

### 2.01 ADMINISTRATION & COMPLIANCE

A. Prior to start of work on the project, the Contractor shall perform the following:
1. The Contractor shall hire a Jobs Coordinator for the project in accordance with Section 2.02.
2. The Contractor and all subcontractors of every tier shall coordinate with the Jobs Coordinator for services to support their efforts in meeting the targeted hiring percentages as described in Section 1.01 of this Specification.

B. The Contractor and its subcontractors shall use the Craft Employee Request Form (Form 00 09 12-A) for all requests for dispatch of qualified Local Residents and Targeted craft workers (including apprentices and journeymen) in the event that assistance in obtaining such workers is needed from a Community Service Provider, union hiring hall, or other source.

C. Prior to commencing work, the Contractor, on behalf of itself and its subcontractors, shall submit a Workforce Utilization Plan (Form 00 09 12-B) to the County Project Manager that contains the workforce hiring plan and schedule for the hiring of qualified Local and Targeted Workers and the assignment and use of the subcontractors' workforce to meet the Local Worker Hiring requirement. The Contractor, thereafter, shall submit updates of the Workforce Utilization Plan to reflect changes in project conditions, schedule, or subcontractors.

D. No later than the 15th calendar day of each month, the Contractor shall submit to the designated County representative a completed Local and Targeted Hire Status Report containing the relevant information for the preceding month. The Local and Targeted Hire Status Report shall contain, at a minimum, the information specified below for Contractor and its subcontractors:

1. For each California Project Craft Worker (apprentices and journeymen): (a) the total labor hours, total number of all workers (apprentices and journeymen), hours worked on the project; and (b) the wages earned on the project.
2. Total number of Local Residents (apprentices and journeymen), hours worked (apprentices and journeymen), segregated by Tier 1 and Tier 2 Residency Preference Areas, and wages earned by each Local Resident.
3. Total number of Targeted Worker hours worked (apprentices and journeymen by Tier 1 and Tier 2 Residency Preference Areas) and Targeted worker data and workers demographic profile.
4. Total number of hours worked by Local Residents by subcontractor.

E. No later than the 15th calendar day of each month, the Contractor and all its subcontractors shall submit the Local and Targeted Hire Status Report to the designated County representative (or submit the data online if the County elects to provide an online system), to demonstrate progress in meeting the Workforce Utilization Plan. Failure to submit the Local and Targeted Worker Hire Status Report to the designated County representative shall be deemed to constitute zero percent local hire participation for the month and the County may retain the Monthly Mandatory Compliance Withholding (MMCW) amount.

F. The County may, in its sole discretion, elect to provide an online system for the Contractor and all of its subcontractors to input the data required in the Local and Targeted Worker Hire Status Report. If the County so elects, the Contractor and subcontractors shall utilize that online system in lieu of completing and submitting the Local and Targeted Worker Hire Status Report.

G. The Contractor and its subcontractors shall first meet the Local and Targeted Worker Hire participation requirement by employing qualified workers from the Tier 1 Preference Area. If the Contractor is unable to meet their entire Local and Targeted Worker Hire need from this area, it must submit to the Project Manager a statement certifying that it has exhausted all available qualified Local and Targeted Workers from this area during a 48-hour period before pursuing workforce from the Tier 2 Preference Area.

H. The Contractor's compliance with the approved Workforce Utilization Plan will be evaluated monthly using the Local and Targeted Hire Status Report.

I. To enforce compliance on contracts containing mandatory hiring goals, an amount will be withheld from the monthly progress payment to the Contractor in proportion to the deficit percentage of the mandated Local and Targeted Hiring Goal percentage and the actual percentage obtained. The maximum that may be withheld during the

duration of the project is one percent of the total construction contract amount, but not to exceed $500,000, comprised of 0.75 percent for Local Worker goal compliance, and 0.25 percent for Targeted Worker goal compliance. This amount is called the Monthly Mandatory Compliance Withholding (MMCW) amount. The percentage of the MMCW that will be withheld for a given month will be the same as the percentage of the deficit in achieving the LTWHP targets for that month.

The maximum MMCW amount is determined as follows:

Construction Contract Value X .75% ÷ Number of months in baseline construction schedule = MMCW for Local Workers

Construction Contract Value X .25% ÷ Number of months in baseline construction schedule = MMCW for Targeted Workers

J. If the Targeted Worker Hiring mandatory requirements of the Policy have not been satisfied as required for a project, the Contractor nonetheless may be deemed to be in compliance if the Contractor demonstrates both (a) that the Contractor and each of its subcontractors have complied with all other requirements of the Policy, and (b) that the Contractor and each of its subcontractors have satisfactorily demonstrated the following:

Documented contact with the Department of Workforce Development, Aging and Community Services, America Job Centers or with an agency that supports and provides employment and training services for Targeted Workers in construction employment, and in which instance the agency did not refer a qualified Targeted Worker to the Contractors or subcontractor within 48 hours of the job request for fair consideration of the Targeted Worker.

K. At the conclusion of the project, the County will conduct a final evaluation of the Contractor's compliance with the Workforce Utilization Plan as described in Section 2.01.C and execute a final release of funds, if applicable, as described in Section 2.01.I. The Contractor's failure to meet the Local and Targeted Worker Hiring Requirement in Section 1.01 by the conclusion of the project shall result in the County imposing liquidated damages and deducting such amount otherwise owed to the Contractor in its final payment. The County will not be required to pay interest on any amounts withheld during the term of the contract.

L. The County and Contractor specifically agree that the MMCW amount, minus the total value of previous releases, in direct proportion to the actual Local and Targeted hire participation levels achieved by the Contractor consistent with the Workforce Utilization Plan, shall be imposed as liquidated damages, and not as a forfeiture or penalty. It is further specifically agreed that the aforesaid amount is presumed to be the amount of damages sustained due to the Contractor's inability to achieve the Local and Targeted Worker Hiring Requirement in Section 1.01.

M. For construction contracts where the work is performed for a private County Lessee, the Lessee shall be responsible for administration of all aspects of this Section 2.01, including the calculation and collection of the Local Hire Participation Compliance

Rectification Amount. At the conclusion of the project, the Lessee shall pay over the designated County representative any such amounts collected and shall provide a full report to the designated County Representative of all monthly information required to be collected in this Section 2.01.

2.02 JOBS COORDINATOR MINIMUM QUALIFICATIONS

A. If the Jobs Coordinator is selected from the approved list provided on Form 00 09 12-E, that Jobs Coordinator shall be deemed to meet the minimum qualifications. No additional qualification information need be provided.

B. If the Contractor desires to utilize a Jobs Coordinator not listed on Form 00 09 12-E (*i.e.*, a Contractor employee or other non-listed firm), the Contractor must be able to demonstrate that the selected Jobs Coordinator meets the minimum qualifications listed in this Section 2.02. When requested by the County, the Contractor shall provide documentation sufficient to satisfy the County, in the County's sole discretion, that the selected Jobs Coordinator meets the minimum qualifications listed in this Section 2.02.

C. A minimum of 3 years' experience as providing Jobs Coordinator services. Successful candidates for Jobs Coordinators must be able to demonstrate the in-depth ability, experience, and possess the necessary staff capable of providing required services.

D. A successful Jobs Coordinator must demonstrate they possess working relationships with the Building Trades, Targeted Workers and signatory craft councils and unions operating within County of Los Angeles' jurisdiction by describing previous interactions, relationships, and partnerships with these party's/groups.

E. A successful Jobs Coordinator must be able to demonstrate that it has experience on projects similar in scale to the current project.

F. A successful Jobs Coordinator must demonstrate that they possess experience with Targeted Worker populations.

G. A successful Jobs Coordinator must have experience in working with work-source centers, faith-based organizations and other Community Based Organizations (CBOs).

H. A successful Jobs Coordinator must be familiar with incentive programs and tax credit subsidies provided by the State and Federal government to hire workers that fit the corresponding category. Jobs Coordinator to describe their experience in working with these programs

## 2.03 RESPONSIBILITIES OF THE JOBS COORDINATOR

The Contractor shall ensure that the selected Jobs Coordinator effectively performs the following duties:

A. The Jobs Coordinator shall develop, create, design and market specific programs to attract Targeted Workers for construction opportunities (e.g. handouts and fliers for “walk-ins” demonstrating program entrance procedures).

B. The Jobs Coordinator shall coordinate services for Contractor to use in the recruitment of Targeted Workers.

C. The Jobs Coordinator shall educate and assist Contractor on incentives provided by state or federal programs for on-the-job training and employer tax credits.

D. The Jobs Coordinator shall conduct orientations, job fairs and community outreach meetings in the local community.

E. The Jobs Coordinator shall screen and certify the Targeted Workers status.

F. The Jobs Coordinator shall establish a referral and retention tracking mechanism for placed Targeted workers and apprentices.

G. The Jobs Coordinator shall network with the various work source centers, community and faith-based organizations and other non-profit entities that provide qualified Local and/or Targeted Workers.

H. The Jobs Coordinator shall coordinate with the various building trades crafts for referral and placement of Targeted Workers.

I. The Jobs Coordinator shall maintain a database of pre-qualified Targeted Workers for referral.

J. The Jobs Coordinator shall be the point of contact to provide information about available job opportunities on projects.

K. The Jobs Coordinator shall assist the subcontractors with their documentation effort and other reports as it relates to their Targeted Worker hiring requirements.

L. The Jobs Coordinator shall work closely with County staff, the Building Trades, and subcontractors in achieving the Targeted hiring goals.

2.04 COMMUNITY SERVICE PROVIDERS

Examples of Community Service Providers that may be used by Contractor and subcontractors to identify Local Residents and Targeted Workers include:

- Los Angeles County Workforce Development, Aging, and Community Services: http://wdacs.lacounty.gov/
- LA Jobs: https://www.jobsla.org/vosnet/Default.aspx
- Cal Jobs: http://www.caljobs.ca.gov/vosnet/Default.aspx
- Helmets to Hardhats: https://www.helmetstohardhats.org
- America's Job Center of California: http://www.americasjobcenter.ca.gov/

PART 3 – FORMS

Form 00 09 12-A: LTWHP Craft Employee Request Form

Form 00 09 12-B: LTWHP Workforce Utilization Plan for:

Huntington Park Library Refurbishment Project

Form 00 09 12-C: FPL List of Zip Codes

Form 00 09 12-D: Local and Targeted Worker Hire Status Report

Form 00 09 12-E: Approved Jobs Coordinators List

Please note that the County reserves the right to modify, update, change, or make improvements to this form at any time. Qualifying Zip Codes will remain the same.

00 09 12-A

# COUNTYWIDE CWA – HUNTINGTON PARK LIBRARY REFURBISHMENT PROJECT

The County of Los Angeles Countywide Community Workforce Agreement applies to this project. This project shall include a *mandatory* hiring goal of at least 30% California Construction Labor Hours performed by either Tier 1 or Tier 2 Qualified Local Residents and at least 10% of California Construction Labor Hours on the project performed by those classified as a Targeted Worker. California Construction Labor Hours is defined as all craft worker hours performed on the project by California residents, excluding the hours performed off site metal fabricators, designers, project office staff, or vendors. Hours worked by a Targeted Worker who is also a Tier 1 or Tier 2 Qualified Local Resident may be applied towards the 30% goal.

## C O N T R A C T O R  U S E  O N L Y

Please complete and fax or email this form to the applicable union to request craft workers that fulfill the hiring requirements for this project. After faxing this request, call the Local Union to verify receipt and substantiate their capacity to furnish workers as specified below. Please print Fax or Email Transmission Verification Reports and keep copies as records.

| | | | |
|---|---|---|---|
| **TO:** | Local Union #: | **CC:** | County Project Labor Coordinator: |
| | Email/Fax: | | Email/Fax: |
| **FROM:** | Contractor: | | |
| | Issued by: | | |
| | Email/Phone/Fax: | | |

**UNION CRAFT WORKER REQUEST:**

| Craft Classification | Journeyman or Apprentice | Tier 1 or Tier 2 Worker | Targeted Worker | No. of Workers Requested |
|---|---|---|---|---|
| | ☐ JM ☐APP | * | ** | |
| | ☐ JM ☐APP | * | ** | |
| | ☐ JM ☐APP | * | ** | |
| | | | **Total Number of Workers Requested:** | |

**In accordance with the CWA, Article 7, Referral, County and Contractor are requesting the Union:**

* Provide workers from Tier 1. If the supply of available Tier 1 workers has been exhausted, please provide workers from Tier 2, if available.

** Provide targeted workers, if available.

**WORKER REPORTING INSTRUCTIONS:**

| | |
|---|---|
| **Reporting Date/Time** | |
| **Project Location:** | |
| **Reporting To:** | |
| **On Site Phone:** | |
| **Special Instructions:** | |

## U N I O N  U S E  O N L Y

Please complete the "Union Use Only" section and fax or email both pages to the requesting Contractor and Project Labor Coordinator.

| | |
|---|---|
| **Dispatch Received by & Date:** | |

| **Date Worker(s) Dispatched:** | | | | | | |
|---|---|---|---|---|---|---|
| **Name** | **Helmets to Hardhats** | **Journeyman or Apprentice** | **Tier 1 or Tier 2 Worker?** | **Zip Code** | **Targeted Worker?** | **Targeted Category ** if known** |
| | ☐ Y ☐ N | ☐ JM ☐ APP | ☐ Tier 1 ☐ Tier 2 ☐ No* | | ☐ Y ☐ N | |
| | ☐ Y ☐ N | ☐ JM ☐ APP | ☐ Tier 1 ☐ Tier 2 ☐ No* | | ☐ Y ☐ N | |
| | ☐ Y ☐ N | ☐ JM ☐ APP | ☐ Tier 1 ☐ Tier 2 ☐ No* | | ☐ Y ☐ N | |

* No: By selecting "No" for the "Tier 1 or Tier 2 Worker" certifies, on behalf of the Union, that the Union has exhausted all reasonable efforts to locate and dispatch such Tier 1 or Tier 2 worker.



SPEC 7963

00 09 12-A

# COUNTYWIDE CWA – HUNTINGTON PARK LIBRARY REFURBISHMENT PROJECT

** Please indicate number of the Targeted Worker category (1 through 15, as shown on page 2). Indicate multiple categories per worker, if applicable.

**QUALIFYING ZIP CODES - Below are ALL Tier 1 and Tier 2 Qualifying Zip Codes.**
**Tier 1 Zip Codes are shaded.**

**Note: Tier 1 Zip Codes must be exhausted first before moving into Tier 2 Zip Codes.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 90001 | 90002 | 90003 | 90004 | 90005 | 90006 | 90007 | 90008 | 90010 | 90011 |
| 90012 | 90014 | 90015 | 90016 | 90017 | 90018 | 90019 | 90020 | 90021 | 90022 |
| 90023 | 90026 | 90028 | 90029 | 90031 | 90032 | 90033 | 90034 | 90035 | 90036 |
| 90037 | 90038 | 90040 | 90042 | 90043 | 90044 | 90047 | 90057 | 90058 | 90059 |
| 90061 | 90062 | 90063 | 90089 | 90201 | 90220 | 90221 | 90222 | 90242 | 90247 |
| 90250 | 90255 | 90262 | 90270 | 90280 | 90301 | 90302 | 90303 | 90304 | 90401 |
| 90501 | 90601 | 90602 | 90640 | 90706 | 90716 | 90723 | 90731 | 90744 | 90802 |
| 90804 | 90805 | 90806 | 90810 | 90813 | 91001 | 91046 | 91103 | 91201 | 91203 |
| 91204 | 91205 | 91303 | 91331 | 91335 | 91340 | 91342 | 91343 | 91352 | 91401 |
| 91402 | 91405 | 91406 | 91411 | 91502 | 91601 | 91605 | 91606 | 91702 | 91706 |
| 91731 | 91732 | 91733 | 91744 | 91746 | 91754 | 91755 | 91766 | 91767 | 91768 |
| 91770 | 91776 | 91803 | 93243 | 93534 | 93535 | 93543 | 93550 | 93552 | 93553 |
| 93560 | 93591 | X | X | X | X | X | X | X | X |

** A **Targeted Worker** is an individual who is *both* a County resident and who faces **one or more** of the following barriers to employment:

1. Has a documented annual income at or below 100% of the Federal Poverty Level
2. Has no high school diploma or GED
3. Has a history of involvement with the criminal justice system
4. Is experiencing protracted unemployment (receiving unemployment benefits for at least 6 months)
5. Is a current recipient of government cash or food assistance benefits
6. Is homeless or has been homeless within the last year
7. Is a custodial single parent
8. Is a former foster youth
9. Is a veteran or is the eligible spouse of a veteran of the United States armed forces under Section 2(a) of the Jobs for Veterans Act (38 U.S.C.4215[a])
10. Is an eligible migrant and seasonal farm worker
11. Is currently an English language learner
12. Is an older individual (55+)
13. Is disabled
14. Is an individual with a low level of literacy
15. Is a Multi-Craft Core Curriculum (MC3) Program Graduate

**[This form is not intended to replace a Union's Dispatch or Referral Form normally given to the employee when being dispatched to the jobsite.]**

FORM 00 09 12-B - LTWHP Workforce Utilization Plan

**Contractor:** **All Contractors**

## Workforce Utilization Plan / Projection Hours

**Project Name:** **Huntington Park Library Refurbishment Project** **Date:** _____

**Project Duration: TBD**

| | Jun-25 | Jul-25 | Aug-25 | Sep-25 | Oct-25 | Nov-25 | Dec-25 | Jan-26 | Feb-26 | Mar-26 | Apr-26 | May-26 | Jun-26 | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PROJECTED PROJECT HOURS** | | | | | | | | | | | | | | |
| Local Hours (Tier 1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Hours (Tier 2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | | | | |
| Total Local Hours (%) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Targeted Worker Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Targeted Worker Hours (%) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **ACTUAL PROJECT HOURS** | | | | | | | | | | | | | | |
| Local Hours (Tier 1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Local Hours (Tier 2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | | | | |
| Total Local Hours (%) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Targeted Worker Hours | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Targeted Worker Hours (%) | | | | | | | | | | | | | | |

**COUNTY OF LOS ANGELES**
**LOCAL AND TARGETED WORKER HIRE POLICY**
**QUALIFYING ZIP CODES**

**Tier 1, 2 and Qualifying Zip Codes are defined as:**

**Tier 1 Zip Code:** A Tier 1 Qualified Local Resident is defined as a County resident whose primary residency is: (1) within five (5) miles of the proposed project site; and (2) is within a Qualifying Zip Code. If a qualifying Zip Code is partially located within the 5-mile radius, then the entire Zip Code is considered as a Tier I Zip Code, and workers living in that entire Zip Code area may qualify as Tier I hiring.

**Tier 2 Zip Code:** A Tier 2 Qualified Local Resident is defined as a County resident whose primary residency is: (1) within a Qualifying Zip code; and (2) that Qualifying Zip Code is beyond five (5) miles of the proposed project site.

**Qualifying Zip Code:** A Qualifying Zip Code is defined as a zip code within the County of Los Angeles, where either: (1) the average percentage of households living below 200 percent of the Federal Poverty Level (FPL) for that individual's primary residency's Zip Code is greater than the County average for such households; or (2) the Zip Code is one of 11 additional Zip Codes determined by the Board on September 6, 2011 to be a Zip Code where at least 30 percent of the population is living in poverty, and with an unemployment rate of at least 150 percent of the national average.

| Zip Code | Region | SD1 | SD2 | SD3 | SD4 | SD5 |
|---|---|---|---|---|---|---|
| 90001 | Florence / South Central (City of LA) | | X | | X | |
| 90002 | Watts (City of LA) | | X | | X | |
| 90003 | South Central (City of LA) | | X | | | |
| 90004 | Hancock Park (City of LA) | X | X | X | | |
| 90005 | Koreatown (City of LA) | | X | | | |
| 90006 | Pico Heights (City of LA) | X | X | | | |
| 90007 | South Central (City of LA) | X | X | | | |
| 90008 | Baldwin Hills / Crenshaw (City of LA) / Leimert Park (City of LA) | | X | | | |
| 90010 | Wilshire Blvd (City of LA) | | X | | | |
| 90011 | South Central (City of LA) | X | X | | | |
| 90012 | Civic Center (City of LA) / Chinatown (City of LA) | X | | | | |
| 90014 | Los Angeles | X | | | | |
| 90015 | Downtown Los Angeles (City of LA) | X | X | | | |
| 90016 | West Adams (City of LA) | | X | | | |
| 90017 | Los Angeles | X | | | | |
| 90018 | Jefferson Park (City of LA) | | X | | | |
| 90019 | Country Club Park (City of LA) / Mid City (City of LA) | | X | | | |
| 90020 | Hancock Park (City of LA) | | X | | | |
| 90021 | Downtown Los Angeles (City of LA) | X | | | | |
| 90022 | East Los Angeles | X | | | X | |
| 90023 | East Los Angeles (City of LA) | X | | | X | |
| 90026 | Echo Park / Silverlake (City of LA) | X | | | | |
| 90028 | Hollywood (City of LA) | | | X | | X |
| 90029 | Downtown Los Angeles (City of LA) | X | | X | | |
| 90031 | Montecito Heights (City of LA) | X | | | | |
| 90032 | El Sereno (City of LA) / Monterey Hills (City of LA) | X | | | | |
| 90033 | Boyle Heights (City of LA) | X | | | | |
| 90034 | Palms (City of LA) | | X | X | | |
| 90035 | West Fairfax (City of LA) | | X | X | | |
| 90036 | Park La Brea (City of LA) | | X | X | | |
| 90037 | South Central (City of LA) | | X | | | |
| 90038 | Hollywood (City of LA) | | | X | | |
| 90040 | Commerce, City of | X | | | X | |

**COUNTY OF LOS ANGELES**
**LOCAL AND TARGETED WORKER HIRE POLICY**
**QUALIFYING ZIP CODES**

| Zip Code | Region | SD1 | SD2 | SD3 | SD4 | SD5 |
|---|---|---|---|---|---|---|
| 90042 | Highland Park (City of LA) | X | | | | |
| 90043 | Hyde Park (City of LA) / View Park / Windsor Hills | | X | | | |
| 90044 | Athens | | X | | | |
| 90047 | South Central (City of LA) | | X | | | |
| 90057 | Westlake (City of LA) | X | | | | |
| 90058 | Vernon | X | X | | X | |
| 90059 | Watts (City of LA) / Willowbrook | | X | | X | |
| 90061 | South Central (City of LA) | | X | | | |
| 90062 | South Central (City of LA) | | X | | | |
| 90063 | City Terrace | X | | | | |
| 90089 | Exposition Park(City of LA) | | X | | | |
| 90201 | Bell / Bell Gardens / Cudahy | | | | X | |
| 90220 | Compton / Rancho Dominguez | | X | | | |
| 90221 | East Rancho Dominguez | | X | | X | |
| 90222 | Compton / Rosewood / Willowbrook | | X | | X | |
| 90242 | Downey | | | | X | |
| 90247 | Gardena | | X | | | |
| 90250 | Hawthorne (Holly Park) / Lawndale (Federal Bldg) | | X | | | |
| 90255 | Huntington Park / Walnut Park | | X | | X | |
| 90262 | Lynwood | | | | X | |
| 90270 | Maywood | | | | X | |
| 90280 | South Gate | | X | | X | |
| 90301 | Inglewood | | X | | | |
| 90302 | Inglewood | | X | | | |
| 90303 | Inglewood | | X | | | |
| 90304 | Lennox | | X | | | |
| 90401 | Santa Monica | | | X | | |
| 90501 | Torrance | | X | | X | |
| 90601 | Whittier | X | | | X | |
| 90602 | Whittier | X | | | X | |
| 90640 | Montebello | X | | | X | |
| 90706 | Bellflower | | | | X | |
| 90716 | Hawaiian Gardens | | | | X | |
| 90723 | Paramount | | | | X | |
| 90731 | San Pedro (City of LA) / Terminal Island (City of LA) | | | | X | |
| 90744 | Wilmington (City of LA) | | X | | X | |
| 90802 | Long Beach | | | | X | |
| 90804 | Long Beach | | | | X | |
| 90805 | North Long Beach (Long Beach) | | X | | X | |
| 90806 | Long Beach | | | | X | |
| 90810 | Carson / Long Beach | | X | | X | |
| 90813 | Long Beach | | | | X | |
| 91001 | Altadena | | | | | X |
| 91046 | City of Glendale | | | | | X |
| 91103 | Pasadena | | | | | X |
| 91201 | Glendale | | | | | X |
| 91203 | Glendale | | | | | X |
| 91204 | Glendale (Tropico) | | | | | X |
| 91205 | Glendale (Tropico) | | | | | X |
| 91303 | Canoga Park (City of LA) | | | X | | |
| 91331 | Arleta (City of LA) / Pacoima (City of LA) | | | X | | X |
| 91335 | Reseda (City of LA) | | | X | | |
| 91340 | San Fernando | | | X | | |
| 91342 | Lake View Terrace (City of LA) / Sylmar (City of LA) | | | X | | X |
| 91343 | North Hills (City of LA) | | | X | | |
| 91352 | Sun Valley (City of LA) | | | X | | X |

**COUNTY OF LOS ANGELES**
**LOCAL AND TARGETED WORKER HIRE POLICY**
**QUALIFYING ZIP CODES**

| Zip Code | Region | SD1 | SD2 | SD3 | SD4 | SD5 |
|---|---|---|---|---|---|---|
| 91401 | Van Nuys (City of LA) | | | X | | |
| 91402 | Panorama City (City of LA) | | | X | | |
| 91405 | Van Nuys (City of LA) | | | X | | |
| 91406 | Van Nuys (City of LA) | | | X | | |
| 91411 | Van Nuys (City of LA) | | | X | | |
| 91502 | Burbank | | | | | X |
| 91601 | North Hollywood (City of LA) | | | | | X |
| 91605 | North Hollywood | | | X | | X |
| 91606 | North Hollywood | | | X | | X |
| 91702 | Angeles National Forest | X | | | | X |
| 91706 | Baldwin Park / Irwindale | X | | | | X |
| 91731 | El Monte | X | | | | |
| 91732 | El Monte | X | | | | |
| 91733 | South El Monte | X | | | | |
| 91744 | Cityof Industry / La Puente / Valinda | X | | | | |
| 91746 | Bassett / City of Industry / La Puente | X | | | | |
| 91754 | Monterey Park | X | | | | |
| 91755 | Monterey Park | X | | | | |
| 91766 | Phillips Ranch / Pomoona / Chino | X | | | | |
| 91767 | Pomona | X | | | | X |
| 91768 | Pomona | X | | | | |
| 91770 | Rosemead | X | | | | X |
| 91776 | San Gabriel | X | | | | X |
| 91803 | Alhambra | X | | | | |
| 93243 | Lebec | | | | | X |
| 93534 | Lancaster | | | | | X |
| 93535 | Hi Vista | | | | | X |
| 93543 | Littlerock / Juniper Hills | | | | | X |
| 93550 | Palmdale / Lake Los Angeles / Sierra Madre | | | | | X |
| 93552 | Palmdale | | | | | X |
| 93553 | Littlerock / Juniper Hills / Pearblossom / Llano | | | | | X |
| 93560 | North Lancaster | | | | | X |
| 93591 | Palmdale/Lake Los Angeles | | | | | X |

# LOCAL AND TARGETED HIRE STATUS REPORT
# LOS ANGELES COUNTY

**Project:** SAMPLE NAME
**Supervisorial District:** SD 4
**Project Code:** PW13950
**Contractor(s):** Multiple Contractors
**Craft(s):** Multiple Crafts
**Construction Contract Amount:** $0.00
**Mandatory Local and Targeted Hiring Goal: 30.00%**

**From Date:** 9/1/2016
**To Date:** 9/30/2016
**Total Forecast Hours:** 0.00
**Total Project Hours to Date:** 0.00
**Total Hours Percent Complete:** 10.00%

| Area | Total Number of Workers Sep 01-Sep 30 | % of Total Workers Sep 01-Sep 30 | Total Hours Worked Sep 01-Sep 30 | % of Total Hours Worked Sep 01-Sep 30 | Cumulative Total Number of Workers | Cumulative % of Total Workers | Cumulative Total Hours Worked | Cumulative % of Total Hours Worked | Cumulative Wages w/ Benefits | Cumulative Number of Foremen | Cumulative Foremen Hours | Cumulative Foreman Hours % | Cumulative Number of Journeymen | Cumulative Journeyman Hours | Cumulative Journeyman Hours % | Cumulative Number of Apprentices | Cumulative Apprentice Hours | Cumulative Apprentice Hours % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tier 1 | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Tier 2 | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Other in LA County (non-local) | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Outside of LA County | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Employees Not In Specified Zip Lists | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| | | | | | | | | | | | | | | | | | | |
| **Local and Targeted Workers** | | | | | | | | | | | | | | | | | | |
| Local Resident (Tier 1 + Tier 2) | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Targeted Worker | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| | | | | | | | | | | | | | | | | | | |
| **Demographic Profile** | | | | | | | | | | | | | | | | | | |
| African American | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Asian | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Caucasian | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Hispanic | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Native American | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Not Specified | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Two Or More Races | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Other | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| | | | | | | | | | | | | | | | | | | |
| Male | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| Female | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| | | | | | | | | | | | | | | | | | | |
| Veteran | 0 | 0.00% | 0.00 | 0.00% | 0 | 0.00% | 0.00 | 0.00% | $0.00 | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% | 0 | 0.00 | 0.00% |
| | | | | | | | | | | | | | | | | | | |
| **Total Employees** | 0 | | 0.00 | | 0 | | 0.00 | | $0.00 | 0 | 0.00 | | 0 | 0.00 | | 0 | 0.00 | |
| | | | | | | | | | | | | | | | | | | |

# JOB COORDINATOR PANEL

**as of December 2023**

| | |
|---|---|
| **Casamar Group, LLC**<br>Joe Garcia<br>23335 Alamos Lane<br>Newhall, CA 91321<br>TEL: 661.254-2373<br>Fax: 661.253.0549<br>jgarcia@casamargroup.com | **Del Richardson & Associates, Inc.**<br>Del Richardson<br>510 S. La Brea Avenue<br>Inglewood, CA 90301<br>TEL: 310.645.3729 ext. 229<br>FAX: 310.645.3355<br>Del.Richardson@drainc.com |
| **Harris & Associates**<br>John W. Harris<br>865 S. Figueroa Street<br>Los Angeles, CA 90017<br>TEL: 213.489.9833<br>FAX: 626.316.7103<br>john@jwharrislaw.com | **Managed Career Solutions, Inc.**<br>Philip Starr<br>3333 Wilshire Blvd., Suite 405<br>Los Angeles, CA 90010<br>TEL: 213.355.5312<br>FAX: 213.381.5053<br>pstarr@mcscareergroup.com |
| **Mindful Integration of Construction Services**<br>Theodora Oyie, MBA<br>5665 Wilshire Blvd. #1114<br>Los Angeles, CA 90036<br>TEL: 323. 383.9844<br>inclusion@mics.us | **Modern Times, Inc.**<br>Joseph Hernandez<br>1892 E. Altadena Drive<br>Altadena, CA 91001<br>TEL: 213.810.6105<br>FAX: 626.316.7103<br>joe@moderntimesinc.com |
| **Onesimus, Inc**<br>Michael Richardson<br>129 E. 136th Street<br>Los Angeles, CA 90061<br>TEL: 310.701.0359<br>profitableanduseful@gmail.com | **Pacific Resources Services Corporation**<br>Ben Ocasio<br>11421 Lambert Ave.<br>El Monte, CA 91732<br>TEL: 626.800.4006<br>FAX: 626.800.4140<br>bocasio@pacificresourcesservices.com |
| **Padilla & Associates, Inc.**<br>Patricia Padilla<br>211 East City Place Drive<br>Santa Ana, CA 92705<br>TEL: 714.225.0116<br>ppadilla@padillainc.com | **PDA Consulting, Inc.**<br>Pamela Penn<br>8901 S. La Cienega Blvd. Suite 201<br>Inglewood, CA 90301<br>TEL: 310.910.0940<br>pamela.penn@pdaconsultinggroup.com |
| **Playa Vista Job Opportunities and Business Services**<br>Mary Taylor<br>4112 S. Main Street<br>Los Angeles, CA 90037<br>TEL: 323.432.3955<br>FAX: 323.432.3995<br>mtaylor@pvjobs.org | **TransCal Services, LLC**<br>Jeffery Henderson<br>6109 S. Western Ave., Suite 308<br>Los Angeles, CA 90047<br>TEL: 323.305.6470<br>FAX: 323.305.6471<br>jhenderson@transcalservices.com |
| **TSG Enterprises, Inc. dba The Solis Group**<br>Elizabeth Solis<br>131 N. El Molino Ave., Suite 100<br>Pasadena, CA 91101<br>TEL: 626.685.6989<br>FAX: 626.685.6985<br>elizabeths@thesolisgroup.com | **Power2Workers**<br>Christiana Faulkner<br>5505 S. Vermont Ave.<br>Los Angeles, CA 90037<br>TEL: 323.920.6674<br>christiana@power2workers.org |

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# SECTION 01 00 00
# PROJECT GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of the Contract (1.02)
B. Permanent Utility Services (1.03)
C. Work not Included (1.04)
D. Drawings (1.05)
E. Time of Completion (1.06)
F. Long Lead Time Materials and Equipment (1.07)
G. Liquidated Damages (1.08)
H. Examination of Site and Work (1.09)
I. Cooperation (1.10)
J. Restrictions to the Work (1.11)
K. Cutting and Patching (1.12)
L. Air Quality Management District Rules (1.13)
M. Shop Drawings (1.14)
N. Cleaning (1.15)
O. Existing Utility Lines (1.16)
P. Protective Measures (1.17)
Q. Project Administration (1.18)
R. Best Management Practices (BMP) Requirements (1.19)
S. Work In Progress Under Other Contracts (1.20)

1.02 SCOPE OF THE CONTRACT

A. Work to be done under the Contract consists of furnishing all materials, all equipment, and performing the Work required by these Specifications and the Drawings hereinafter, described and necessary, to complete the construction of the Huntington Park Library Project.

B. The work includes but is not limited to the following: the remodeling and refurbishment of the interiors and exterior of the existing building. This includes the necessary abatement and demolition in order to provide the updates to MEP, low voltage, lighting, ceiling, wall, and floor finishes, bookshelves, casework, and signage. Improvements will also be made to restrooms and exterior pathways to ensure compliance with current Americans with Disabilities Act accessibility standards. For a more detailed scope of work, please refer to the drawings and specifications titled "Huntington Park Library".

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1.03 PERMANENT UTILITY SERVICES

The Work shall include all operations necessary to place required utility services in operating condition, including service lines from points of connection shown on Drawings, permanent meters, connections, and inspections. The work includes installation of telephone conduit, backboards, and terminal cabinets as shown, and cooperation with the serving utility company for the installation of other telephone equipment and cables. The County will arrange and pay for telephone switchboards, instruments, and cables.

All other expenses in connection with utility service installations shall be borne by the Contractor; however, upon receipt of certified cost statements, the County will reimburse Contractor for all charges made by serving companies in connection with permanent utility service installations.

Drawing notes and/or specification provisions of trade sections concerning utilities shall take precedence over the foregoing provisions.

1.04 WORK NOT INCLUDED

All items indicated on the Drawings as "N.I.C." (not in contract).

1.05 DRAWINGS

The Work shall conform to the Drawings entitled Huntington Park Library Project with sheet numbers and titles as listed on Sheet G0.00 of the Drawings.

1.06 TIME OF COMPLETION

A. The work to be performed under the contract shall be completed within 365 calendar days, beginning with the date stipulated in the written notice to proceed issued by the Director.

B. Failure to complete the work by the identified completion date will be subject to the Liquidated Damages identified in Paragraph 1.08.

C. Final Payment Request shall be submitted within twenty (20) days after completion of the contract work, including all punch list items.

1.07 LONG LEAD TIME MATERIALS AND EQUIPMENT

A. The Contractor shall make every effort to demand of his Subcontractors and suppliers, relative to long lead time items, that they order such items well in

advance of the scheduled time of installation. Time extensions for late ordering of such materials will not be allowed.

1.08 LIQUIDATED DAMAGES

A. All time limits stated in the Contract Documents are of the essence of the Contract and should the Contractor fail to complete the work required to be done on or before the time of completion as set forth in these specifications, including any authorized extension of time, it is mutually understood and agreed by and between the awarding entity and the Contractor that the use by the public of the Contract Work will be correspondingly delayed, and that by reason thereof, the awarding entity and the public will necessarily suffer great damages; that such damages from the nature of the case will be extremely difficult and impractical to fix; and that the awarding entity and the Contractor have endeavored to fix the amount of said damages in advance as follows:

1. The sum of $1,500 a day for each day's delay in the completion of the work beyond the time limit stipulated in Paragraph 1.06.

B. It is further mutually understood and agreed by and between the awarding entity and the Contractor that the sum of liquidated damages set forth above will be additive to a total of $1,500 a day for each and every day's delay in the event that the time limits, as hereinbefore specified, are concurrently exceeded. Any authorized extensions of time will be added to the time limits stipulated.

C. The Extended Overhead Daily Rate is not applicable when it is determined that liquidated damages apply due to a Contractor's delay.

1.09 EXAMINATION OF SITE AND WORK

A. Bidders must examine the location, physical conditions, and surroundings of the proposed Work and judge for themselves the extent to which these factors will influence the performance of the Contract Work.

B. The plans for the Work show conditions as they are supposed or believed by the Department to exist, but it is not intended, or to be inferred, that the conditions as shown thereon constitute a representation, express or implied by the County or its officers, that such conditions are actually existent, nor shall the Contractor be relieved of the liability under his Contract, nor the County, or any of its officers, be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the

plans or referred to in the Specifications and the actual conditions revealed during the progress of the Work.

C. The County will conduct a prebid conference and job walk of the project site at 10 a.m. on August 14, 2025.

1.10 COOPERATION

In the entrance and exit of all workers and in bringing in, storing, or removing of materials and the erection and maintenance of equipment and in the manner and time of prosecuting the work, the Contractor shall cooperate with those in authority on the premises to prevent the entrance of those whose presence is forbidden or undesirable, and he shall observe all rules and regulations in force on the premises and avoid undue interference with the convenience, sanitation, and routine of County departments occupying the premises.

1.11 RESTRICTIONS TO THE WORK

A. The Department reserves the right to determine which of the Contractor's operations are noise, dust, or dirt producing, or which disrupt utility service, or which constitute blocking of passageways, exits, entrances, etc., or which in any way constitute an interference in the proper function of the building.

B. Contractor shall maintain clear access to all protection equipment at all times, including access to fire hydrants.

C. Control of Tools: During the progress of the work, all hand tools, including power driven hand tools, cables, ropes, and other implements shall be transported and retained, except when in use in an approved locked toolbox. Care shall be taken that no tool is left unguarded or left where it might be taken by an unauthorized person.

D. All work by the Contractor is subject to inspection at any time and without notice by the County.

E. The working hours are Monday through Friday between 7:00 a.m. to 4:00 p.m. unless otherwise specified by the County.

1.12 CUTTING AND PATCHING

The Contractor shall perform all cutting, patching, and finishing operations occasioned by the Work under the Contract, whether or not such operations are indicated on the Drawings or specifically mentioned in the various sections of the

Specifications. All such operations shall be performed in the best practices of the various trades involved and to the satisfaction of the Department. All patching and finishing materials shall match existing adjacent surfaces in every respect, including design, type and quality of materials, finish, and color. Cutting, patching, and finishing shall include all such operations in existing areas required by the Work under the Contract.

## 1.13 AIR QUALITY MANAGEMENT DISTRICT RULES

The Contractor shall become familiar with requirements of the South Coast Air Quality Management District Rules 50, 66, 66.l, 66.2, 403, and 1113. The Contractor is responsible for conforming to and using materials which meet the requirements of the above-specified rules.

## 1.14 SHOP DRAWINGS

Furnish shop drawings as required in the various sections of the Specifications or as requested by the Department. Unless otherwise specified, submit six (6) copies of shop drawings to the Department for review. One set will be returned to Contractor marked "no exceptions noted" or "exceptions noted." If changes are required, six (6) copies of corrected shop drawings shall be delivered to the Department. Shop drawings shall be of sufficient size and scale to clearly show all details; shop drawings of millwork and cabinet work shall show molding full size. No materials shall be furnished or Work done on items requiring shop drawings prior to acceptance. Acceptance of shop drawings shall not relieve the Contractor from responsibility for deviations from the Contract Documents, nor from responsibility for errors or omissions of any sort in the shop drawings. Neither does such acceptance relieve the Contractor from his responsibility for the correct installation, or for the proper operation in service, of items requiring shop drawings.

## 1.15 CLEANING

During progress of Work and upon completion of each part of the Work as defined by the sections into which these Specifications are divided or as separated by the various trades involved in the Work, each area shall be cleaned of debris emanating from the Work. The Contractor shall remove excess materials, waste, rubbish, and debris, and his construction and installation equipment from the premises. Any dirt and stains caused by the Work under the Contract shall be removed from the surfaces of the structures and from equipment and fixtures. Final acceptance of the Work done under these Specifications will not be given until the cleaning has been inspected and approved by the Department.

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## 1.16 EXISTING UTILITY LINES

Except as indicated on the Drawings or in the Specifications, the Contractor will not be liable for the rerouting of existing active underground lines, which may be discovered during the progress of the Work.

## 1.17 PROTECTIVE MEASURES

The Contractor shall provide and maintain substantial and adequate protection as may be required to protect new and existing Work and all items of equipment and furnishings for the entire duration of Work.

The Contractor shall repair or make good any and all damage or loss he may cause to the building or other County property to the full satisfaction of the Department.

## 1.18 PROJECT ADMINISTRATION

All materials supplied and all Work done by the Contractor shall be under the general administration of the Department and in accordance with the Drawings and Specifications.

## 1.19 BEST MANAGEMENT PRACTICES (BMP) REQUIREMENTS

A. The Contractor shall comply with Section 01 57 00 (for projects less than one acre), Section 01 57 00 (for projects greater than one acre), the Los Angeles County Department of Public Works Construction Site Best Management Practices (BMP's) Manual, latest edition. A copy of the BMP Manual can be obtained at the Los Angeles County Department of Public Works Cashier's Office, 900 South Fremont Avenue, Alhambra, CA 91803, (626) 458-6959.

## 1.20 WORK IN PROGRESS UNDER OTHER CONTRACTS

It is anticipated that the work of a developer may be concurrently in progress with the work of this contract. Refer to General Conditions articles, "Other Contracts" and Cooperation with Others."

* * * *

# SECTION 01 14 00
# ALTERATION PROJECT PROCEDURES

## 1.00 GENERAL

## 1.01 CONTRACTOR'S USE OF THE PREMISES

A. The Contractor will be restricted in the use of the site to that area designated by the County. If the allotted space is too restrictive, provide a written request to the County, identifying the amount of additional area required, the reason why the existing area is inadequate, and any incentives for the County to provide the additional space.

B. The parking lot is owned by the City of Huntington Park. Use of any portion of the parking lot will require permission from the City of Huntington Park.

C. Obtain and pay for the use of additional storage or work areas if required for operations.

## 1.02 INTERRUPTION OF EXISTING SERVICES

A. The facility is in continuous operation.

B. If an interruption of any existing utilities and/or equipment operations to the existing building will be required provide the County a minimum of 7 days notice for minor interruption and 14 days advance notice for major interruption, obtain County's permission and if required by the County, interrupt service only during non-business hours unless otherwise noted in the Contract Documents. Interruptions affecting areas outside the tenant improvement space constitutes a major interruption.

## 1.03 PROTECTION OF EXISTING IMPROVEMENTS

A. Take all precautions necessary to protect existing building, utilities and other site improvements from damage due to the work of this Project and be responsible for their restoration of any damaged property to its original condition if damage is a result of the Contractor's construction activities.

B. Cooperate with County to sequence the work so as not to unnecessarily interfere with operation of occupied facilities. Prior to demolition or construction work, consult with County to determine a construction schedule which will permit the existing facilities to function without interruption. Thereafter, Contractor shall provide County's Representative with a minimum of fourteen days advance notice, in writing, of anticipated portion of the Work which may, because of noise or otherwise, require advance operational planning.

C. In planning and performing the Work, make every effort to maintain all pollutants, including noise, dirt and dust levels at the absolute minimum possible.

D. Continuously maintain ingress and egress to and from existing building for purposes of fire and emergency entrance and escape, loading and delivery, and building maintenance, to the satisfaction of the County and authorities having jurisdiction.

E. Protect all utilities against interruption, damage or contamination during construction; if necessary, provide temporary utilities to maintain services continuously. Such utilities shall include, but shall not be limited to, electricity, water, gas, sewerage, telephone, data, oxygen, nitrous oxide, vacuum and compressed air.

F. Provide temporary barriers to separate occupied areas from work areas. Seal all joints to create dust-proof enclosures.

G. Limit equipment and vehicles in ingress and egress and use of service areas to the minimum essential to operations. If there is unavoidable conflict with Contractor's equipment in such areas, upon request of County, remove such equipment immediately to facilitate emergency services, and within a reasonable time, for all other services.

1.04 DAMAGE AND RESTORATION

A. Damage to existing or new work caused by equipment or other operations, whether accidental or made necessary by reason of Contract requirements, shall be restored or replaced as specified or directed by the County, at Contractor's sole expense.

B. Restoration shall be equal to the original work, and finishes shall match the appearance of, as nearly as possible, like existing adjacent work. Restoration shall be subject to acceptance by the County and shall be made as necessary at Contractor's sole expense.

C. Work not properly restored or where not capable of being restored as intended under these specifications shall be removed and replaced as directed by County, at Contractor's sole expense.

2.00 PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK

A. New materials: As specified in product Sections; match existing products and work for patching and extending work.

B. Type and quality of existing products: Determine by inspection and testing products where necessary, referring to existing work as a standard.

3.00 EXECUTION

3.01 EXAMINATION

A. Verify that demolition is complete and areas are ready for installation of new work.

B. If actual conditions differ from conditions shown on the Contract Documents, immediately report the differing conditions to the Director and wait for written instructions.

C. Beginning of work means acceptance of existing conditions.

3.02 PREPARATION

A. Cut, move or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage. Replace materials as specified for finish work.

C. Remove debris and abandoned items from area.

D. Prepare surfaces and remove surface finishes to provide for proper installation of new work and finishes.

E. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity.

3.03 INSTALLATION

A. Coordinate work of alterations and renovation to expedite completion.

B. Designated areas: Complete in all respects.

C. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.

D. Install products as specified in each Section.

3.04 TRANSITIONS

A. Where new work abuts or aligns with existing, perform a smooth and even transition. Patch work to match existing adjacent work in texture and appearance.

B. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along with a straight line at a natural line of division and make recommendations to Director.

3.05 REPAIR OF DAMAGED SURFACES

A. Patch or replace portions of existing surfaces which become damaged, lifted, discolored or showing other imperfections.

B. Repair substrate prior to patching finish.

3.06 FINISHES

A. Finish surfaces as specified in each Section.

B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

* * *

# SECTION 01 23 00

# ALTERNATIVES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Alternative proposals as identified on the drawings and described herein shall state the net sum to be **added to** Lump Sum Bid in the event that the Alternative proposal is included. Dollar amounts for Alternative proposals shall be inserted in the "Form of Bid".

B. If the County determines to award a contract, it shall be awarded to a responsive and responsible Bidder with the lowest bid price. If there are alternatives, the lowest bid price shall be determined by adding the lump sum bid and the price of all alternatives. This does not preclude the Board of Supervisors from selecting any combination of alternates after the lowest responsible bidder has been determined.

C. Include in the Alternative proposal all changes in cost resulting in the work of all trades affected thereby. Work shall be performed in accordance with the drawings and specifications affected unless otherwise specified.

D. Contractor shall determine to his own satisfaction the extent the work is affected by the Alternative proposals and shall make full and proper allowance therefore in the preparation of this proposal.

1.02 BID ALTERNATIVES:

**1. Additive Alternate No. 1**
Furniture, Fixtures and Equipment (FF&E), and Shelving:

Provide and install furniture, fixtures, and equipment (FF&E) items, including, but not limited to, shelving units, custom casework, loose furniture, modular furniture, and equipment. Refer to Sheets A3.31 thru A3.34 for FF&E, shelving, and equipment schedules indicating items that are part of this alternate.

## 2. Additive Alternate No. 2

(E) Exterior Guardrails on south side of arcade to be painted by contractor, typ. Refer to exterior elevation sheet A4.01, South Elevation 9.

* * *

# SECTION 01 26 13
# CONTRACTOR'S REQUEST FOR INFORMATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. This section covers general requirements for Contractor's Requests for Information (RFI).

B. The Contractor will prepare and submit RFIs as directed by the LACPW Project Manager.

C. Related Sections:

1. General and Supplementary Conditions for changes in the Work.

2. Section 01 31 19: Progress Meetings

3. Section 01 33 00: Submittals

### 1.02 SUBMITTALS

A. Submit a Request for Information to the LACPW when:

1. An unforeseen condition or constructability question occurs.

2. Questions regarding information in the Contract Documents arise.

3. Information not found in the Contract Documents is required.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting. When the RFI is answered at the Project meeting, number the RFI and enter the response into the meeting minutes.

1. When the urgency of the need or the complexity of the item makes clarification at the next scheduled Project meeting impractical, prepare and submit a formal written RFI to the LACPW.

C. RFIs shall be submitted within a reasonable time frame so as not to interfere with or impede the progress of the Work. The Contractor shall make every effort to keep the number of RFIs to a minimum. If the number of RFIs becomes unwieldy, the County may require the Contractor to abandon the RFI process and submit requests as either submittals, substitutions, or requests for change.

D. When the response to an RFI effects the cost or time duration of the project, notify the County in accordance with the General Conditions at the time of

the submittal. Notification shall occur prior to commencing such work, so that the change order process can be initiated.

1. At time of the time of submittal of the RFI, notify the County to the time available before the response will cause a time or cost impact to the Project.

2. An answered RFI shall not be construed as approval to perform extra work.

E. Form of Submittal:

1. Submit legible written RFIs on a standard CSI or AIA preprinted form or other such form as approved in advance by the County. Each request shall include the following information:

a. Project name, as listed on the Contract Documents, and County Specs. Number;
b. Date;
c. RFI number;
d. Name, address, telephone and e-mail address of the Contractor;
e. Number and title of affected Specification Section(s);
f. Drawing numbers and detail numbers as appropriate;
g. Indicate if the RFI will result in a time or cost impact;
h. Clear, concise explanation of information or clarification requested;
i. Blank, lined spaces for Architect's response;
j. Signature block for County to acknowledge review of Architect's response;
k. Mark each page of each RFI attachment in the lower right corner with the RFI number;
l. Number submitted RFIs consecutively; and
m. Sign and stamp all RFI forms. RFIs from subcontractor or material suppliers shall be submitted through the Contractor. Contractor shall review all such information request prior to submitting to the County.

F. RFIs not meeting the requirements of this Section will not be answered and any consequential impact on the project shall be the sole responsibility of the Contractor. Unanswered RFIs will be returned with a stamp or notification "Not Reviewed."

G. RFI Log: Contractor shall maintain and update the log weekly and furnish to the County when requested. The log shall contain the following minimum information:

a. RFI number
b. Date submitted
c. Brief description of content or subject

d. Date answered

H. Allow a minimum of five (5) working days for review and response. The response time will be increased if more information is required, when the RFI is submitted out of sequence, or if in the opinion of the County, more time is required to answer the RFI.

1.03 QUALITY ASSURANCE

1. Carefully review the Contract Documents before submitting a RFI to the County. Verify that the information requested is not indicated in the Contract Documents or cannot be determined from a careful review.

    1. The County may not answer RFIs for information that is readily available in the Contract Documents.

2. RFIs requesting clarification of coordination issues, shall include the Contractor's suggested solution as an attachment to the RFI.

    1. Such coordination issues include, but are not limited to, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items.

    2. Provide scale drawings or sketches indicating the proposed solution.

    3. RFIs which do not include a suggested solution will not be answered.

3. Do not use RFIs for the following:

    1. To request approval of submittals.

    2. To request approval of substitutions.

    3. To request changes to the Contract Documents and to confirm action taken by the Contractor for requested changes/substitutions to the Contract Documents.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

* * *

# SECTION 01 29 73
# SCHEDULE OF VALUES

## PART 1 - GENERAL

### 1.01 DESCRIPTION

A. Submit to the Department, six (6) copies of an accurate and realistic Schedule of Values allocated to the various portions of the work, ten (10) calendar days from issuance of Notice to Proceed under the Consultant Services Agreement.

B. The Contractor will prepare and submit the Schedule of Values as directed by the LACPW Project Manager.

C. The Schedule of Values, unless objected to by the Department, shall become the basis for the Contractor's applications for payment.

1. Upon request by the Department, support values given with data that will substantiate their correctness.

D. Related requirements specified elsewhere.

1. Section 01 00 00, "Project General Requirements".

### 1.02 FORM OF SUBMITTAL

A. Type schedule on 8-1/2" x 11" white bond paper. Identify schedule with:

1. Title of project and location.

2. Specification number.

3. Name and address of Contractor.

4. Date of submission.

B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Use the Table of Contents of the project specifications as a basis for the format for listing component items.

1. Identify each line item with the number and title of the respective section of the specifications.

D. List sub-values of major products or operations for each line item. Additional sub-values may be requested by the Department.

E. Costs for the various portions of the work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress payments will be requested, list the total installed value, including Contractor's overhead and profit.

F. A similar detailed schedule, itemizing costs and/or credits in a form satisfactory to the Department, shall accompany all quotations for changes in the work or for extra work. Refer to article entitled "Provisions for Extras" in the General Conditions of the project specifications.

G. Round off figures to nearest ten ($10) dollars wherever possible.

H. The sum of all values listed in the schedule shall equal the total contract sum.

1.03 REVIEW AND RESUBMITTAL

A. After review by the Department, revise and resubmit Schedule as required. Resubmit revised Schedule in same manner.

B. Progress payments will not be made until Schedule has been approved.

* * *

# SECTION 01 31 00
# COORDINATION AND MEETINGS

PART 1 – GENERAL

1.01 SECTION INCLUDES:

A. Coordination
B. Preconstruction Meeting
C. Progress Meetings
D. Preinstallation Meetings

1.02 COORDINATION

A. Coordinate scheduling, submittals, and work of the various Sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later and for accommodating items to be installed by the County.

B. Coordinate sequence of work to accommodate County occupancy as specified in Section 01 00 00 Project General Requirements.

1.03 PRECONSTRUCTION MEETING

A. Construction Manager/County Project Manager will schedule a meeting after Notice of Award.

B. Attendance Required: Architect, Project Coordinator, Prime Contractors, Major Subcontractors, Project Inspector and key County personnel.

C. Agenda:

1. Contract Agreement

   a. Transmit Performance and Material Bonds to Architect
   b. Review General/Supplementary Conditions
   c. Deferred Approvals

2. Receive documentation from Contractor

   a. Construction Schedule
   b. Schedule of Values

c. List of Subcontractors with Addresses and Phone Numbers
d. List of Submittals and Estimated Date of Submittal

3. Project Administration

a. Application for Payment, Project Schedule, Lien Release, As-built Documents, Contract Administration
b. Change Orders and Proposal Requests
c. Submittals and Substitutions, Deferred Approvals
d. Site Meetings
e. Testing Lab
f. Verified Reports

4. Special County Conditions

a. Temporary Facilities
b. County Occupancy
c. Work by County
d. Access to Site – County Contract

5. Construction Process

a. Contractor to give Overview of Construction
b. Contractor to identify items to be selected by Architect/County and date selections must be made.
c. Contractor to review special requirements for equipment, safety, and noise.

6. Project Close-Out

a. Close-out Binder
b. As-Built Documents
c. Final Verified Reports

D. Architect or County Project Manager to record minutes and distribute copies within three days after meeting to participants, Architect and those affected by decisions made.

1.05 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work as needed.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Project Coordinator, Prime Contractors, major Subcontractors and suppliers, Project Inspector, key County personnel and Architect as appropriate to agenda topics for each meeting.

D. Agenda

1. Review Minutes of Previous Meetings
2. Workforce Safety and OSHA topics.
3. County LWTP policy project compliance status
4. Review of Work Progress
5. Field Observations, Problems, and Decisions
6. Identification of problems which impede planned progress.
7. Review of Submittals Schedule or Status of Submittals.
8. Review of Off-site Fabrication and Delivery Schedules
9. Maintenance of Progress Schedule
10. Corrective Measures to Regain Project Schedules
11. Planned Progress During Succeeding Work Period
12. Coordination of Projected Progress
13. Maintenance of Quality and Work Standards.
14. Effect of Proposed Changes on Progress Schedule and Coordination
15. Other Business Relating to Work

E. Architect or County Project Manager to record minutes and distribute copies within three days after meeting to participants, Architect, and those affected by decisions made.

1.06 PREINSTALLATION MEETING

A. When required in individual specification sections, convene a preinstallation meeting prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect and Project Manager four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation and installation procedures.

2. Review coordination with related work.

E. Contractor to record minutes and distribute copies within three days to participants, Architect and those affected by decisions made.

1.07 COORDINATION OF SUBMITTALS

A. Schedule and coordinate submittals specified in Section 01 33 00.

B. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate request for substitutions to assure compatibility of space, of operating elements, and effect on work of other sections.

1.08 COORDINATION OF SPACE

A. Coordinate use of project space and sequence of installation of mechanical and electrical work which is indicated diagrammatically on drawings. Follow routings shown for pipes, ducts, and conduits as closely as practical, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximum accessibility for other installations, for maintenance and for repairs.

B. In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.09 COORDINATION WITH WORK BY COUNTY

A. Coordinate any work by County.

1.10 COORDINATION OF CONTRACT CLOSE-OUT

A. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion.

B. After County occupancy of premises, coordinate access to site by various sections for correction of defective work and work not in accordance with Contract Documents to minimize disruption of County's activities.

C. Assemble and coordinate close-out submittals specified in Section 01 77 00.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

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# SECTION 01 31 19
# PROGRESS MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scheduling and administration of progress meetings.

1.02 RELATED REQUIREMENTS

A. Instructions to bidders.

B. Project general requirements.

C. Construction schedules.

D. Shop drawings, product data and samples.

E. Quality control.

F. Temporary Facilities.

1.03 PROGRESS MEETINGS

A. The County will schedule and administer progress meetings throughout the construction of the work.

B. The County will make physical arrangements, prepare agenda and distribute notice for the meetings to participants in advance of meeting date.

C. The Project Manager will preside at meetings. Meeting minutes will be recorded and copies will be distributed to participants prior to next meeting.

D. Location of meetings: Project's field office or Project Manager's office.

E. Attendance: Project Manager, Inspector, Contractor, job superintendent, subcontractors, suppliers and others as appropriate to agenda; Architect/Engineer and others shall attend when appropriate.

F. Minimum Agenda:

1. Approval of minutes of previous meetings.

2. Review of work progress.

3. Field observations, problems and decisions.

4. Identification of problems which impede planned progress.

5. Review of submittals schedule and status of submittals.

6. Review of off-site fabrication and delivery schedules.

7. Maintenance of progress schedule.

8. Corrective measures to regain projected schedules.

9. Planned progress during succeeding work period.

10. Coordination of projected progress.

11. Maintenance of quality and work standards.

12. Effect of proposed changes on progress schedule and coordination.

13. Other business relating to Work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

* * *

# SECTION 01 32 00
# CONSTRUCTION SCHEDULES

Critical Path Method Schedule Integration System

## 1. GENERAL

DESCRIPTION – The work specified in this section consists of developing and maintaining a Critical Path Method (CPM) schedule integration system for the contract. Planning, scheduling, management, and execution of work in accordance with contract documents are the sole responsibility of the Contractor.

1.1 Related General Conditions/General Requirements Articles, and Specifications Sections

| | | |
|---|---|---|
| a. | General Conditions Articles | 12.A, 12.B, 12.C |
| b. | General Conditions Articles | 14 |
| c. | General Conditions Articles | 15.B.e.3 |
| d. | General Requirements Articles | 1.02 |
| e. | General Requirements Articles | 1.06 |

1.2 Generate a CPM schedule integration system using commercially available CPM scheduling software program containing direct file interchange capability with the software program used by the Los Angeles County Department of Public Works. Prepare as directed by the County Project Manager.

1.3 For scheduling submittals produce Precedence Diagram Method (PDM) and time scaled network diagram submittals on D-Size (22-inch by 34-inch) or E-Size (34-inch by 44-inch) medium suitable for reproduction. Print schedule submittal tabular reports on A-Size (8 ½-inch by 11-inch) paper. For scheduling submittals, the Contractor shall include backup diskettes. The backup diskettes shall be made directly from the CPM scheduling software and shall contain all files of the project that can be restored by the County for its evaluation and analysis.

1.4 Contract milestone dates, County furnished goods, availability dates, and real estate availability dates, are unique zero duration activities as a “start no earlier than” or “finish no later than” milestone. Each milestone activity will constrain its dependent work. Assume Notice to Proceed (NTP) is given at day zero for calculation of constraint dates for milestones.

1.5 Float is not for exclusive use or benefit of either the County or Contractor but is an expiring resource available to both parties on a

nondiscriminatory basis. Float is used by either party, as needed to meet contract milestones and contract completion dates. Contract time extensions for contract performance will be granted only to extent that delays or disruptions to affected work paths exceed total float along those paths of current contract schedule (update schedule) in effect at time of delay or disruption. These delays or disruptions must also cause end date of work to exceed current contract date or milestone date and be beyond control and without fault or negligence of Contractor or any subcontractor at any tier. If delays or disruptions impact an already negative float path, Contractor will not receive a time extension unless and until activity with highest float is driven even further negative.

1.6 Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times or durations should be submitted with written justification to obtain the County's acceptance. Use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to proportionate benefit of the County and Contractor. Use of any technique solely for purposes of suppressing float will be cause for rejection of schedule submittal.

1.7 Planning units – Scheduling software supports schedule Planning Units of hours, days, weeks or months. The standard time unit applied to the schedule integration system is defined as days.

1.8 Schedule network – Use Retained Logic CPM Precedence Diagram Method of scheduling.

1.9 Analyze in detail, activities included in contract schedule to determine activity time durations in units of working days. Base durations on engineering and design resources, drawing production, submittal review periods, procurement lead time and duration, manufacturing times, labor (crafts), equipment, and materials required to perform each activity on a normal workday basis. No on-site activity shall have a duration over 10 working days except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment, and concrete curing.

## 2. PRODUCTS

SUBMITTALS – Submit one original and four copies of schedule unless specified otherwise. Provide submittals specified in this section to the County for review and acceptance.

2.1 Baseline CPM Contract Schedule

Provide the County with a means to monitor and follow progress of all phases of work, with contractually specified interim milestones and completion dates, and with constraints, restraints or sequences included in the contract. Degree of schedule detail required shall include factors to the satisfaction of the County, including but not limited to the following:

2.1.1 Master list of submittals and all other requirement as referenced in Section 01 33 00 Submittals.

2.1.2 Contract interim milestones and contract completion date, substantial completion dates, constraints, restraints, sequence of work indicated.

2.1.3 Type of work to be performed, sequences, and labor trades involved.

2.1.4 Purchases, manufacture, tests, delivery, and installation activities for major materials and equipment.

2.1.5 Deliveries of County furnished goods and/or materials in accordance with dates or schedule windows of such times set forth in the contract or furnished by the County.

2.1.6 Preparation, submittal, and acceptance of shop and/or working drawings and material samples showing a 30-day minimum time specified for the County and third party reviews of normal or routine submittals, so identified in the specifications, and the same time frame shall be allowed for at least one re-submittal or submittals so identified in the contract documents.

2.1.7 Approvals and permits required by regulatory agencies or other third parties.

2.1.8 Schedules for subcontract work.

2.1.9 Assignment of responsibility for performing specific activities.

2.1.10 Access and availability to work areas.

2.1.11 Identification of interfaces and dependencies with preceding, concurrent and follow-on construction or contractors and utilities.

2.1.12 Actual tests, submissions of test reports, and acceptance of test results.

2.1.13 Start up, testing, training, and assistance required under the contract.

2.1.14 Planning for phased or total takeover by the County.

2.1.15 Punch-list and final clean up.

2.1.16 Identification of construction restrictions as well as any activity requiring unusual shift work, such as two shifts, six day weeks, specified overtime, or work at times other than a standard work day.

2.2 The schedule of values shall be prepared and submitted together with the construction schedule.

2.3 Failure to meet these requirements may result in a determination and recommendation that the Board of Supervisors determine that the successful bidder as non-responsible because such failure reflects the bidder's ability to manage the work.

3. Current CPM Contract Schedule Updates

3.1 Initially, upon approval of the baseline CPM contract schedule, establish the current CPM contract schedule from the baseline CPM contract schedule. Thereafter, update the current contract schedule monthly with data date designated by the County. Use updated current contract schedule for subsequent planning, scheduling, and execution of work to be accomplished. Obtain County prior acceptance before making deviations in logic and activity durations in the current CPM contract schedule.

3.2 Participate with the County in periodic meetings, at least monthly, on dates directed by the County and seven days prior to monthly status. At meeting held seven days prior to the data date, provide preliminary updated current CPM contract schedule that forecasts project status on the data date and contains actual start and actual finish dates for activities in progress or completed, remaining durations of activities already in progress, percent completed, logic changes, new or deleted activities, and new change order/modifications.

3.3 Submit a stand alone portion of the network (fragnet), if current progress reflects negative float of minus 10 days or more for a milestone activity, as indicated by most recent CPM contract schedule, allowed by contract as amended by approved change orders/modifications. Show activities affected, date delay or disruption occurred or how productivity was impacted, and unmitigated impacts to schedule caused delay or disruption. Submit similar fragnet showing Contractor's plan to mitigate delay or disruption and subsequent impacts to schedule at the County's request. Provide written narrative describing circumstances that caused delay or disruption and methodology used to determine extent of delay or disruption. Submission of such fragnets does not constitute permission to proceed with plan. Execute some or all of the following remedial actions, and submit a recovery schedule that may include:

3.3.1 Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.

3.3.2 Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or combination of the foregoing to eliminate the backlog of work.

3.3.3 Reschedule the work in conformance with the specifications requirements.

4. Before implementing any of the above actions, notify and obtain acceptance from the County. If such actions are accepted, incorporate current CPM contract schedule revisions before next update.

5. Addition of equipment or construction forces, increasing working hours or other methods, manner, or procedure to return to contractually required completion date will not be considered justification for a change order/modification, nor be treated as acceleration where the need for a recovery schedule has been caused by the Contractor and/or its subcontractors or suppliers at any tier.

6. When the Contractor experiences change order/modifications or delays and a time extension is requested, submit to the County a written time impact analysis illustrating the influence of each change or delay on current contract schedule completion date utilizing current CPM contract schedule. Include in each time impact analysis a fragnet demonstrating how the Contractor proposes to incorporate the change order/modification or delay into the current CPM contract schedule. The fragnet shall contain a sequence of new and/or activity revisions that are proposed to be added

to the current CPM contract schedule in effect at the time change or delay is encountered to demonstrate influence of delay and method of incorporating the delay and its impact into the schedule as they are encountered.

6.1 Each time impact analysis shall demonstrate estimated time impact based on events of delay, date of change order/modifications, proceed order, or unilateral change order/modification given to the Contractor, status of construction at that point in time, and event time computation of activities affected by change or delay. Event times used in analysis shall be those included in latest version of the current CPM contract schedule, in effect at time change or delay was encountered.

6.2 Submit each time impact analysis in triplicate, within ten days after a delay occurs. If the Contractor does not submit a time impact analysis for a specific change order/modification or delay within specified period of time, the Contractor will be deemed to have irrevocably waived rights to additional time and cost.

6.3 Because float time within current CPM contract schedule is jointly owned, it is acknowledged and agreed by the Contractor that the County caused delays on the project may be offset by County caused time savings (including, but not limited to: critical path submittals returned in less time than allowed for the contract, acceptance of substitution requests which result in a savings of time along the critical path for the Contractor, etc.). In such an event, the Contractor will not be entitled to receive an extension of time or delay damages until the County caused time savings are exceeded and contract completion data also exceeded.

6.4 The County will accept or reject each time impact analysis. Upon acceptance, a copy of a time impact analysis signed by the County will be returned to the Contractor for incorporation into the schedule.

6.5 Upon mutual agreement by both parties, incorporate fragnets illustrating the influence of change orders/modifications and delays into the current CPM contract schedule during first update after agreement is reached.

6.6 In the event the Contractor does not agree with the decision of the County regarding impact of a change or delay, the County’s determination shall govern.

7. The Contractor shall resolve out-of-sequence progress, if any, to provide the actual construction sequence to calculate the current critical path(s) and identify any deviations of interim milestones and/or project completion.

8. As-built schedule – Submit as-built schedule covering work performed under the Contract within 30 days after final completion. As-built schedule – Certified by a planner/scheduler and Contractor's project manager as being the manner in which Contract was executed. Submittal and acceptance of the schedule will be a condition precedent to reduction/release of retainage at the end of the contract.

9. Schedule reviews – The County will review and respond to scheduling submittals within 14 days after submittal, unless a different review period is specified in this section. Submit a revised schedule within seven days after receipt of the County's response if the County requires changes or additional information.

10. Early completion schedule – If the schedule duration proposed by the Contractor is less than the completion date in the NTP, the proposed schedule will not nullify the Contractor's right to the NTP duration. The Contractor agrees that in the event a proposed early completion schedule (or any subsequent update) which is found to be acceptable by the County, indicating a duration which is less than time allowed by Contract for completion of work or of interim milestone, Contract completion time shall only be shortened by a change order/modification to equal Contractor's proposed baseline CPM contract schedule duration.

    If the schedule duration proposed by the Contractor is less than the completion date in the NTP, the proposed schedule will not nullify the Contractor's right to the NTP duration.

11. Three week rolling bar chart schedule – Once a week, on a day mutually agreed to by the County and the Contractor, a meeting will be held to assess the progress achieved by the Contractor during previous work week. Submit a project schedule listing activities completed and in progress for the previous week and the activities scheduled for the succeeding two weeks based on the current CPM contract schedule. The three week rolling bar chart schedule shall be provided from the current CPM contract schedule and include all activities scheduled including: activity ID, description, early start and early finish, total float, original duration, remaining duration, percent complete, performance of the activity, and pertinent remarks as to activity status. The schedule shall be submitted to the County before the weekly meeting for review. Submit copies of schedule on 11-inch by 17-inch paper.

12. Monthly Updated Current Contract Schedule

    a. One computer generated backup copy of monthly updated current CPM contract schedule file.

    b. Written narrative for updated current CPM contract schedule.

13. Fragnets

    a. One computer generated backup copy of fragnet files.

    b. Written narrative of fragnet assumptions.

14. Contract Time Scaled Network Diagrams – Submit computer generated time-scaled network diagram entitled “Current Time Scaled Network Diagram” with submittal of items referenced below.

    a. Submit with initial early work schedule submittal.

    b. Submit every month with updated current CPM contract schedule.

15. Written Narrative Reports – Include a stand alone narrative of sufficient detail to explain basis of Contractor’s submittal with each schedule submittal.

    15.1 CPM Contract Schedule Submittals – Explain determination of activity durations and describe Contractor’s approach for meeting required interim and final completion milestone dates, as specified in the Contract. Include as a minimum basis and assumptions used in preparing the submittal, including crew sizes, equipment requirements, and anticipated delivery dates; restraints; critical path activities; production rates; activities requiring overtime or additional shifts; activities that contain time contingencies for impacts to be expected from normal rainfall; holidays and other non-work days; potential problem areas; permits; coordination required with the County; utilities and other parties; and long lead delivery items requiring more than 30 days from order to delivery. Identify work items that may be expedited by use of overtime or additional shifts. Identify and explain sequencing and other constraints such as manpower, material, and equipment. Include listing of holidays and special non-work days.

    15.2 Current CPM Contract Schedule Submittals – State in narrative, work actually completed and reflect progress along critical path in terms of days ahead of or behind allowable dates. Specific requirements of narrative are as follows:

15.2.1 If updated current CPM contract schedule indicates an actual or potential delay to contract completion date or interim milestone dates as specified under the contract documents or modified by change order/modification, identify causes of delays, disruptions and interruptions and provide explanation of work affected and proposed corrective action to meet milestone dates involved or to mitigate potential delays or disruptions. Document and log in a matrix format activities with non-mitigated negative float until the negative float is mitigated. Identify deviations from previous month's critical path. The matrix will include applicable activity number, description, planned start and finish dates, current start and finish dates, and float quantity.

15.2.2 Identify by activity number and description, activities in progress and which activities are scheduled to complete during the next period.

15.2.3 Identify by activity number and description, activities to be started during the month following the report period. Show Contractor's forecast early and late start, and finish dates.

15.2.4 Discuss added change order/modification work items.

3. EXECUTION

3.1 Baseline CPM Contract Schedule

3.1.1 Provide Contractor's detailed activities and sequencing for work included in the contract. Assign unique activity identification for each detailed activity.

3.1.2 Indicate Contractor's best estimate for original durations, early dates, late dates, logic ties, constraint dates, and total float. Schedule activities in the sequence which Contractor intends to perform work.

3.1.3 Include following activity sequence for major material and equipment procurement:

3.1.3.1 Submittal preparation; review for acceptance; and fabricate/deliver – Divide procurement items that may contain multiple submittals occurring at different time intervals into separate sequences that can be tracked

on individual basis. Include a maximum original duration of 20 working days for re-review. Resubmittal activities shall contain submittal preparation activities for other material and equipment procurement (non-major) to schedule.

3.1.4 Baseline CPM contract schedule activity requirement are as follows:

3.1.4.1 Activity descriptions – Briefly convey scope and location of work indicated.

3.1.4.2 Activities – Discrete items of work accomplished under contract that provide measurable and recognizable parts of work.

3.1.4.3 Include as contract deliverables, submittal and approval of permit applications and variances, samples of materials, shop drawings, working drawings, inspection and test plans, safety and security plans, and site traffic control plans. Include activities of the County that may affect progress as well as those of affected utility companies and other similarly involved third parties. Include activities in the baseline CPM contract schedule as stipulated in general requirements.

3.1.4.4 Work activities – Show duration in work days.

3.1.4.5 Work activities – Durations of 10 working days or less except for non-construction activities such as procurement of materials, or fabrication of equipment. Should a work activity require more than 10 working days, subdivide work activity to define appropriate work items.

3.1.4.6 Critical path is defined as the sequence(s) of activities with the least amount of float.

3.1.4.7 Failure to include any element of work required for performance of the contract in baseline CPM contract schedule will not excuse Contractor from completing work required to achieve milestone completion, notwithstanding acceptance of baseline CPM contract schedule submittals.

Activities that are susceptible to weather delays caused by rain shall contain time contingencies for those potential delays. The time contingencies shall be described in the appropriate activity log windows of scheduling software. In scheduling the work, Contractor shall plan for normal rainfall (including its subsequent effects on days following extremely heavy rain).

3.2 Baseline CPM Contract Schedule Changes

When commencing new work associated with a change order/modification, incorporate work into the current baseline CPM contract schedule submittal as new activities after discussion with the County concerning how changes will be placed into the revised baseline CPM contract schedule. After an official change order/modification has been issued for work, add it to the schedule.

3.3 Fragnets

3.3.1 Submit revised current CPM contract schedule within 14 days of request. If Contractor falls behind in prosecution of work, as indicated by negative critical path, or submittal of current CPM contract schedule no longer appears to represent actual prosecution of work.

3.3.2 Properly connect to and constrain by, previously existing predecessor and successor activities, as applicable, activities of revised portion(s) of schedule. Band impacted activities in separate networks (fragnets); indicating specific delay or impact issues and submit to the County for review. Combine approved fragnets into current CPM contract schedule.

3.3.3 Time extensions will be granted only to the extent that equitable time adjustments for activity or activities affected exceed total or remaining float along critical path of activities at time of actual delay, or at time a change order/modification was issued. Float or slack time is not for the exclusive use or benefit of the Contractor but is an expiring resource available to all parties as needed to meet contract milestones and contract completion date. Time extensions will not be granted nor delay damages paid until delay occurs:

3.3.3.1 Which is beyond the control and without the fault or negligence of the Contractor and its subcontractors or suppliers, at any tier; and

3.3.3.2 Which extends actual performance of work beyond applicable current Contract completion date and most

recent date predicted for completion of project on approved schedule update, current as of time of the delay or as of time of issuance of a change order/modification.

3.4 Submittal of Schedule

3.4.1 Contractor shall submit the construction schedule within ten (10) calendar days, per Section 00 01 00, Paragraph 1.14e, after receipt of the Notice to Proceed (NTP) on hard copies and CD that is compatible with P6. The Contractor shall provide to the County for review four (4) copies of the construction schedule indicating the sequence of operations, description of the work, calendar definition and duration showing entire job performed within the specified contract time.

3.4.2 If the schedule duration proposed by the Contractor is less than the completion date in the NTP, the proposed schedule will not nullify the Contractor's right to the NTP duration.

3.4.3 The County shall review the Contractor's construction schedule. The Contractor shall incorporate all the revisions requested by the County and submit the final schedule within seven (7) calendar days of its receipt from the County.

3.4.4 The schedule of values shall be prepared and submitted together with the construction schedule.

3.4.5 Failure to meet these requirements may result in a determination and recommendation that the Board of Supervisors determine that the successful bidder as non-responsible because such failure reflects the bidder's ability to manage the work.

3.4.6 The schedule shall be revised at no additional cost to the County and resubmitted for review when:

3.4.6.1 Changes to contract affect contract completion time.

3.4.6.2 "Slippage" occurs because of procurement delays, rain, strikes and other delays.

3.4.6.3 Any activities are modified from previous submittal.

3.4.6.4 Delay on initial non-critical items is of such magnitude as to change the critical path.

3.5 Responsibility for Completion

The Contractor shall furnish sufficient forces, offices, facilities and equipment, and shall work such hours including night shift and overtime operations, as necessary to ensue the prosecution of the work in accordance with the current monthly construction schedule update. If, in the opinion of the County, the Contractor falls behind in meeting the construction schedule as presented in the current monthly schedule update, the Contractor shall take such steps as may be necessary to improve its progress, and the County may require it to increase the hours of work, the number of shifts, overtime operations and/or the amount of construction plant and equipment without additional cost to the County.

END OF SECTION

# SECTION 01 32 33
# PHOTOGRAPHIC DOCUMENTATION

## PART 1 – GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.

2. Periodic construction photographs.

B. Related Sections include the following:

1. Division 1 Section, Submittal Procedures, for submitting photographic documentation.

2. Division 1 Section, Closeout Procedures, for submitting digital media as Project Record Documents at project closeout.

## PART 2 – PRODUCTS

### 2.01 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in PNG, JPEG or TIFF format, produced by a digital camera with minimum sensor size of 4.0 megapixels, and at an image resolution of not less than 1024 by 768 pixels.

## PART 3 – EXECUTION

### 3.01 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.

2. Field Office Images: Maintain one set of images on CD-ROM or thumb drive in the field office at project site, available at all times for reference. Identify images same as for those submitted to Architect and Construction Manager.

C. Preconstruction Photographs: Before commencement of demolition, or commencement of construction, take digital photographs of project site and surrounding properties, including existing items to remain during construction, from different vantage points.

D. Periodic Construction Photographs: Take digital photographs weekly, with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Architect or Construction Manager Directed Construction Photographs: From time to time, Architect or Construction Manager may instruct photographer about number and frequency of photographs and subject, general directions or vantage points for photographs. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

END OF SECTION

# SECTION 01 33 00
# SUBMITTALS

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES

A. Submittal Procedures
B. Construction Progress Schedules
C. Shop Drawings
D. Product Data
E. Samples
F. Manufacturers' Instructions
G. Manufacturers' Certificates
H. Coordinated Drawings
I. Request for Information
J. Contractor's Photographs

### 1.02 SUBMITTALS LIST AND SCHEDULE

A. Submittal: Within 30 days or submission of List of Submittals, whichever is later, after award of contract, and before submitting items for review, submit two copies of submittals list and schedule.

B. The Contractor will submit and document all submittals as directed by the County Project Manager.

C. Schedule: Compile complete schedule of submittals anticipated to be made during progress of work.

1. Include list of each type item for which Contractor's drawings, shop drawings, coordination drawings, product data, samples, certificates of compliance, manufacturer's certificates, warranties, and other types of submittals are required. Include number of Contractor's drawings, shop drawings, and coordination drawings anticipated within each submittal.

2. Sequentially number each submittal. Use original submittal number with sequentially numbered suffix for resubmittals.

3. Allow at least 10 working days, average, for Architect's review of submittals following receipt of submittal, including return to Contractor.

4. Indicate date of submittal by Contractor to Architect and date of receipt of reviewed submittals by Contractor from Architect.

5. Coordinate schedule with subcontractors and materials suppliers.

6. On acceptance by Architect, adhere to schedule except when specifically otherwise permitted. Accurately maintain submittal log for duration of contract.

D. Revisions: Revisions to original submittal list and schedule will only be accepted by the County Project Manager when revisions are required by circumstances not reasonably anticipated by Contractor during preparation of original schedule.

1.03 SUBMITTAL PROCEDURES

A. Transmit each submittal directly to Architect and copy the County Project Manager on the transmittal.

1. Bind submittals sturdily, neatly label covers.
2. Include job number as it appears on Contract Documents.
3. Include state agency application or approval number.
4. When requested by the County, all submittals shall be submitted by pdf. File.

B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

C. Identify Project, Architect, Contractor, Subcontractor or supplier, manufacturer; pertinent Drawing Sheet and detail number(s) and specification Section number, as appropriate.

1. Provide name and telephone number of individual who may be contacted for further information.

D. Apply Contractor’s stamp with Contractor’s original signature or initials affixed thereto, certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents. Stamped signatures or initials are acceptable.

E. Schedule submittals to expedite the project. Coordinate submission of related items.

1. Make all submittals in accordance with the progress schedule and far enough in advance of scheduled dates of installation to provide required time for reviews for securing necessary approvals for possible revision and submittal and for placing orders and securing delivery.

F. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed work.

1. Requests for deviations from Contract Documents shall be submitted for consideration before submittal of affected items. Submit in accordance with substitution requirements of Section 01 65 00 Transport, Handling and Storage. Only deviations which have been previously accepted in writing shall be included in submittals.

G. Provide space for Contractor and Architect review stamps.

H. Revise and resubmit submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

I. Determine and verify all field dimensions and conditions, materials, catalog numbers and similar data.

J. Coordinate as required with all trades and all public agencies involved.

K. Unless otherwise specifically authorized by Architect, make all submittals in groups containing all associated items. Architect may reject partial submittals as not comply with the provisions of this Section.

L. Resubmittals:

1. Subject to same terms and conditions as original submittal.

2. The County Project Manager will accept not more than one resubmittal.

a. Should additional resubmittals be required, Contractor shall reimburse County for Architect's account for time spent in processing additional resubmittals at rate of 2.5 times rate of Direct Personnel Expense (DPE). Direct Personnel Expense is defined as direct salaries

of Architect's personnel engaged or Project and portion of costs of mandatory, and customary contributions and benefits related thereto, including employment taxes and other statutory employee benefits, insurance sick leave, holidays, vacations, pensions, and similar contributions and benefits.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit as required in Section 01 32 00.

1.05 SHOP DRAWINGS

A. Submit a schedule of the shop drawings, listing their required submission and review dates to the County Project Manager for approval. The submission time shall be in accordance with the requirements set forth in Section 1.02, Submittals List and Schedule, Paragraph A. The schedule shall allow sufficient time for checking by the Architect. In addition, the shop drawing submission and review dates shall be incorporated into the progress schedule required in the General Conditions.

1. "Elapsed time due to 'Revise and Resubmit' or 'Not Approved' action, indicated, on submittal review (due to inaccurate data or incomplete definition), shall not adversely affect equipment delivery and/or installation schedules".

2. "Allotted time for review/approval process shall be a minimum of ten (10) working days from the date individual submittals are received by the Architect.

B. Submit newly prepared information, drawn to accurate scale. Highlight, encircle or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as to the basis of Shop Drawings. Standard information prepared without specific reference to the Project will not be approved as Shop Drawings.

C. Shop Drawings shall include fabrications and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.

5. Notation of dimensions established by field measurement.

D. Sheet Size: Except for templates, patterns and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 inch x 11 inch, but not larger than 30 inch x 42 inch.

E. The Contractor shall review, stamp with his approval as herein required, and submit with reasonable promptness and in orderly sequences, in accordance with the submittal schedule. All shop drawings required by the Contract Documents or subsequently by the Architect as covered by modifications shall be properly identified. At the time of submission the Contractor shall inform the Architect in writing of any deviation in the shop drawings.

F. Stamp: Each page of shop drawings shall bear the Contractor's stamp, which shall signify the Contractor's representation that he has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained in the shop drawings, all in accordance with the requirements of Section 01 33 00 Submittals. Each stamp shall be accompanied by a wet signature or initial of an employee of the Contractor who may be contacted for information. Stamped signatures or initials are not acceptable.

G. Submittals not certified by being stamped and signed will be returned without action as well as those, in the Architect's opinion, that have not been adequately reviewed or coordinated by the Contractor.

H. Method of Review: Submit shop drawings, electronically as a pdf file using Primavera Contract Manager Version 11, unless otherwise instructed by the Director. Comments or corrections will be noted on the shop drawings and returned to the Contractor, who shall identify all changes made since the previous submittal and resubmit in the same manner. After it is reviewed by the Architect, the shop drawings will be stamped and returned to the Contractor who shall make distribution of copies as required.

I. The Architect will review and approve shop drawings with reasonable promptness so as not to cause any delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. The Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions.

1. Contractor shall allow additional time if processing must be delayed to permit coordination with subsequent submittals.

J. Submittal of shop drawings to the Architect shall be made by the Contractor with a dated transmittal form or letter, and not by subcontractors or suppliers.

K. The Architect’s approval of shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect’s approval relieve the Contractor from responsibility for errors or omissions in the shop drawings.

1. Notations by the Architect which increase contract or time of completion shall be brought to County Project Manager's attention and authorization by the County shall be obtained before proceeding with work.

L. No portion of work requiring shop drawings shall be commenced until the shop drawings have been approved by the Architect.

M. SHOP DRAWING PROCESSING

1. Requirements for Submittal of Shop Drawings

a. Shop drawings shall be submitted directly to the Architect and copy of transmittal to the County Project Manager.

2. Each shop drawing submitted for review shall have the following information:

a. Project Name
b. Specs. No.
c. Contract No.
d. Technical Specifications Section No.

3. Each item of the submittal must be referenced to the proper item of the specification or drawings.

4. A signed statement from the General Contractor stating that the submittal has been reviewed by him and that it conforms with the drawings and specifications.

5. Provide a copy of each transmittal to the County Project Manager and Inspector.

6. Types of Approvals

   a. “No Exception Taken” (Approved). This stamp will be used by the Architect for accepted shop drawings and will qualify the submittal for shop drawing number.

   b. “Exception Noted” (Approved as Noted). This stamp will be used by the Architect when minor correction will make the submittal acceptable. These corrections will be shown in red on each of the submittals or on a correction list. This approval will qualify the submittal for a shop drawing number.

   c. “Resubmit” (Rejected). Submittals which do not conform to the drawings and specifications will be returned without stamping or issuance of a shop drawing number. The rejection transmittal will state why the submittal was not acceptable and request that it be resubmitted.

N. Assignment of Shop Drawings Numbers

Each accepted submittal shall be stamped by the Architect and assigned a shop drawing number using either of the following systems. The shop drawing number will be shown on each sheet that is stamped by Architect.

1. A simple numerical sequence may be used whereby each submittal is assigned a number in order of approval (SD-1, SD 2…).

2. A numerical sequence by classification may be used such as SD-S-1 for a Structural Submittal; SD-AC-1 for an Air Conditioning Submittal; SD-C-1 for a Civil Submittal, SD-L-1 for a Landscape Submittal; SD-A-1 for an Architectural Submittal; and SD-X-1 for Miscellaneous Submittals.

3. Material submittals and paint color chips should be assigned a shop drawing number for identification purposes.

O. Transmittal of Submittals

The General Contractor shall submit to the Architect a set of shop drawings which comply with this Exhibit. Upon receipt of the submittal, the Architect will review or have his consultants review the submittal for compliance with the drawings and specifications.

P. Processing

1. Procedure

a. Shop drawings will be stamped or returned as per Section M of this Exhibit. Accepted and numbered shop drawings shall be returned to the General Contractor. The Architect will provide a pdf copy of approved shop drawings to the County Project Manager, Building Inspector, and Contractor.

b. The County Project Manager is to check shop drawings for any deviation from the drawings or specifications prior to releasing them to the Contractor. If there are discrepancies is in the shop drawings, they should be sent back to the Architect for correction.

1.06 PRODUCT DATA

A. Submit pdf copy of product data using Primavera Contract Manager Version 11, unless otherwise instructed by the Director.

B. Product data shall identify applicable products, models, options and other available data specific to the project requirements.

C. After review and approval by the Architect, copies will be distributed to the County Project Manager, Building Inspector, and General Contractor. The approved product data sheets shall be retained at the site by the General Contractor to be used for reference.

1.07 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the product with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Unless precisely specified, submit samples of finishes from the full range of manufacturers' standard colors, textures and patterns for Architect selection, or in custom colors selected.

C. Include identification on each sample with full Project information, as required for Shop Drawings, Item, 1.04 above.

D. Submit a minimum of three (3) samples or as specified in individual sections of the specifications, two of which will be retained by the Architect.

E. Reviewed samples which may be used in the work are indicated in individual specification sections.

F. Approval or rejection of samples will be made by the Architect in writing.

1.08 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting and finishing in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.09 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification sections, submit manufacturers' certificate to Architect for review in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.10 COORDINATED DRAWINGS

A. Submit drawings which indicate routing, locations, sizes, types and numbers of components in concealed spaces where potential conflict may occur between structures, mechanical, electrical, fire sprinklers, communications and ceiling suspension systems.

B. Indicate locations of all ceiling penetrations and surface-mounted items. Provide cross sections at all areas to indicate proper support of ceilings and non-interference with work of other sections of the specifications. Cross sections shall indicate coordination required and proposed solutions for routing of elements where potential conflict exists. A reproduction of Architect's reflected ceiling plan is not acceptable.

C. Drawings shall be based on field measurements, shop drawings and product data.

D. Conflicts shall be brought to the County Project Manager's attention immediately.

E. Submit to the Architect, in writing, requests for clarification or interpretations that will affect the intent of the Contract Documents.

F. The coordinated drawings shall indicate each class of work in the affected area. The drawing or written submittal shall include Contractor's recommendations for the solution of any potential conflicts as well as recommendations tendered by any work of any section of the specifications which may be affected thereby.

G. Submit the coordinated drawings in a scale of not less than 1/8" – 1' – 0" with necessary sections and profiles at an appropriate, clearly readable enlarged scale. Submit the coordinated drawings as one reproducible and two blue-line prints as a pdf file using Primavera Contract Manager Version 11, unless otherwise instructed by the Director.

H. The Architect will review the submittals, make appropriate notations and comments to ensure the solution meets the intent of the Contract Documents and then return to Contractor for implementation.

I. The Contractor shall be responsible for the proper coordination of the work of all sections of the specifications in the execution of coordinated drawing. Any installation of materials, components or equipment under one section of the specifications without full and complete agreement, knowledge and consent by fabricators of adjacent or otherwise related or affected work will not be approved.

J. It shall be incumbent upon the Contractor that all fabricators of work involved in the execution of coordinated drawings be informed, consulted and advised in sufficient advance time to arrive at

solutions where no extension of contract time or extra cost to the County will be approved due to Contractor's negligence in the expeditious, timely submittal of coordinated drawings.

1.11 REQUEST FOR INFORMATION

A. Submit Request for Information (RFI) or interpretation in writing to the County.

B. Response will be in writing, by the County, either in the construction field meeting notes or on the RFI itself, within 5 working days of receipt of RFI.

1. No change in cost interpretations or clarifications will be accepted as such.

2. Change in cost interpretation or clarifications will institute a Change Order procedure.

1.12 CONSTRUCTION PHOTOGRAPHS

A. Submit with payment request monthly. See Section 01 32 33.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

* * * * *

# SECTION 01 33 23
# SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

## PART 1 – GENERAL

### 1.01 DESCRIPTION

A. Submittals

1. Shop drawings.

2. Product or catalog data.

3. Samples.

B. The Contractor will prepare and submit shop drawings as directed by the County Project Manager.

C. Related work specified elsewhere.

1. Operating and maintenance manuals.

2. Spare parts or hardware lists.

3. Tests and certificates.

### 1.02 DEFINITIONS

A. Shop Drawings

1. Original drawings prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate some portion of the work; showing fabrication, layout, setting or erection details.

2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

B. Product or Catalog Data

1. Manufacturers standard drawings modified to delete nonapplicable data or include applicable data.

2. Manufacturers catalog sheets, brochures, diagrams, schedules, charts, illustrations or other descriptive data. Mark each copy to identify pertinent dimensions, materials, products or models.

C. Samples

1. Physical examples to illustrate materials, equipment or workmanship.

2. Office samples to show functional characteristics of product or material. Submit with full range of colors available.

3. Field samples and mock-up; erect at site in location acceptable to the County.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Prior to Submittal

1. Review and approve Shop Drawings, Product Data and Samples prior to submission to the Department.

2. Coordinate each submittal with work of the project and Contract Documents so as to cause no delays in the work.

3. By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents.

4. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Department's acceptance unless the Contractor has specifically informed the Department in writing of such deviation at the time of submission and the Department has given written acceptance to the specific deviation.

5. Contractor's responsibility for errors and omissions in submittals or deviations from Contract Documents is not relieved by the Department's review of submittals.

6. The Contractor shall direct specific attention, in writing or on submitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Department on previous submittals.

B. After Submittal

1. Begin no work which requires submittals until return of such submittals with the Department's stamp and signature indicating review.

2. Distribute copies of submittals to subcontractors, suppliers or manufacturers as their interests appear.

1.04 IDENTIFICATION OF DATA

A. All submittals for review shall have the following identification data, as applicable, contained thereon or permanently adhered to.

1. Project Name and Location

2. Specifications Number

3. Subcontractor's, Vendor's, and/or Manufacturer's Name, Address and Phone Number

4. Product Identification

5. Shop Drawing Title, Contractor's Drawing Number, and Date of Drawing and Revisions

6. Applicable Contract Drawings and Specifications Section Numbers

7. Contractor's Approval, Signature and Date

B. Submittal Format

Submittal No. _____

Project Name _____

_____

_____

Specifications No. _____

Product _____

Section No. _____

Supplier _____

We have reviewed the submitted and have verified that it meets the criteria required in accordance with the plans and specifications.

Contractor's Name _____

Signature _____

Title _____

C. Catalog Data

1. Each separate catalog, brochure or single page data sheet submitted shall have the identification required and the Contractor's approval.

2. Catalogs or brochures containing multiple items for review need identification only on the cover. Identify page numbers and catalog items.

3. In the event that one or more of the multiple items are not accepted in any submittal, additional copies required will not be required until all items are accepted.

4. Provide a space approximately 4" x 4" for the Department to affix its status stamp.

1.05 COLOR AND FINISH SELECTION

A. Contractor Submittals

1. Submit as soon as practical, subsequent to award of contract, names of manufacturers and pertinent products or materials proposed for use in which a color selection is required.

2. Submit standard color charts or samples as requested by the specifications. All items for color selection must be submitted prior to issuance of any approvals.

3. Contractor is responsible for submitting products that comply with technical specifications.

1.06 SUBMISSION REQUIREMENTS

A. Submit all Shop Drawings, Product or Catalog Data and Samples to the District by transmittal containing identification of project, specifications number and identification of items being submitted.

B. Product Data

1. Original Submittal – Six (6) copies of all Shop Drawings and/or Product Data for review in ample time to coordinate necessary features of construction with all fabrication and installation requirements.

2. Resubmittal – When required, copies will be returned to Contractor. After revision submit new copies as stipulated for original submittal. Indicate all changes.

C. Samples

1. Original Submittal – Furnish three (3) samples, unless otherwise specified, of each item for which samples are required for review. Obtain review prior to delivery of material to project site. Such samples shall be representative of actual material proposed for use in project and of sufficient size to demonstrate design, color, texture, and finish.

2. Resubmittal – All rejected samples will be returned upon request. All resubmittals shall consist of three (3) samples.

1.07 REVIEW AND PROCESSING

A. General

1. The Department will review and accept or take other appropriate action upon Contractor's submittals for conformance with the design concept of the work and with the information given in the Contract Documents. Acceptance of a specific item shall not indicate acceptance of an assembly of which the item is component.

2. Submittals not approved by the Contractor will be returned to Contractor. Submittals will not be reviewed or accepted by the Department or Architect without Contractor's prior approval.

B. Review

1. Product Data – After review, two (2) copies bearing the Department's review stamp and signature will be returned to Contractor.

2. Samples – After review one (1) sample will be returned for Contractors records and the remainder will be retained by the County and Architect for their records.

END OF SECTION

# SECTION 01 50 00
# TEMPORARY FACILITIES

## 1 - GENERAL

### 1.01 DESCRIPTION

1.02 Office.
1.03 Storage structure.
1.04 Telecommunications.
1.05 Not Used
1.06 Toilets.
1.07 Protection from Weather.
1.08 Utilities.
1.09 Construction signboards.
1.10 Temporary chain link fencing.
1.11 Temporary Walkways and Driveways
1.12 Storage of materials.
1.13 Parking.
1.14 Staging areas.

### 1.02 OFFICE

Contractor shall provide a separate office facility for the County's use, of at least 150 square feet. Facility shall have a lockable exterior door, screened windows, heating and air conditioning, a six-foot wide desk with drawers, plan tables, a plan rack, bookcase, shelf, a minimum three-drawer file cabinet, and at least three chairs. This facility shall be provided in addition to Contractor's office.

### 1.03 STORAGE STRUCTURE

Contractor shall provide and maintain on the premises, where directed, a watertight storage structure for all materials that might be damaged by weather, including storage facilities for concrete test samples or other material samples required for work.

### 1.04 TELECOMMUNICATIONS

Fast Internet Service

Contractor shall provide, at his own expense, fast internet service for use by Contractor and the County and their authorized representatives respectively.

### 1.05 NOT USED

## 1.06 TOILETS

Contractor shall install and maintain in a sanitary condition, suitable chemical toilets for use of workmen. Toilets shall be in a location approved by the Department. There shall be a minimum of one (1) toilet for each multiple of twenty (20) Contractor's employees, or fractional part thereof, working at the job site. The temporary restroom facilities shall be serviced a minimum of three (3) times a week.

## 1.07 PROTECTION FROM WEATHER

The existing building structure and interior finish and furnishings shall be protected from rain, dew, wind, and all other elements of the weather during periods when roof areas are unprotected by roofing or when breaches are present in exterior walls. Such areas shall be covered with weathertight tarpaulins or roofing materials firmly secured or by other approved methods. Refer to General Conditions. When, in the opinion of the Department, breaches in roof or wall areas afford access to unauthorized persons the Contractor shall, at no additional expense to the County, construct at such breaches, substantial barricades of type and material as approved by the Department.

## 1.08 UTILITIES

The Contractor shall arrange for and provide all utility services necessary to the work, including electrical current for power and light, and water supplies; or at Contractor's option, he may use free of charge, available County utility services as may exist on the site. Motors connected to County electrical circuits shall not exceed 1/3 horsepower. Contractor shall provide, maintain and remove upon completion of work, all temporary connecting lines to sources of supplies, and temporary meters and accessories as needed.

The Contractor shall bear all expenses involved in the provisions of providing and connecting all temporary utility services. The County will assume payment for utility service charge at the time the various permanent meters are set. Refer to Project General Requirements section for permanent utility services.

## 1.09 CONSTRUCTION SIGNBOARDS

Refer to article entitled "Advertising" of the General Conditions. Prior to any ground breaking operation or in the case ground breaking is not required, within ten (10) days after award of contract, the Contractor shall furnish and erect two (2) identification signboards 4'-0 x 8'-0 in size, constructed of 3/4" exterior grade plywood within a frame, supported on posts, and adequately braced to resist wind stresses. The sign background shall be painted with two (2) coats of exterior type paint over a suitable primer and lettered with block letters professionally applied. The signboard shall set forth, in sequence, the following information with the layout as directed by the Department.

Huntington Park Library Refurbishment Project
County of Los Angeles
Board of Supervisors

| | |
|---|---|
| Janice Hahn | 4th District |
| Hilda L. Solis | 1st District |
| Holly J. Mitchell | 2nd District |
| Lindsey P. Horvath | 3rd District |
| Kathryn Barger | 5th District |

Fesia Davenport, Chief Executive Officer, Chief Executive Office
Mark Pestrella, Director, Department of Public Works
Skye Patrick, Library Director, Library
NAC Architecture

In addition, individual signs of Contractors, subcontractors and materialmen may be displayed as approved.

Signs shall be promptly removed by the Contractor or by the owner, if individually owned, upon completion of the work. The size, construction, subject matter and location of all signs shall be subject to the approval of the Department.

1.10 TEMPORARY CHAIN LINK FENCING

1. The Contractor shall provide and maintain a 6 ft. high chain link fence around the construction area(s) consisting of 11 gauge (minimum) x 2" mesh chain link fabric attached to substantial steel pipes spaced at 10 feet on center maximum. Provide top and bottom tension wires and corner post bracing. Provide chain link gates with welded steel pipe frames and all hardware required for proper operation. Fencing shall not have any loose or easy to remove tie wires, hog rings, etc.

2. Provide and maintain the County specified chain link fence enclosures around each jobsite with vehicle and man gates as specified by the County.

3. Obtain and pay for all required permits and inspections. Construct in accordance with applicable codes and regulations of public agencies having jurisdiction.

1.11 STORAGE OF MATERIALS

Storage of materials shall be only within areas designated by the Department.

1.13 PARKING

The Contractor and subcontractor employee parking is restricted to parking onsite or as approved by the County.

## 1.14 STAGING AREAS

Contractor shall coordinate with County for location, extent and type of construction staging areas.

* * *

# SECTION 01 57 19
# TEMPORARY AND ENVIRONMENTAL CONTROLS

## SECTION 1 - GENERAL

### 1.1 SUMMARY

This section establishes general control requirements for protection of land and water resources; control of noise, dust, and debris, and other environmental pollution; regulation traffic, and control of other activities of the Contractor and the Contractor's subcontractors in performance of the work of the contract.

### 1.2 DEFINITIONS

A. Environmental pollution and damage means the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to human life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

B. Sediment means soil and other debris that has been eroded and transported by storm or well production runoff water.

C. Inert solids/inert waste means non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established pursuant to Division 7 of the California Water Code and does not contain significant quantities of decomposable solid waste.

D. Inert fill means a permitted facility that accepts inert waste such as asphalt and concrete exclusively.

E. Construction and demolition waste includes solid wastes such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.

1. Rubbish includes both combustible and noncombustible wastes such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones.

2. Debris includes both combustible and noncombustible wastes such as leaves and tree trimmings that result from construction or maintenance and repair work.

F. Class III landfill means a landfill that accepts nonhazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.

G. Chemical waste includes petroleum products, bituminous materials, salts, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.

H. Sanitary Wastes:

1. Garbage includes refuse and scraps resulting from preparation, cooking, distribution, or consumption of food;

2. Sewage means domestic sanitary sewage.

## 1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00.

B. Environmental Protection Program: Prior to commencement of the work of this contract. Compile and submit to the County the written environmental protection program proposed by the Contractor for compliance with requirements of this section, as defined under paragraph 1.4 below. Meet with the County to review the proposed environmental protection program, make changes in the plan, and secure the County's approval of the written environmental protection program, prior to commencement of the work.

## 1.4 QUALITY CONTROL

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this section. Comply with all pertinent Federal, State, and local regulations pertaining to water, air, solid waste, and noise pollution. Require the Contractor's subcontractors to comply with the provisions of this section.

B. Environmental Protection Program:

1. After award of the contract, and prior to commencement of the work, schedule and conduct a meeting with the County representatives to discuss solid waste management and environmental protection, recycling, and rebate programs required in connection with the work.

2. Not more than 21 calendar days after the meeting, prepare and submit a written and/or graphic Solid Waste Management and Environmental Protection Plan including, but not necessarily limited to:

   a. List of Federal, state and local laws, regulations, and permits concerning environmental protection, pollution control, noise abatement, and noise control that are applicable to the Contractor's proposed operations;

   b. Procedures to be implemented to provide the required environmental protection and to comply with applicable laws and regulations;

   c. Location or locations of solid waste disposal areas proposed to be used by the Contractor, with statement as to current permits or licenses issued to those disposal areas;

   d. Contractor's proposed procedures for recycling and re-use of materials;

   e. Contractor's proposed participation in rebate programs.

   f. Revise and submit the Solid Waste Management and Environmental Protection Plan as required by the County.

   g. Approval of the Contractor's Waste Management and Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protective measures.

3. With each application for progress payment, submit a summary of solid waste generated by the construction and demolition operations.

   a. Submit on form copied from the example at the end of this

section on a different form acceptable to the County;

b. Include copies of all manifests, weight tickets, receipts, and invoices specifically identifying the work and waste materials from recycling centers, class III landfills, and inert fills.

C. Prepare and maintain a 3-ring binder with rebate information and product identification as required for the County to qualify for rebate programs; submit the binder with final closeout submittals.

SECTION 2 - PRODUCTS

2.1 MATERIALS

Except for materials proposed by the Contractor for compliance with the requirements of this Section, and approved in advance by the County, no materials are needed.

SECTION 3 - EXECUTION

3.1 PROTECTION OF LAND RESOURCES

A. It is intended that land resources within boundaries of the project, but outside the limits of permanent work performed under this contract, shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project.

B. Insofar as possible, confine activities of the Contractor to pertinent areas defined on the drawings or elsewhere in the Contract Documents. Maintain natural drainage patterns. Conduct construction activities in such a manner that ponding or stagnant water conducive to mosquito breeding habitat will not occur at any time.

C. Land Resources: Do not remove, cut, deface, injure, or destroy trees or other vegetation outside the work area limits. Do not remove, cut, deface, injure, or destroy trees or other vegetation inside the work area limits except as permitted by the County and where land resources are damaged by the Contractor, promptly replace or repair to the approval of the County and at the Contractor’s expense.

D. Tree Trimming: In accordance with recognized standards for such work, trim

and seal tree limbs overhanging the line of the work and in danger of being damaged by the Contractor's operations. Remove other tree limbs as directed by the County so the tree will present a balanced appearance. Roots: Do not cut any roots unnecessarily during excavating or trenching operations, expose roots 75 mm (3 inches) in diameter of larger, encountered in the course of excavation, and do not sever but wrap them in burlap as a protective measure while exposed, and at the edge of the excavation or trench, neatly trim all roots 25 mm (1 inch) in diameter or larger that are severed in the course of excavation and paint them with a heavy coat of tree seal approved by the County.

E. When and as directed by the County obliterate all signs of temporary construction such as work areas, structures, foundation of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction; Level all temporary roads, parking areas, and other areas which have become compacted or shaped; At unpaved areas where vehicles are operated, provide a suitable surface treatment or wet down periodically to prevent dust from becoming a nuisance, keep haul roads clear of objects which create unsafe conditions, and promptly remove contaminants and construction materials dropped from construction vehicles.

F. Do not drop mud and debris from construction vehicles onto public streets; sweep turning areas and pavement entrances as needed.

3.2 NOISE CONTROL: Do not permit noise levels exceeding the following:

A. Trenchers, pavers, graders, and trucks: 90 dBA at 50 feet as measured under the noisiest operating conditions;

B. All other equipment: 85 dBA at 50 feet.

C. Use whisperized type generators as approved by the County.

D. Jack Hammers: Equip with exhaust mufflers and steel muffling sleeves; Use whisperized type air compressors as approved by the County.

E. Operations: Keep noise equipment as far as possible from noise-sensitive site boundaries, do not leave machines idling, use electric power in lieu of internal combustion engine power when practicable; Maintain equipment in a manner to reduce noise from excessive vibration, faulty mufflers, and similar

sources, provide mufflers on all engines, and schedule operations to minimize their duration at any given location.

F. Monitoring: As needed, provide portable sound metering devices meeting requirements of ANSI S1.4 for Type 2 sound level meters. Promptly locate and correct noncomplying noise levels.

G. Contractor shall take all practical measures to minimize, or eliminate if possible, air borne and structure borne noise generated from construction activities. Contractor shall comply with the ground vibration limits as specified by ANSI S3.29-1983.

H. The use of explosives and riveting will be prohibited.

## 3.3 RECYCLING REQUIREMENTS

Implement a recycling program which includes separate collection of waste materials. Refer to technical specifications for recycling of building materials via an on-site crushing operation.

## 3.4 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

There are no known archaeological remains at the project site. Should skeletons, artifacts, or other archaeological remains be uncovered: Suspend operations of this contract at the site of discovery, continue operations in other areas, and notify the County immediately of the finding. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an adjustment under pertinent provisions of the contract.

## 3.5 BURNING RUBBISH AND DEBRIS

Do not permit open burning of rubbish, debris, and/or other combustibles on the site.

## 3.6 DUST CONTROL/AIR QUALITY

A. Contractor shall prevent air borne debris and dust generated during construction activities from traveling outside the area of work in accordance with SCAQMD Rule 403. All loose materials being hauled onto or out of the site in open truck beds or trailers shall be covered in accordance with State of California Vehicle code Section 23114. Wheels of all vehicles shall be cleaned prior to leaving the Project site.

B. County and City of Los Angeles streets shall be kept free of construction dirt and debris at all times by use of street sweeping equipment. The degree of

cleanliness to be maintained will be determined by the County.

C. Contractor shall water down all construction activities, such as excavation that create dust.

D. The Contractor shall provide temporary dust proof enclosures to ensure that particulate matter does not migrate outside of enclosed work areas to adjacent occupied hospital areas. The Contractor's means and methods shall dictate the exact method used to comply with this requirement.

E. Maintain and operate construction equipment so as to minimize exhaust emissions. During construction, the site shall be watered and all equipment cleaned once a day to reduce particulate and dust emissions.

F. The Contractor shall not allow any construction equipment with an internal combustion engine to idle more than five (5) minutes in accordance with California Vehicle Code § 2485 (diesel).

## 3.7 COMPLIANCE

A. The County will notify the Contractor in writing of any observed noncompliance with the provisions of this section and will describe actions to be taken. Such notice, when delivered to the Contractor or his authorized representative at the job site, will be deemed sufficient for the purpose. Immediately upon receipt of such notice, initiate the required action or actions.

B. Noncompliance: If the Contractor fails or refuses to comply promptly, the County may issue an order stopping all or part of the work of this contract until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it was determined that the Contractor was in compliance.

## 3.8 TRAFFIC REGULATION

A. Traffic Maintenance: Determine the routing of construction vehicles before starting work, based on restrictions indicated on the drawings and the safeguards and procedures necessary to carry out the work. In addition be responsible for controlling construction traffic within and adjacent to the site, provide all entrances, lifts and safeguards required necessary to the progress of the work, and effectively control such traffic to provide minimum hazard to

the work and all persons, route all construction equipment, trucks, and similar vehicles via existing public streets to and from the site as approved by the governing authorities and the Construction Access Plan.

B. Obtain and pay for permits and inspections necessitated by the use of public streets, sidewalks, curbs, and paving. Post guarantees and bonds that may be required, and repair and make good any damages thereto, acceptable to the authorities having jurisdiction, construct and maintain temporary walks and bridges for pedestrians. Keep streets adjacent to the site open to vehicular and traffic.

C. Maintain constant access for police, fire, and ambulance service.

D. Provide and maintain for proper control of traffic and safety of all concerned. All necessary barricades, suitable and sufficient lights, reflectors, and danger signals, warning and closure signs, directional and detour signs, and whatever additional measures necessary.

E. Indicate on a 24-hour basis all restricted and dangerous conditions existing on or adjacent to the site, illuminate barricades, danger signals, warning signs and obstructions and night and keep waning lights burning from one hour before sunset and until one hour after sunrise.

3.9 Parking: Do not permit parking on site to interfere with activities related to the performance of the work. The Contractor is responsible for providing offsite parking for all Contractor construction personnel at no additional cost to the County, if the County provided Contractor parking area does not provide enough parking spaces for construction personnel.

END OF SECTION

# SECTION 01 60 00
# PRODUCT HANDLING

## PART 1 – GENERAL

### 1.1 DESCRIPTION

A. Work Included: Products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. Additional procedures also may be prescribed in other Sections of these Specifications.

### 1.2 QUALITY ASSURANCE

A. Include within the Contractor's written quality assurance program such procedures as are required to assure full protection of work and materials.

### 1.3 MANUFACTURER'S RECOMMENDATIONS

A. Except as otherwise approved by the Architect, determine and comply with manufacturer's recommendations on product handling, storage, and protection.

### 1.4 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.

B. Maintain packaged materials with seals unbroken and labels intact until time of use.

C. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the County.

D. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

1.5 PROTECTION

A. Protect unfinished surfaces, including jambs and soffits or openings used as passageways, through which equipment and material are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the County.

1.6 REPAIRS AND REPLACEMENTS

A. In the event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the County.

B. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

# SECTION 01 74 19 - CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING FOR LOS ANGELES COUNTY PROJECTS

## PART 1 GOAL

Consistent with the County's efforts to comply with the California Integrated Waste Management Act of 1989 (Public Resources code, Section 40000 et seq.), one goal of this project is to reduce, reuse, and/or recycle the construction and demolition debris generated by the project in accordance with Los Angeles County Code, Chapter 20.87, Construction and Demolition Debris Recycling and Reuse.

## PART 2 GENERAL DEBRIS RECYCLING REQUIREMENTS

2.1 Prior to the commencement of construction, the Contractor shall submit to the Los Angeles County Public Works, Environmental Programs Division (EPD), a Construction and Demolition Recycling and Reuse Plan (RRP) via EPIC-LA.

2.2 Contractor shall submit a RRP for all work done for or on behalf of the County that generates C&D debris.

## PART 3 DEBRIS RECYCLING REQUIREMENTS FOR ANY WORK DONE FOR OR ON BEHALF OF THE COUNTY

3.1 The RRP submitted in accordance with Paragraph 2.2 of this Section must demonstrate that the Contractor will reduce, reuse, and/or recycle the C&D debris generated by the project. The RRP must demonstrate that the project will deliver debris to an approved facility for recycling or reuse of at least 70% of the mixed and inert debris and 100% of soil and land clearing debris generated by the project.

The RRP must also identify proper recycling or disposal of 100% of universal waste generated by alteration or renovation projects.

3.2 As part of the Contractor's request for final payment, the Contractor shall submit a Final Compliance Report to EPD for review and approval.

The Final Compliance Report shall include information and documentation as set forth in the Section D of the C&D Recycling and Reuse Guidelines.

3.3 As part of the approval of the final payment, EPD will review the Final Compliance Report to determine if the Contractor documented the quantity of debris generated, reused, and recycled, and achieved a

recycling/reuse rate at least 70% by weight and of mixed and inert debris and 100% of soil debris generated and disposed during the project duration.

3.4 If EPD determines that the applicant has not provided sufficient documentation to show that all of the project C&D Debris and universal waste included in the RRP, were properly recycled, reused and/or disposed, within one year of the completion of the project plus any additional time provided by Public Works for the correction of any deficiencies, or if the documentation indicates that the project C&D debris and universal waste were not properly recycled, reused and/or disposed, EPD will calculate the applicable penalty in accordance with the penalty schedule below:

| Tons of C&D Not Recycled and Not Reported | Penalty Amount | |
|---|---|---|
| For up to the first ton | $ 100 | fixed amount; plus, as applicable, amounts below |
| From above the first ton up to 15 tons | $ 60 | per ton (or fraction thereof); plus, as applicable, amounts below |
| From above 15 tons up to 45 tons | $ 45 | per ton (or fraction thereof); plus, as applicable, amounts below |
| From above 45 tons | $ 30 | per ton (or fraction thereof) |

## PART 4 COST

The cost associated with complying with the debris recycling requirements shall be identified separately and included in the Contractor's lump sum base bid.

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Attachments 1, 2, 3, and 4 are attached to Section 01 74 19.

Construction and Demolition Recycling and Reuse

Attachment 1

Provide the following information to the County of Los Angeles Department of Public Works Environmental Programs Division Construction & Demolition Debris Recycling and Reuse Unit by emailing this form to CND@dpw.lacounty.gov

Name of the Project: _____

Address: _____

Project Description:

Estimated Tonnage or Cubic Yard of Debris Generated from:

Grading: _____

Demolition: _____

Construction: _____

Contractor Project Manager:_____

Email Address:_____

County Project Manager: _____

Email Address: _____

| Submitted by: | Date: | Email Address: |
|---|---|---|
| _____ | _____ | _____ |

Office Use Only:

____ Project is encouraged to make a good-faith effort to reduce, reuse, and/or recycle the debris generated to the maximum extent feasible.

____ Project is subject to Part 3 of Section 01 74 19. Submit a Recycling and Reuse Plan (Attachment 2)

Reviewed by: _____ Date: _____

PLAN form I

County of Los Angeles Department of Public Works
Environmental Programs Division

**CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING AND REUSE PLAN**

# ATTACHMENT 2 - COMMERCIAL

## COMMERCIAL DEMOLITION

**Commercial wood frame structures including warehouses, apartments, and hotels**

Total square footage _____ multiply by 0.06 equals _____ tons generated

Tons generated _____ multiply by 0.65 equals _____ mixed tons generated

Tons generated _____ multiply by 0.35 equals _____ inert tons generated

**Commercial concrete/masonry structures**

Total square footage _____ multiply by 0.10 equals _____ tons generated

Tons generated _____ multiply by 0.14 equals _____ mixed tons generated

Tons generated _____ multiply by 0.86 equals _____ inert tons generated

**Brick or Cinder Block Walls**

Wall height (H)(feet)_____ Wall length (L)(feet)_____ Width of block (W)(inches divided by 12)_____

Multiply H by L by W equals _____cubic feet multiply by 0.029 equals _____ inert tons

**Walkways, Driveways, and Parking Lots**

Square footage _____ multiply by 0.01 equals _____ inert tons

**Total tonnage generated**_____ **Total mixed tonnage**_____ **Total inert tonnage**_____

## COMMERCIAL CONSTRUCTION

**Wood-frame structure**

Total square footage _____ multiply by 0.002 equals _____ tons generated

Tons generated _____ multiply by 0.65 equals _____ mixed tons

Tons generated _____ multiply by 0.35 equals _____ inert tons

**Concrete/masonry structure**

Total square footage _____ multiply by 0.002 equals _____ tons generated

Tons generated _____ multiply by 0.14 equals _____ mixed tons

Tons generated _____ multiply by 0.86 equals _____ inert tons

**Total tonnage generated**_____ **Total mixed tonnage**_____ **Total inert tonnage**_____

PLAN form I

County of Los Angeles Department of Public Works
Environmental Programs Division

**CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING AND REUSE PLAN**

| Table 1: Facilities to be Used | | | | |
|---|---|---|---|---|
| | **A**<br>**Facility to be Used ***<br>**(include address & phone number)** | **B**<br>**Facility Handling Method ****<br>**& Recycling Rate** | **C**<br>**Tons to be Sent to Facility** | **D**<br>**Tons to be Recycled (multiply B by C)** |
| **Sample** | *ABC Recycling*<br>*123 Main Street, Any Town, 98765*<br>*(800) 555-1212* | *Recycle*<br>*60% = 0.60* | *50 tons* | *30 tons*<br>*(0.60 multiplied by 50 tons)* |
| **Mixed Debris** Wood, gypsum, metal, glass, plastic, organics, etc. | | | | |
| | | | | |
| **Inert Debris** Asphalt, brick, concrete, ceramic, tile, etc. | | | | |
| | | | | |
| | | **Totals** | | |

* See *Construction and Demolition Debris Recycling Facilities in Los Angeles County*
** Handling Method: Recycle, Reuse, or Disposal

| Table 2: Tonnage Generated | | | | |
|---|---|---|---|---|
| | **E**<br>**Total Tons (from table above)** | **F**<br>**Tons to be Recycled or Reused** | **G**<br>**Tons to be Disposed (E minus F)** | **H**<br>**Diversion Rate (F divided by E)** |
| **Mixed Debris** | | | | |
| **Inert Debris** | | | | |
| **Totals** | | | | |

PLAN form I

County of Los Angeles Department of Public Works
Environmental Programs Division

**CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING AND REUSE PLAN**

# ATTACHMENT G – GRADING

Indicate: Cut (cubic yards) _____ Fill (cubic yards) _____

☐ Soil to balance on site; no import and no export

☐ Cubic yards of soil imported (Fill minus Cut) _____

☐ Cubic yards of soil exported (Cut minus Fill) _____

Calculate exported soil tons: cubic yards _____multiply by 1.0125 equals _____tons exported

Indicate below where the exported soil will be sent.

| **Facilities To Be Used (At least 50 percent must be reused)** | | | |
|---|---|---|---|
| | **A Facility to be Used (include address and phone number)** | **B Tons to be Sent to facility** | **C Tons to be Reused** |
| **Sample** | *ABC Recycling 123 Main Street, Any Town, 98765 (800) 555-1212* | *50 tons* | *50 tons* |
| Rock, soil, and gravel | | | |
| | | | |
| | | | |
| | **Totals** | | |

| **D Total Tons Generated (Total from table above, Column B)** | **E Total Tons to be Reused (Total from table above, Column C)** | **F Total Tons to be Disposed (D minus E)** | **G Diversion Rate (E divided by D)** |
|---|---|---|---|
| | | | |

**Applicant: Give copy of this Attachment to your hauler to ensure the proper facilities are used.**

**ATTACHMENT 3**

**CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING SUMMARY**

**Project Information**

Check one: ☐ Roadway ☐ Flood Control ☐ Water/Sewer

☐ Traffic Signal/Street Lighting ☐ Bridge/Structure ☐ Other _____

Project Name: _____

Project ID No.: _____

Project Address/Location: _____

Resident Engineer/Inspector: _____ Office Engineer: _____

**Contractor Information**

Company Name: _____

Company Address: _____

Report Prepared by _____ Phone Number: _____

**Project Duration: From:** _____ **To:** _____

| Type of Debris Generated | Debris Generated (tons) | Debris generated (cubic yards) | Name of Facility used | For EPD Use only | For EPD Use only |
|---|---|---|---|---|---|
| | | | | Diversion | Disposal |
| Asphalt | | | | | |
| Brick | | | | | |
| Concrete | | | | | |
| Green Waste | | | | | |
| Metal (ferrous) | | | | | |
| Metal (non-ferrous) | | | | | |
| Mixed Debris | | | | | |
| Rock | | | | | |
| Soil | | | | | |
| Wood Waste | | | | | |
| Other: | | | | | |
| Other: | | | | | |
| | | | Totals | | |

**Please fax this completed form to (626) 737-1723 (no cover sheet needed)**

**To: LACDPW, Environmental Programs, C&D Unit From: _____**

# SECTION 01 74 23
# FINAL CLEANING

## 1.00 GENERAL

## 1.01 DESCRIPTION

A. Principal work in this Section:

1. Keep premises, adjacent private properties and public properties free from accumulations of waste, debris and rubbish caused by construction operations.

2. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces.

## 1.02 SAFETY REQUIREMENTS

A. Standards: Maintain Project in accord with State and local safety and insurance standards.

B. Hazard control:

1. Store volatile wastes in covered metal containers and remove from premises daily.

2. Prevent accumulation of wastes which create hazardous conditions.

3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on Project site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Store in containers with tight-fitting lids and remove to legal dump site.

3. Special reference is made to the Los Angeles County Department of Public Works Storm Water Pollution Control Requirements for Construction Sites which require implementation of the NPDES standards. The cost of implementing the NPDES standards and adhering to the Storm Water Pollution Control Requirements must be included in the lump sum bid for the Project.

2.00 PRODUCTS (Not applicable)

3.00 EXECUTION

3.01 DURING CONSTRUCTION

A. Remove or paint over, as appropriate to the substrate, graffiti on the site or surrounding fence daily.

B. Wet down materials and rubbish to lay dust and prevent it from blowing.

C. Provide on-site covered containers for collection of waste materials, debris and rubbish. Provide a collection can at each location used as an eating area. Pick-up all garbage daily.

D. Remove waste materials, debris and rubbish from site and legally dispose of at legal public or private dumping areas off County's property.

E. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

F. Comply with the County of Los Angeles Department of Health design /construction and maintenance risk assessment: Policies and Procedures Infection Control Policy Guidelines Procedure No.918.01.

3.02 FINAL CLEANING

A. In preparation for Substantial Completion or Occupancy conduct final inspection of all work.

B. Repair, patch and touch-up marred surfaces to specified finish to match adjacent surfaces.

C. Contaminated earth:

1. Final clean-up operation includes the removal and disposal of earth contaminated or unsuitable for support of plant life in planting areas, and filling of resulting excavations with suitable soil.

2. Contaminated areas include those used for disposal of waste concrete, mortar, plaster, masonry, and similar materials, areas in which washing out of concrete and plaster mixers or washing of tools and like cleaning operations have been performed, and areas that have been oiled, paved, or chemically treated.

3. Do not dispose of waste oil, solvents, paints, solutions, or like penetrating material by depositing or burying on County's property. All

material shall be disposed in accordance with all regulatory requirements.

D. Broom clean paved surfaces; rake clean other surfaces of grounds.

E. Keep Project clean until Final Acceptance by the County.

END OF SECTION

# SECTION 01 75 00
# PROJECT ADDED STOCK

## PART 1 – GENERAL

### 1.01 DESCRIPTION

A. Work in This Section: Principle items include:

1. Providing Added Stock Materials to the Owner.

B. Related Work Not in This Section:

1. Project Closeout.

2. Documents affecting Work of this Section include, but are not necessarily limited to, sections in all divisions of these Specifications.

### 1.02 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Added Stock to one person on the Contractor's staff as approved by the County.

B. All materials shall be delivered to the County in original, unopened containers bearing the manufacturer's original labels.

### 1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 23.

B. Prior to submitting request for final payment, transmit the final Project Added Stock to the County and secure County approval.

### 1.04 ADDED STOCK PROTECTION AND HANDLING

A. Maintain the Added Stock completely protected from deterioration, loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.

PART 2 – PRODUCTS

2.01 ADDED STOCK

A. All materials delivered, as Added Stock, shall exactly match the materials used on the project. Materials shall be from the same dye-lots, production runs, and color matching and match the installed materials.

PART 3 - EXECUTION

3.01 SCHEDULE OF MATERIALS

Floor Finish Material, Base Finish Materials, Wall Finish Materials and Ceiling Finish Materials as indicated in the specification sections. See summary referenced below.

Quantities apply in the summary below unless noted otherwise in individual sections.

| Section/ Drawings | Item | |
|---|---|---|
| 09 3013 | Ceramic Tile - - | 2% OF TOTAL INSTALLED FOR EACH TILE TYPE, COLOR ETC BUT NOT LESS THAT ONE UNOPENED BOX OR CONTAINER. 2% OF EACH GROUT BUT NOT LESS THAT ONE UNOPENED BOX OR CONTAINER |
| 09 6813 | Tile Carpeting -- | 5% OF TOTAL INSTALLED FOR EACH CARPET TYPE, COLOR ETC. BUT NOT LESS THAN ONE UNOPENED BOX OR CONTAINER. |
| 09 6513 | Rubber Base -- | 2% OF TOTAL INSTALLED FOR EACH RUBBER BASE TYPE, COLOR ETC. BUT NOT LESS THAN ONE UNOPENED BOX OR CONTAINER. |
| 09 8434 | Acoustical Wall Panels -- | 2% OF TOTAL INSTALLED FOR EACH TYPE AND COLOR |
| 09 5113 | Acoustical Panel Ceilings -- | 2% OF TOTAL INSTALLED FOR EACH ACOUSTICAL CEILING TYPE, COLOR, COMPOSITION, GRADE, FINISH, AND VARIETY, BUT NOT LESS THAN ONE UNOPENED BOX OR CONTAINER. |
| 09 7200 | Wall Covering -- | 2% OF TOTAL INSTALLED FOR EACH WALL COVERING TYPE, COLOR, COMPOSITION, GRADE, FINISH, AND VARIETY, BUT NOT LESS THAN ONE UNOPENED BOX OR CONTAINER. |

09 7911 Interior Wood Veneer Laminate – ONE UNOPENED BUNDLE EACH TYPE

09 8413 Wood Fiber Acoustical Units 2% OF TOTAL INSTALLED FOR EACH WOOD FIBER ACOUSTICAL UNIT TYPE, COLOR, COMPOSITION, GRADE, FINISH, AND VARIETY, BUT NOT LESS THAN ONE UNOPENED BOX OR CONTAINER.

09 9113 Exterior Painting – ONE UNOPENED GALLON OR CONTAINER FOR EACH PAINT TYPE, COLOR, COMPOSITION, GRADE, FINISH, AND VARIETY WITH LABELS CLEARING SPECIFYING COLOR AND TYPE.

09 9123 Interior Painting -- ONE UNOPENED GALLON OR CONTAINER FOR EACH PAINT TYPE, COLOR, COMPOSITION, GRADE, FINISH, AND VARIETY WITH LABELS CLEARING SPECIFYING COLOR AND TYPE.

3.02 DELIVERY

A. Transmit all materials to the County in one submission at the completion of the Project. The Contractor is not to use the Added Stock materials for Punchlist and repairs.

# SECTION 024119

# SELECTIVE DEMOLITION

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

### 1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

### 1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor. To be removed from the site by the contractor.

### 1.4 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

### 1.5 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.6 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

## 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    c. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

## 3.3 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

## 3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

## 3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

## 3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

# SECTION 02 2600
# ABATEMENT OF HAZARDOUS MATERIALS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Abatement of hazardous materials identified in the Hazardous Building Materials Survey Huntington Park Library Renovation Project, except for underground storage tanks, contaminated soil or groundwater. Furnish labor, materials, supplies, and incidentals required, protect Project site personnel and the surrounding public from exposure to potentially hazardous substances, and prevent the spread of potentially contaminated or hazardous substances.

2. The furnishing of labor, supervision, materials, equipment, tools, permits, manifesting, and services required in the characterization, transportation, and disposal of identified or suspected hazardous substances. The suspect substance may be in drums, containers, stockpiled, or may exist as debris piles on the Project site.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 02 4119 – Selective Demolition

3. Section 02 8213 - Asbestos Abatement

4. Section 02 8333 - Lead Abatement and Lead Related Construction Work.

C. Regulatory Requirements shall include, but not be limited to: Comply with laws, ordinances, codes, rules, and regulations of the Federal, State and local authorities having jurisdiction over any of the Work specified herein. Comply with federal EPA and state Department of Transportation regulations for shipping of hazardous substances to offsite disposal facilities. Comply with any regulatory requirements imposed by the treatment, storage, and disposal facility. Regulations pertaining to the transport and disposal of hazardous substances/materials include, but are not limited to, the following:

1. Department of Transportation 49 CFR 172 through 179.

2. Department of Transportation 49 CFR 387 (46 FR 30974, 47073).

3. Department of Transportation DOT-E 8876.

4. Environmental Protection Agency 40 CFR 136 (41 FR 52779).

5. Environmental Protection Agency 40 CFR 261, 262 and 761.

6. Resource Conservation and Recovery Act (RCRA).

D. Any transporter of hazardous substances shall be licensed in the state in which handling and transportation will take place in accordance with applicable regulations.

E. Comply with OSHA (Occupational Safety and Health Administration) Standards and Regulations contained in Title 29 Code of Federal Regulations, Part 1910.120 "Hazardous Waste Operations and Emergency Response."

F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.02 QUALITY ASSURANCE

A. The Work of this Section shall be performed by an entity possessing the following minimum qualifications:

1. Project site personnel shall wear personal protective equipment and protective clothing consistent with the levels of protection required for this Work as specified by OSHA (29 CFR Part 1910.120).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ABATEMENT OF HAZARDOUS MATERIALS

A. Abate hazardous materials including hazardous materials identified in the Phase I Assessment Report.

B. The Work of this section does not include the removal of underground storage tanks, contaminated soil or groundwater, unless specifically authorized in writing by the OAR.

3.02 CONTAINMENT OF RELEASED SUBSTANCES

A. If a hazardous material appears to be leaking or otherwise spreading, contain the release of the material. Provide measures to prevent the release of the material to the environment and protect Project site personnel, adjacent properties and occupants, and the general public from potential exposure.

B. During the course of substance containment or evacuation of Project site personnel, protect personnel (onsite workers, non-workers, or the general public) from contact with or exposure to the released substances.

C. The abatement or evaluation of any suspected hazardous material shall only be performed by properly trained and/or certified personnel.

3.03 HEALTH AND SAFETY

A. In an emergency or imminent hazard situation the health and safety of personnel on or near the Project site are the responsibility of the Work of this section. Immediately notify the OAR designated representative of the Owner Consultant. Owner representatives will notify Federal, State and Local regulatory authorities, if required.

B. Project site personnel or members of the general public who have been exposed to or have come in contact with any hazardous materials or chemicals shall be immediately transported to the nearest hospital.

3.04 TESTING, TRANSPORT, AND DISPOSAL OF HAZARDOUS SUBSTANCES

A. Collect one composite sample from each media type (solid, liquid, or sludge) of potentially hazardous substance stored in drums, stockpiled, or otherwise identified at the Project site for the purposes of obtaining approvals for proper transport and disposal of the suspect materials. Submit analytical results to a representative of the Owner Consultant, as designated by the OAR.

B. If required, overpack any leaking or deteriorated drums to prevent leaks or spills, and pack small 5-gallon containers into larger new 55-gallon drums. Cover solid waste materials and stockpiled soils with an HDPE liner to prevent storm water runoff from contaminating surrounding areas.

C. Prepare manifests, material profiles, and submit lab analysis for drums/containers and any other documentation required by the receiving facility for signature by a representative of the Owner Consultant and/or Owner, as designated by the OAR. Copies of waste profiles, manifests, and disposal documentation shall be submitted to the OAR designated representative of the Owner, prior to disposal and/or transporting of hazardous substances.

D. Coordinate waste sampling and analysis requirements with the disposal facility and properly complete profiling and transport documents prior to loading and transport.

E. A State registered “Hazardous Waste Hauler” shall transport the waste to a lawfully permitted and Owner approved facility.

F. Prior to transport, a copy of the hazardous waste manifest shall be transmitted by facsimile, through the Project site Owner Consultant, for review and approval. The manifests shall list the generator’s name. The OAR designated representative of the Owner Consultant shall provide the Project site specific generator’s EPA ID # which shall be included on the manifest. Attach the land disposal restriction (LDR) form to the manifest prior to submission to the Owner office. The blue and yellow manifest copies and a copy of the LDR form shall be mailed to the Owner office. Other copies of the manifest and LDR shall be submitted to the waste transporter.

G. Load, handle, and transport 55-gallon drums and other waste containers to the appropriate disposal facility in accordance with Federal and State regulations.

H. Transport documentation from the receiving facility verifying acceptance and receipt of drums/containers at the facility and sampling and associated test results shall be

submitted to the representative of the Owner Consultant, as designated by the OAR, within fifteen days following receipt of hazardous substances to the disposal facility.

I. Materials identified as hazardous wastes under RCRA are not permitted to remain at the Project site more than 30 days after being deemed to be a hazardous waste. During this period of Project site storage, provide precautions to contain and prevent the release of hazardous or potentially hazardous materials to the environment.

END OF SECTION

# SECTION 02 8213
# ASBESTOS ABATEMENT AND ASBESTOS RELATED DISTURBANCE

## PART 1 – GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Abatement of building and/or structure related Asbestos.

2. Removal of building and/or structure related Asbestos.

3. Disturbance of building and/or structure related Asbestos.

B. Related Requirements:

1. Section 02 2600 – Abatement of Hazardous Material.

2. Division 01 - General Requirements.

3. U.S. Environmental Protection Agency Regulations for Asbestos (Title 40, Code of Federal Regulations, Part 61, Subparts A and B, and Part 763, Subpart E.)

4. Title 8, Article 4, California Code of Regulations Construction Industry Safety Orders, Section 1529 "Asbestos" or current revised California regulations.

5. South Coast Air Quality Management District (SCAQMD) Rule 1403.

### 1.02 SECTION DEFINITIONS AND ACRONYMS

A. Abatement – Procedures to control fiber release from Asbestos Containing Materials or Asbestos Containing Construction Materials. Includes Removal, Encapsulation, Enclosures, Repair, Demolition, and Renovation activities but does not include Asbestos Related Disturbance.

B. AHERA - Asbestos Hazard Emergency Response Act, 40 CFR, Part 763, Subpart E, and subsequent amendments.

C. Air Filtration and Ventilation System - A portable exhaust system, equipped with HEPA filtration, and capable of maintaining a constant air flow into a Regulated Area from adjacent areas and exhausted outside the Regulated Area.

D. Amended Water - Water to which a surfactant (wetting agent) has been added.

E. ANSI - American National Standards Institute.

F. Asbestos - Means the asbestiform varieties of chrysotile (Serpentine); crocidolite (Riebecktite); amosite (cummingtonitegrunerite); anthophyllite; tremolite; and actinolite.

G. Asbestos Containing Construction Material (ACCM) – Means any manufactured construction material which contains more than one tenth of one percent (0.1 percent) Asbestos by weight.

H. Asbestos Containing Material (ACM) – Means any material containing more than one-percent (1 percent) Asbestos.

I. Asbestos Containing Waste (Non-hazardous) – Non-Friable Asbestos Containing Material including, but not limited to, floor covering, roofing materials and cementitious materials requiring disposal.

J. Asbestos Containing Waste (Hazardous) – Friable Asbestos Containing Materials and Asbestos contaminated objects and debris requiring disposal.

K. Asbestos Related Disturbance – is the drilling, coring, removal or similar disturbance of ACCM or ACM not to exceed three square feet in any one opening and not to disturb 100 square feet or greater cumulatively on any one project (contract).

L. ASTM - American Society for Testing and Materials.

M. Building ID Number or Code - A six digit alphanumeric identification code assigned to each building on an Owner site, also referred to as the insurance code, ID number or similar terms.

N. Bulk Samples - Samples of building or other materials collected for analysis to determine the presence and quantities of Asbestos.

O. Class I, II, III, and IV asbestos work has the meaning as defined in California Code of Regulations Title 8, Section 1529.

P. Clean Room - An uncontaminated area or room, which is a part of the worker Decontamination Enclosure System with provisions for storage of worker's street clothes and clean protective equipment.

Q. Competent Person - Has the same meaning as defined in the California Code of Regulations Title 8, as it relates to, "Competent Person."

R. Controlled Disturbance – An activity by which a contractor disturbs an asbestos containing material or an asbestos containing construction material using the work practices allowed for in this specification and in compliance with regulatory limitations.

S. Curtained Doorway – A device to allow ingress and egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an exiting or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along

one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Other effective designs may be submitted for review.

T. Decontamination – The process of eliminating Asbestos contamination from building surfaces, objects, and property, by cloths, mops, or other utensils dampened with water and disposed of afterwards as Asbestos contaminated waste.

U. Decontamination Enclosure System – Means an enclosed area, which is adjacent and connected to the Regulated Area, consisting of an Equipment Room, Shower Room, and Clean Room for the Decontamination of workers, materials, and equipment contaminated with Asbestos.

V. Demolition - The wrecking or taking out of any load supporting structural member of a facility together with any related handling operations.

W. DOSH - Division of Occupational Safety & Health or Cal/OSHA.

X. DOT – Department of Transportation.

Y. DTSC – Department of Toxic Substances Control.

Z. Encapsulating Material - A liquid material applied to Asbestos Containing Materials which controls the possible release of Asbestos fibers from the material either by creating a membrane over the surface (bridging agent) or by penetrating into the material and binding its components together (penetrating Encapsulating Material).

AA. Encapsulation - The application of an Encapsulating Material to Asbestos Containing Materials to prevent the release of Asbestos fibers into the air.

BB. Enclosure - The construction or application of an airtight, impermeable, permanent barrier around Asbestos Containing Material to control the release of Asbestos fibers into the air.

CC. Equipment Room - A room within the worker Decontamination Enclosure System with provisions for storage of used clothing and equipment and for controlled transfer of materials and equipment into and out of the regulated area.

DD. Facility Component – Means any part of a facility including equipment.

EE. FETU - Facilities Environmental Technical Unit.

FF. Fixed Object - A piece of equipment, furniture, or improvement in the Work area, which cannot be removed from the Work area.

GG. Friable Asbestos - Asbestos Containing Material which, when dry, can be crumbled, pulverized or reduced to a powder by hand pressure or as defined by current regulations.

HH. Glove Bag Technique - A method with limited applications for removing small amounts of Asbestos Containing Material from short piping runs, valves, joints, elbows, and other

non-planar surfaces in a Work area. The glove bag assembly is a manufactured or fabricated device consisting of a glove bag (typically constructed of 6 mil transparent polyethylene or polyvinyl chloride plastic), two inward projecting long sleeves gloves, an internal tool pouch, and labeled for Asbestos waste. The glove bag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains asbestos fibers released during the process. Workers who are permitted to perform the Glove Bag Technique shall be thoroughly trained, experienced, and skilled in this method.

II. Hazardous Waste - Means Friable Asbestos generated and prepared for waste disposal. Does not include non-friable material or materials containing one-percent or less of Asbestos as determined by PLM and/or the point counting method.

JJ. HEPA Filter - Means a filtering system capable of trapping and retaining at least 99.97 percent of mono-dispersed particles 0.3 microns in diameter or larger. For respirators this shall include NIOSH rated P-100 cartridges only.

KK. HEPA Vacuum - A vacuum system furnished with HEPA filtration.

LL. High Volume Vacuum - A vacuum system with the capacity to collect material through a four inch diameter hose a minimum distance of 150 feet. This system shall be furnished with HEPA Filter at the air exhaust port and water applicators within the hopper.

MM. HVAC – Heating, Ventilation, and Air Conditioning System.

NN. Location Code - Refers to a unique four digit numeric code assigned by the Owner to each of its Project sites.

OO. Lockdown Coat – A material applied to surfaces where Asbestos has been completely removed. The manufacturer shall determine the concentration of this material.

PP. Member – A component part of a structure complete in itself.

QQ. Movable Object - A portable piece of equipment or furniture in the Work area, which can be removed from the Work area.

RR. NESHAP - National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).

SS. NIOSH - National Institute for Occupational Safety and Health.

TT. Outside Air - Air outside of buildings and structures.

UU. Owner Consultant (OC) - Refers to the firm, company or individual designated by the Owner.

VV. PCM - Phase Contrast Microscopy as it relates to clearance air, personnel exposure assessment, and ambient air monitoring. This procedure must follow the NIOSH Method 7400, Asbestos Fibers by PCM.

WW. PLM - Polarized Light Microscopy used for bulk sample analysis with dispersion staining for the determination and quantifying of Asbestos in Bulk Samples building materials.

XX. Regulated Area - Designated rooms, spaces or areas of the Project in which asbestos Abatement actions are to be performed or which may become contaminated as a result of Abatement activities. A contained Work area is a Work area, which has been sealed and furnished with a Decontamination Enclosure System. A non-contained Work area is an isolated or controlled access Work area, which has not been sealed or furnished with a Decontamination Enclosure System.

YY. Removal – Means operations where ACM and/or PACM is removed or stripped from structures or substrates including Demolition.

ZZ. Renovation – Means the modifying of any existing structure, facility, or portion thereof.

AAA. SCAQMD – South Coast Air Quality Management District.

BBB. Shower Room - A room between the Clean Room and the Equipment Room in the worker Decontamination Enclosure System furnished with hot and cold running water controllable at the tap, and suitably arranged for complete showering during Decontamination.

CCC. Small Scale Short Duration – Such work not to exceed amounts greater than those which can be contained in a single glove bag or may not exceed amounts which can be contained in a single prefabricated mini-enclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function, and as completely defined in 40CFR, 763, Subpart E, Appendix C.

DDD. Staging Area - Areas near the Waste Transfer Airlock where containerized Asbestos waste is temporarily placed prior to permanent removal from the Work area.

EEE. Surfactant - A chemical wetting agent added to water.

FFF. TEM - Transmission Electron Microscopy as defined for Asbestos clearance air monitoring within AHERA. This procedure must follow the NIOSH Method 7402, Asbestos Fibers by TEM.

GGG. TSI - Thermal System Insulation as defined in AHERA.

HHH. USEPA or EPA – United States Environmental Protection Agency.

III. Visible Emissions - Any emissions from a known or suspected Asbestos Containing Material that is visually discernible.

JJJ. Waste Transfer Airlock - A Decontamination system provided for transferring containerized waste from inside to outside of the Work area.

1.03 POLICIES AND PROCEDURES

A. The Owner has a zero tolerance policy for uncontrolled Asbestos releases during construction or Abatement Work. An Asbestos release requiring an emergency response is any uncontrolled release of Asbestos Containing Construction Materials. The Owner shall be immediately notified of such uncontrolled releases.

B. Pre-qualified Asbestos Abatement Subcontractors are not permitted to subcontract any Abatement work to a lower tier Subcontractor without the prior written approval of the Owner.

C. Where ACM is damaged or disturbed, except during Controlled Disturbance or Abatement, Work in that room shall cease, the room be vacated immediately, the Owner Consultant notified of the disturbance with corrective action provided as required by the Owner Consultant.

1.04 ROLES AND RESPONSIBILITIES

A. Roles and Functions:

1. Coordinate the Work of this section directly with the Owner and/or Owner Consultant.

2. Work under this section shall be performed in strict accordance with applicable Federal, State, and Local regulations, standards, and codes governing asbestos Abatement and any other Work performed in conjunction with the Asbestos Abatement Work.

3. The most recent edition of any relevant regulation, standard, document, or code is in effect. Where conflict among the requirements or with this Specification exists, the most stringent requirement shall be provided.

1.05 SITE SECURITY

A. The Work area shall be restricted to authorized, trained, and protected personnel. A list of authorized personnel shall be established by the Owner Consultant prior to commencement of the Work and posted at the entrance of the Regulated Area.

B. Report to the Owner Consultant any unauthorized entry into the Regulated Area. Following notification, a written report of the incident shall be provided to the Owner Consultant.

C. A logbook shall be maintained at the entrance of the Regulated Area. Persons entering the Regulated area shall record their name, company affiliation, time in, and time out for each entry and exit.

D. Access to the contained area shall be through the worker Decontamination Enclosure System or other room established when worker Decontamination Enclosure System is not required. Other means of access shall be blocked or locked to prevent entry to or exit from the Work area. The only exceptions are the waste pass-out airlock, which shall be

sealed except during the Removal of containerized Asbestos waste from the Work area, and emergency exits in case of fire or accident. Emergency exits shall be operable from inside the Work area; however they shall be sealed with polyethylene sheeting and tape.

E. Maintain Regulated Area security during Abatement Work. Regulated Areas and ancillary equipment accessible to non-authorized personnel shall be protected from unauthorized access by constructing a minimum barrier of 3/8 inch CDX plywood supported by 2 by 4 studs, 16 inches on center. Height shall be as required to safely access Regulated Area. An access door shall be provided with hasp and padlock sufficient to prevent unauthorized entry. A key shall be provided to the Owner and Owner Consultant. Required barriers within an occupied building shall be furnished with sheathing as required by state and local fire protection regulations.

F. The protective barrier for a High Volume Vacuum shall be a minimum of eight feet in height. Barriers for these systems may be constructed of chain link type fencing instead of the specified barriers. Such fencing, if provided, shall be covered with an opaque covering resistant to environmental conditions. This barrier system shall be maintained at times while the enclosed equipment is on the Project site.

G. Unless otherwise specified, remove barriers upon completion of the Work of this section. Repair and/or replace to original condition, damage resulting from installation, use, and removal of the barriers.

1.06 EMERGENCY PLANNING

A. Emergency planning and procedures shall be developed, submitted, reviewed, and agreed to by the Owner prior to the commencement of Abatement Work.

B. Emergency procedures shall be provided in the written languages understood by employees working on the Project and shall be prominently posted at the entrance of the Decontamination Enclosure System. Prior to entering the Work area, parties must read and sign these procedures to acknowledge receipt and understanding of the Work site layout, location of emergency exits, and emergency procedures.

C. Emergency planning shall consider the effects of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces, and heat related injury. Develop and provide written procedures and training to employees.

D. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

E. In the event of non-life threatening situations requiring medical treatment, injured or otherwise incapacitated employees shall decontaminate following normal procedures with assistance from fellow workers if necessary, before exiting the Work area.

F. In the event of life threatening injury or illness requiring immediate medical treatment, worker Decontamination shall be given minimum priority. Provide measures to stabilize

the injured worker, remove them from the Work area and secure proper medical treatment.

G. Telephone numbers of emergency response personnel shall be prominently posted at the entrance of the Decontamination Enclosure System along with the location of the nearest telephone. In addition to the 911 emergency number, post the address and telephone number of the nearest emergency medical services provider.

H. Provide at least one employee on the Project site at times during progress of Abatement work that is trained and certified in first aid and cardiopulmonary resuscitation (CPR). This employee shall be identified by name and proof of training shall be provided to the Owner Consultant prior to the commencement of the Work of this section.

I. Provide at least one 4A/60BC dry chemical extinguisher in the Equipment Room and one at each corner of contained areas in excess of 1,000 square feet. Workers shall be trained in the proper operation of fire extinguishers.

J. Emergency exits shall be provided and clearly marked with arrows or other clearly visible markings to permit easy identification from anywhere within the Work area. Exits shall be secured to prevent access from uncontaminated areas while still permitting emergency egress. Exits shall be properly sealed with polyethylene sheeting, which can be cut to permit emergency egress. Emergency exits may lead through the worker Decontamination Enclosure, the waste removal airlock or other alternative exits as required by fire officials.

1.07 LICENSING

A. The Work of this section shall be performed by an entity duly licensed in the State of California in accordance with the provisions of Chapter 9 of Division 3 of the Business and Professions Code, as amended. The Abatement work of this section shall be performed by an entity holding a license with an "ABS" Asbestos Certification as issued by the Contractors State License Board.

B. The entity performing the Work of this section, other than Asbestos Related Disturbance involving less than 100 square feet shall be registered with the Department of Industrial Relations in accordance with the provisions of Section 6501.5 of the California Labor Code.

1.08 ASBESTOS RELATED REQUIREMENTS

A. Qualifications:

1. Comply with the provisions of the California Labor Code, Division 5, Part 1, as it pertains to safety in employment and the applicable provisions of Title 8, Chapter 4, Subchapters 1 through 21, California Code of Regulations (CCR) as it pertains to Occupational Safety and Health, and Subchapter 7, Section 5208 Article 4, and Section 1529, Asbestos regulations.

2. Where Electrical Work is required in a Regulated Area this work shall be performed as required in Division 16 and personnel who enter a Contained and Regulated Class I and II Asbestos work area are required to possess a current EPA certification as an Asbestos worker. Personnel who enter a Class III Asbestos Related Disturbance work area shall require personnel trained in accordance with AHERA Operations and Maintenance training requirements.

B. Abatement Activities:

1. The Asbestos Abatement work shall be performed by persons who comply with applicable Federal, State, and local regulations including AHERA certified training.

2. Supply labor, materials, services, insurance, permits, and equipment necessary to perform the Work in accordance with applicable Federal, State, and Local regulations and this Specification.

3. For Class I asbestos work, collect pre-Abatement air samples. Results shall be submitted prior to commencement of the Work of this section. Include location of Samples, name of air sampling professional, equipment, and methods utilized for sampling and analysis.

4. Submit weekly job progress reports detailing Abatement activities for Projects with schedules that exceed thirty days of Abatement work. Include review of progress with respect to previously established Milestones and schedules, major problems and action taken, injury reports, equipment breakdown, and air sampling results.

5. Within five workdays of transport and/or disposal, submit copies of transport manifests, disposal receipts, and weight certificates for Asbestos waste removed from the Work area during the Abatement process. Weight certificates shall indicate in pounds the net weight of waste disposed from the Project site as indicated on the manifest.

6. Submit copies on a daily basis of the Work site entry logbooks.

7. Submit logs on a weekly basis documenting filter changes on respirators, HEPA Vacuums, HEPA Filtered ventilation units, water filtration units, and other approved engineering controls.

8. Submit results of materials testing conducted during Asbestos Abatement work for purposes of utilization during such activities. (i.e., depth test, substitution materials, etcetera).

9. Where Decontamination Enclosure System is required, post at the entrance a list containing the names, addresses, and telephone numbers of the entity performing the Work of this section, designated Competent Person, the Owner and/or Owner Consultant, the testing laboratory and any other personnel who

may be required to access the Work area or perform services during the Abatement Work.

10. For employee review, post at the entry of the Work area a copy of the scope of Work, special conditions, the current standard Specifications, and the applicable prevailing wage.

C. Asbestos Related Disturbance:

1. The Asbestos Related Disturbance Work shall be performed by persons who comply with applicable Federal, State, and local regulations including AHERA certified training.

2. Within ten days of analysis, submit results of air sampling data collected for Cal/OSHA compliance air monitoring during the course of the Asbestos Related Disturbance (Class III asbestos work). If this data is used to discontinue use of employee protective equipment then the data shall be provided before discontinuing use of protective equipment.

3. Within five workdays of transport and/or disposal of Asbestos Containing Waste, submit copies of transport manifests and/or disposal receipts.

1.09 SUBMITTALS

A. Provide in accordance with Division 01 and this section.

B. Prior to commencement of the Asbestos Abatement work of this section, submit the following notices, documentation, Shop Drawings, and Product Data:

1. For Projects involving Asbestos Containing Materials 100 square feet or more, provide a typed written notification in accordance with Rule 1403 of SCAQMD and 40 CFR Part 61.146 of Subpart M to the SCAQMD, and to and in accordance with the Division of Occupational Safety and Health prior to start of the Work.

2. Submit to the Owner, satisfactory proof the required permits, site location, and arrangements for transport and disposal of Asbestos Containing Waste materials have been completed in accordance with California Health and Safety Code, Section 25143.7. Obtain and submit a copy of handling procedures and a list of protective equipment utilized for Asbestos disposal at the landfill.

3. Submit to the Owner satisfactory documentation that employees, including foremen, supervisors, and any other company personnel or agents who may be exposed to airborne Asbestos fibers or who may be responsible for any aspects of Asbestos Abatement work or Asbestos Related Disturbance have received adequate training that includes, at a minimum, information as described within this section and as required by AHERA.

4. Prior to commencement of Abatement Work, personnel required to construct and enter the Work area or handle containerized Asbestos Containing Materials shall have received adequate training, in accordance with the requirements of this Specification and by 40 CFR, Part 763, Subpart E (AHERA) and Title 8, Section 1529, of the California Code of Regulations applies.

5. Special Project site training for equipment and procedures unique to this Project site shall be provided as required.

6. Training in emergency response and evacuation procedures shall be provided to personnel performing Asbestos Abatement work of this section.

7. Submit documentation from a physician certifying that employees are medically monitored and are physically capable of working while wearing the required respiratory protection without suffering adverse health effects as required by California D.O.S.H regulations. Where such documentation is required, the certification shall state that the employee or agent is approved to work with Asbestos and wear a respiratory protection without restrictions. Provide information to the examining physician about unusual conditions in the workplace environment that may impact on the employee's ability to perform Abatement Work activities.

8. Submit Shop Drawings for layout and construction of Decontamination Enclosure Systems and barriers for isolation of the contained Asbestos Abatement work area as detailed in this Specification and required by applicable regulations.

9. When used, submit manufacturer's certification that HEPA Vacuums, air filtration units, and other local exhaust ventilation equipment complies with ANSI Z9.2.

10. Submit Product Data verifying that air filtration devices (i.e., air filtration units and vacuums) for use on this project have been registered or certified, as applicable, in compliance with the SCAQMD Rules.

11. If rental equipment is to be furnished in Abatement Work areas or to transport Asbestos contaminated waste, written notification concerning the intended use of the rental equipment shall be provided to the rental agency with a copy submitted to the Owner.

12. Document NIOSH approvals for respiratory protective devices furnished as required by the Work. Include manufacturer certification of HEPA filtration capabilities for cartridges and filters.

13. Submit documentation of respirator fit testing for employees and agents entering the Abatement work area or areas where respiratory protection is

required. This fit testing shall be performed in accordance with DOSH regulations.

14. Submit a Sample of forms to be used in documenting required items to be submitted and/or reviewed.

C. Provide other required submittals specified as part of the Work of this section.

1.10 PRE-ABATEMENT MEETING

A. Attend a meeting to be held prior to the commencement of Abatement Work. Attending this meeting shall be representatives of the Owner, the Owner Consultant if applicable, and the testing/monitoring personnel who shall actually participate in the testing/monitoring program. Secure the attendance of the individual who will be the Project site Competent Person for the Abatement Work.

B. Included in the general preconstruction meeting will be a discussion of requirements and submittals for Asbestos Related Disturbance, where such applies.

C. At this meeting provide required submittals except for those to be submitted during progress of the Work. In addition, provide detailed information concerning:

1. Preparation of Work area and Shop Drawings. (Abatement Only).

2. Personal protective equipment, including respiratory protection and protective clothing. (Abatement, and Asbestos Related Disturbance if required).

3. Employees who will participate in the Project, including delineation of experience, training, and assigned responsibilities during the Work. (Abatement and Asbestos Related Disturbance).

4. Decontamination procedures for personnel, Work area, and equipment. (Abatement and Asbestos Related Disturbance).

5. Abatement methods and procedures to be provided. (Abatement Only).

6. Required air monitoring procedures pre-Abatement and SCAQMD requirement Abatement Only and Cal/OSHA mandatory Abatement and Asbestos Related Disturbance.

7. Procedures for handling and disposing of waste materials, including disposal facility. (Abatement and Asbestos Related Disturbance).

8. Procedures for final Decontamination and cleanup. (Abatement Only).

9. A sequence of Work activities and performance schedule. (Abatement Only).

10. Procedures for dealing with heat stress. (Abatement Only).

11. Emergency procedures. (Abatement Only).

1.11 CLOSE OUT DOCUMENTATION

A. Provide the following close out documentation:

1. Filter change logs for air filtration units, water filtration units and respirators. (Abatement Only).

2. Foreman's daily job reports. (Abatement Only).

3. Employee entry/exit logs for containment. (Abatement Only).

4. Visitor entry/exit logs for containment. (Abatement Only).

5. Manometer printout reports for applicable containment. (Abatement Only).

6. Air sample results for personnel (Abatement and Asbestos Related Disturbance).

7. Air Samples for Abatement Work areas and air filtration units. (Abatement Only).

8. Copies of hazardous and non-Hazardous Waste manifests. (Abatement and Asbestos Related Disturbance).

9. Hazardous Waste weight tickets. (Abatement Only).

10. Signed Daily Personnel Report Forms. (Abatement Only).

11. Signed code of conduct form from each employee working on a Project. (Abatement Only).

12. Signed asbestos Abatement Project Personnel Logs. (Abatement Only).

B. Receipt of the last workday attendance log and the daily personal monitoring results shall be submitted within two days upon completion of the Abatement Work of this section.

PART 2 – PRODUCTS

2.01 Materials and Equipment:

A. Materials

1. Products: The following products have been specifically approved for use as encapsulants/lock-down or bridging agents for Owner asbestos abatement and asbestos related construction projects and lead abatement and lead related construction projects. Products not approved by the Owner shall not be used.

a. Asbestos Removal Encapsulant: Foster 32-60 blue by Foster Products Corporation; removal, lock down or penetrating with dilution.

b. Asbestos Bridging Encapsulant: Foster 32-80 by Foster Products Corporation; for pipe covering and boiler lagging.

c. A-B-C Fiberspray 6410 and 6422SP by Fiberlock Technologies, Inc.; for coring, small jobs and gloves bags.

d. A-B-C Asbestos Binding Compound 6421, 6422 and 6423 by Fiberlock Technologies, Inc.; for general use, removal, lock down, penetrating and bridging; good for soils.

e. Fiberset PM 7475 clear by Fiberlock Technologies, Inc.; compatible with flooring.

f. Fiberset PM 7470 white by Fiberlock Technologies, Inc.; compatible with flooring.

g. Lag-Kote by Fiberlock Technologies, Inc.; multi-use product including fireproofing and thermal system insulation.

h. Lag-Klothe by Fiberlock Technologies, Inc.; water activated repair cloth for pipes, boilers and breaching.

2. General:

a. Deliver materials in the original sealed packages, containers, or bundles bearing the name of the manufacturer and brand name.

b. Store materials subject to damage off the ground, away from wet or damp surfaces, and under cover, sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the Abatement Work area until, area is cleared for normal occupancy.

c. Damaged, deteriorating or previously used materials shall not be furnished and shall be removed from the Project site and legally disposed of.

d. A sufficient supply of disposable mops, rags, and sponges for Abatement Work area Decontamination shall be provided.

e. Unless otherwise specified, the Owner will provide water and power for construction purposes. Connect to existing system as required.

3. Asbestos Related:

a. Plastic, polyethylene sheeting or visqueen shall be a fire retardant type. Provide documentation from the manufacturer verifying compliance with this requirement.

b. Where a contained work area is required for Abatement Work, a minimum of two layers of 4-mil polyethylene sheeting shall be installed for walls.

For floors and other installations, polyethylene sheeting of at least 6-mil thickness shall be furnished in sufficient widths to minimize the frequency of joints.

c. Method of attaching polyethylene sheeting shall be reviewed prior to installation and/or commencement of Abatement Work. Method of attaching polyethylene sheeting shall not cause damage to equipment, finish surfaces, or other property.

d. Polyethylene sheeting furnished for the Decontamination Enclosure System shall be opaque white or black in color and shall be a minimum of 6-mil thick.

e. Disposal bags shall be of 6-mil polyethylene, with the outer bag pre-printed with labels as required by SCAQMD and applicable Cal/OSHA and DOT requirements at a minimum.

f. Apply labels as per SCAQMD, Cal/OSHA, and DOT requirements for disposal containers.

g. Provide warning signs as required by CAL/OSHA.

h. Surfactant (wetting agent) shall be a material that, when tested, demonstrates a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331 - Surface and Interfacial Tension of Solutions of Surface Active Agents. Where Work area temperature may cause freezing of the Amended Water solution, the addition of approved antifreeze in a manufacturer recommended amount is permitted.

B. Equipment

1. General:

a. Equipment delivered to the Project site shall be free of Asbestos and/or fibrous debris. No equipment with Asbestos and/or fibrous debris in or on it is permitted on Owner properties.

b. Provide sufficient lighting to illuminate the Work area for safe visual working conditions and to clearly examine surfaces.

c. Provide a sufficient supply of scaffolds, ladders, lifts, and hand tools that meet applicable Federal, State, and local regulations.

d. Provide non-metallic dustpans, squeegees, and shovels for cleanup.

2. Asbestos Related:

a. A sufficient quantity of air filtration ventilation units furnished with HEPA filtration and operated in accordance with ANSI Z9.2-79 and EPA guidance documents shall be furnished to provide one workplace air change every 15 minutes creating -0.02 column inches of water pressure differential everywhere within the contained area when compared to the pressure outside the area. For small Enclosures and glove bags, a HEPA Filtered vacuum system may be furnished to provide the pressure differential. A log documenting the filter change history of each unit is required before use. Any unit without this log shall have filters changed and the unit decontaminated.

b. Provide a printable manometer for determining and recording the pressure differential within the isolated Work area as compared with the ambient environment. A printed record is required for the duration of the Project. The manometer shall operate 24 hours per day with a printed differential reading not to exceed fifteen minute intervals.

c. High volume vacuum equipment shall be provided during soil Removal operations unless otherwise specified.

d. Provide sprayers with pumps in a quantity capable of providing Amended Water in sufficient quantities to adequately wet materials during Asbestos Abatement activities. Provide spray bottles or adequate equipment necessary to keep materials impacted by Asbestos Related Disturbance adequately wet.

e. Non-skid footwear shall be worn by Abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

f. Provide other required safety equipment to workers and authorized visitors.

g. When roll-off disposal containers are delivered to a Project site, four wheels of each container shall be moved and rested upon a sheet of plywood no smaller than four-foot by four-foot by ¾ inch minimum.

## 2.02 EMPLOYEE PERSONAL PROTECTIVE EQUIPMENT

A. Respiratory Protection:

1. Where respirators are required these shall be provided for protection from particulate contaminants as required by the National Institute of Occupational Safety and Health.

2. The respirators provided shall furnish a protection factor as required by CCR Title 8, Section 1529 for the fiber concentration in the work area. When powered air purifying respirators are provided, a sufficient supply of charged replacement

batteries, filters, and a flow test meter shall be provided in the Clean Room area. Air purifying respirators with dual HEPA Filters may be provided during Work area preparation activities.

3. Provide spectacle kits and eyeglasses for employees who wear glasses and must wear full-face respirators.

B. Fit Testing:

1. Workers must perform positive and negative air pressure fit tests each time a respirator is donned, whenever the respirator design so permits. Powered air purifying respirators shall be tested for adequate flow as specified by the manufacturer.

2. Workers shall be undergo a qualitative fit test in accordance with procedures detailed in the D.O.S.H. requirements for respirators provided to comply with the requirements of this Project. An appropriately administered quantitative fit test may be substituted for the qualitative fit test.

3. Where respirators are required, documentation of adequate respirator fit must be provided to the Owner Consultant.

4. No one wearing a beard shall be permitted to don a respirator and enter the Work area.

5. Where respirators are required, a minimum of two additional respirators of each type and training on their donning and use must be provided at the Work site for authorized visitors required to enter the Work area.

C. Protective Clothing:

1. Where protective clothing is required, full body disposable protective clothing, including head, body, and foot coverings, shall be provided to workers and authorized visitors in sizes adequate to accommodate movement without tearing.

2. Disposable clothing including head, foot, and full body protection shall be provided in sufficient quantities and adequate sizes for workers and authorized visitors.

3. A new suit shall be donned upon each entry to the Abatement Work area or area where the permissible exposure level will be exceeded.

4. Hard hats, protective eye wear, gloves, rubber boots and/or other footwear shall be provided as required for workers and authorized visitors. Safety shoes may be required and shall be provided.

PART 3 - EXECUTION

## 3.01 ABATEMENT PROCEDURES AND WORK AREA PREPARATION

A. Work Area Preparation

1. For Class I and II asbestos work, shut down and lock out heating, cooling and air conditioning system (HVAC) components that are located in, supply, or pass through the Work area. Seal intakes and exhaust vents in the Work area with tape and 6-mil polyethylene. Seal seams in any system components that pass through the Work area.

2. Provide and post signs at locations and approaches to the Regulated Area. The signs shall comply with Cal/OSHA regulations.

3. In conjunction with the Owner, shut down and lock out/tag out electric power to Class I and II asbestos work areas. Provide equipment for temporary power with ground fault interrupters and lighting sources. Temporary power sources and equipment shall comply with applicable electrical code requirements and Cal/OSHA requirements for temporary electrical systems. The Owner shall perform electrical connections of electrical cable and equipment provided as part of the Work of this section to existing Owner systems. The Owner shall pay for the costs of electric power consumed during performance of the Work of this section, unless otherwise noted.

4. For Class I and II asbestos work, clean and seal off windows, doorways, elevator openings, corridor entrances, drains, ducts, grills, grates, diffusers, skylights, and any other openings between the Abatement Work area and areas outside of the Abatement Work area with 6-mil polyethylene sheeting and tape prior to proceeding with required cleaning.

5. Clean Movable Objects within the Abatement Work area with a HEPA Filtered vacuum and wet cleaning methods. After cleaning, these objects shall be removed from the Abatement work area and carefully stored in a location designated by the Owner.

6. Clean Fixed Objects in the Abatement Work area with a HEPA Filtered vacuums and wet cleaning methods. Careful attention shall be given to machinery behind grills or gratings where access may be difficult but contamination is present. Cleaning of walls, floors, and ceilings behind fixed items is required. After cleaning, enclose Fixed Objects in 6-mil polyethylene sheeting and seal securely in place with durable tape.

7. Clean surfaces in the Abatement Work area with a HEPA Filtered vacuums and wet cleaning methods. Do not utilize any methods, such as dry sweeping or vacuuming, with equipment not furnished with HEPA Filters thereby creating airborne dust and particulates. Do not disturb Asbestos Containing Materials during this cleaning phase.

8. For Class I and II asbestos work, floors shall be covered with two layers of 6-mil (minimum) polyethylene sheeting. Additional layers of sheeting may be furnished as drop cloths for cleanup of bulk materials.

9. Polyethylene sheeting shall be sized and installed to minimize seams. If the floor area to be covered requires seaming, seams on successive layers of polyethylene sheeting shall be staggered a minimum of six feet between each seam to reduce the potential for water penetration into the existing flooring. Do not install seams at the junction between a wall and floor.

10. Polyethylene sheeting installed on a floor shall extend at least 12 inches up the sidewalls of the Abatement Work area.

11. Polyethylene sheeting shall be installed so as to prevent slippage between successive layers of installed material.

12. For Class I and II asbestos work, walls shall be covered with two layers of 4-mil minimum thickness polyethylene sheeting.

13. Polyethylene sheeting installed on a wall shall overlap floor sheeting by at least 12 inches beyond the wall/floor joint to provide a seal against water damage.

14. Polyethylene sheeting installed on a wall shall be adequately fastened to prevent it from falling away from the walls. Provide additional support/attachment when air filtration ventilation systems are provided.

15. For Class I and II asbestos work with porous, dropped, or perforated ceilings, those ceilings shall be covered with one layer 4-mil minimum thickness polyethylene sheeting.

16. Polyethylene sheeting installed on ceilings shall be adequately fastened to prevent it from falling away from the ceiling.

17. Provide one layer of 3-mil maximum, polyethylene sheeting (non-fire retardant type) for isolation of fire sprinkler devices. Installed taping shall not impede the normal function of the fire sprinkler device. Approved wire sprinkler guards shall be furnished in conjunction with isolation.

18. Where required, install and operate air filtration equipment to provide one air change in the Abatement Work area every 15 minutes. Openings made in the Enclosure System to accommodate these units shall be made airtight with durable tape and/or caulking as needed. If more than one unit is installed, they shall be turned on one at a time, checking the integrity of barriers after each unit is started. Insure that adequate power supply is available to satisfy the requirements of the air filtration units. Exhaust from these units shall be directed to the outside of the building whenever feasible. They shall not be exhausted into occupied areas of the buildings. Exhaust duct shall be extended from the Abatement Work area to the

outside as required. Careful installation and daily inspections shall be performed to verify the exhaust ducts do not discharge into any areas of the building.

19. Once the Enclosure system is constructed and reinforced with air filtration units in operation as required, test the Enclosure for leakage utilizing smoke tubes. Repair, replace or reconstruct as required.

20. Following completion of the construction of polyethylene barriers and Decontamination Enclosure System, operate the air filtration units overnight to insure the barriers will remain intact and secured to walls and fixtures before beginning actual Abatement Work.

21. Commencement of the Work of this section shall not occur until:

    a. The entire containment system has been constructed and inspected by Owner Consultant in accordance with the required Shop Drawings.

    b. Air filtration units are functioning within the requirements of this section.

    c. Air filtration units are functioning within the requirements of this section.

    d. Pre-Abatement submittals, notifications, postings, and permits have been provided and reviewed by the Owner Consultant.

    e. Equipment for Abatement, Decontamination, and disposal are on the Project site.

    f. Worker training, respirator fit testing, and medical surveillance has been provided and reviewed by the Owner Consultant.

    g. A Notice to Proceed is transmitted by the Owner.

3.02 ASBESTOS RELATED DISTURBANCE WORK PRACTICES (Small-Scale, Short Duration – SSSD)

A. For Class III work, shut off air handling equipment to rooms work will occur in.

B. Provide and post signs at the entrance to the work area affected. The signs shall comply with Cal/OSHA regulations.

C. For Class III work clean the area immediately under the location to be disturbed.

D. For Class III work move any moveable furniture or objects from immediately beneath the area to be disturbed.

E. Provide an enclosure around the area of disturbance. This may include, but is not limited to:

1. Mini-enclosure where not more than two persons may occupy for the purpose cutting holes up to three square feet in walls or ceilings.

2. For drilling, coring, sawing or similar disturbance, an enclosure shall be placed over the area of disturbance of sufficient size to cover that area and contain the tools used. This can include drilling with a shroud, through a wet sponge, through a plastic enclosure, or similar designs which will ensure control of Asbestos fibers and other dust. Drilling or coring with the use of a vacuum collection device shall be equipped with a HEPA filtered vacuum.

F. Class III work performed without a HEPA vacuum collection device shall have surfaces of disturbance adequately wet to control fiber release.

G. Clean by wet method the surfaces disturbed, the enclosure device and/or materials used, and any tools used during the disturbance operation.

H. Clean up by wet method and/or HEPA vacuum any debris that may have escaped outside the enclosure required by this section.

3.03 DECONTAMINATION ENCLOSURE SYSTEM FOR ABATEMENT WORK

A. Decontamination Enclosure Systems shall be provided at locations where workers will enter or exit the Abatement Work area of Class I and II asbestos work prior to any other set up. Only one system at a single location for each Regulated Area is required. At least one individual shall be stationed at the entrance of each system at times Abatement Work is in progress.

B. These systems may consist of existing rooms outside of the Abatement Work area, if the layout permits, and that can be enclosed in polyethylene sheeting, and are accessible from the Abatement Work area. If this intended layout is not feasible, given existing site conditions, Enclosure systems may be constructed out of metal, wood, or plastic support as required.

C. Decontamination Enclosure Systems constructed at the Project site shall be furnished with 6-mil opaque white or black polyethylene sheeting or other approved materials for privacy. Detailed descriptions of portable, prefabricated units, if furnished, shall be submitted for review. Shop Drawings must include floor plan with dimensions, materials, size, thickness, plumbing, and electrical utilities.

D. Decontamination Enclosure System shall consist of at least a Clean Room, a Shower Room, and an equipment room, each separated from the other, from the Abatement Work area and from the non-Work area by "Z-flaps" at a minimum. The system shall be furnished with, at a minimum, two layers of 6-mil polyethylene sheeting on the floors, walls, and ceiling.

E. Clean room shall be of adequate size to accommodate the Abatement crew. Clean work clothes, clean disposable clothing, replacement filters for respirators, disposable towels, and other necessary items shall be provided for in adequate supply adjacent to the Clean

Room. A location for posting notices shall also be provided adjacent to this area. When required, a lockable door shall be furnished to control access into the Clean Room from outside the Abatement Work area. Comfort lighting, heat, and electricity shall be provided as required. The Clean Room shall not be used for storage of tools, equipment, materials, or as office space.

F. Shower room shall contain one or more showers as required to adequately accommodate workers. Each showerhead shall be supplied with hot and cold water adjustable at the tap. The shower Enclosure shall be constructed to ensure against any kind of leakage. Provide an adequate supply of soap, shampoo, and disposable towels, available at times. Shower water shall be drained, collected, and progressively filtered through a system achieving a maximum particle size of 1.0 microns.

G. The Equipment Room shall be used for storage of equipment and tools at the end of a shift. These shall have been cleaned using a HEPA Filtered vacuum and wet cleaning methods. A container lined with a labeled 6-mil polyethylene bag for collection of disposable clothing shall be located in this room. Reusable footwear shall be stored in this area after being cleaned.

3.04 WASTE CONTAINER REMOVAL AIRLOCK AND EMERGENCY EXITS

A. The waste container pass-out airlock shall be constructed away from the Decontamination Enclosure System. This airlock shall be in a location that provides direct access from Abatement Work area to the outside of the building if possible.

B. This system shall consist of an airlock, container Staging Area, and another airlock providing access to outside Abatement Work area.

C. The waste container airlock shall be constructed in similar fashion with similar materials as the Decontamination Enclosure System.

D. This airlock system shall not be used to enter or exit the Abatement Work area.

3.05 ALTERNATIVE PROCEDURES

A. Soil Removal

1. Required Asbestos Abatement shall be performed prior to soil Removal.

2. If soil Removal is specified, debris within or upon the soil shall be considered part of the soil and shall be removed as a contaminated waste. Debris includes, but is not limited to, fabric, paper, and other fibrous or porous materials.

3. It is not the intention of this section to require the Removal of large rocks, abandoned non-Asbestos-containing pipe, lumber, and similar debris. If these conditions are encountered, clean and encapsulate these materials instead of removing them as a contaminated waste, provided Asbestos contamination is not

ingrained within and/or affixed to them. Any such materials remaining shall be stacked to one side to allow for access to the soil below for removal purposes.

4. Unless otherwise specified, soil shall be removed with a High Volume Vacuum system. Soil shall be removed to the hard pan unless otherwise specified or required.

5. After soil Removal has been completed, the Owner Consultant shall inspect the Work. Approval of the Removal Work is required prior to lock down and Encapsulation.

6. Soil requires Encapsulation following Asbestos Removal, including but not limited to, High Volume Vacuum removal. Apply a continuous even coat of encapsulating material at the rate of no more than fifty square feet per gallon. Other structural surfaces shall receive an evenly applied coat of lock down material.

B. Other:

1. High Volume Vacuum systems shall be provided with an Enclosure constructed at the waste discharge port. This Enclosure shall be of sufficient size to accommodate the workers and disposal containers necessary for the Project. The Enclosure shall be constructed of one layer, 6-mil minimum, of polyethylene sheeting. An air filtration unit shall be furnished during operation of the High Volume Vacuum.

2. Where pipe insulation is to be removed in a crawl space and/or attic space a single layer of 6-mil polyethylene sheeting with a minimum width of four feet shall be placed centered under the Removal surfaces.

3. If specified procedures cannot be furnished, a written request shall be provided to the Owner outlining details of the problem encountered and recommended alternative solutions.

4. Alternative procedures shall provide equivalent or greater protection than the specified and/or required procedures.

5. Any alternative procedure requires the written approval of the Owner prior to implementation.

## 3.06 WORKPLACE ENTRY AND EXIT PROCEDURES

A. Before entering the Regulated Area personnel shall read and be familiar with posted regulations, personal protection requirements, and emergency procedures. A signature sheet shall be posted for signatory acknowledgement these have been reviewed and understood by personnel prior to entry.

B. Workers and other authorized personnel shall enter the Abatement Work area through the Decontamination Enclosure System or other room required when Decontamination Enclosure System is not required.

C. Personnel who enter or exit the Regulated Area shall sign the entry and exit log located adjacent to the Clean Room.

D. Personnel shall proceed first to the Clean Room, don respirator, and washable and/or disposable clothing.

E. General construction area equipment including, but not limited to, hard hats, eye protection, and gloves shall also be provided as required. Clean respirator and cartridges, and protective clothing shall be provided and utilized by each person for each separate entry into the Regulated Area.

F. Before leaving the Regulated Area for Class I and II asbestos work personnel shall remove gross contamination from the outside of respirators and protective clothing by vacuuming and/or wet wiping methods. Each person shall clean protective footwear just prior to entering the Equipment Room.

1. Personnel shall proceed to Equipment Room where they remove protective equipment except respirators. Deposit disposable clothing into appropriately labeled containers.

2. Still wearing respirator, personnel shall proceed to the shower area, clean the outside of the respirators and the exposed face area under running water prior to removal of respirator then shower and shampoo to remove residual Asbestos contamination. Various types of respirators will require slight modification of these procedures. A powered air purifying respirator face piece will have to be disconnected from the filter/power pack assembly when such is not waterproof, upon entering the shower. A dual cartridge respirator may be worn into the shower and cartridges shall be replaced for each new entry into the Work area.

3. After showering and drying off, proceed to the Clean Room and don clean clothing.

G. At no time shall any personnel exit an Abatement Work area into a space occupied by staff or students without being completely dressed. Any violation of this requirement will result in the permanent removal of the person from the Project site.

3.07 REMOVAL PROCEDURES

A. Brushes furnished for removing loose Asbestos Containing Material during detail cleaning of substrate shall be furnished with nylon or fiber bristles. Metal or wire brushes are not permitted. Brushes used during this process shall be disposed as contaminated waste when use of the brush for this work is completed.

B. A sufficient supply of HEPA Filtered vacuum systems shall be provided during cleanup of Abatement Work. Brush attachments are not permitted for use with vacuum systems.

C. Barriers constructed to isolate the Regulated Area from other areas shall be inspected at least three times per shift; prior to the start of Abatement activities; half way into the shift; and following the completion of the Abatement activities at the end of the shift. Inspect and document observations in the daily Project log.

D. Damage and defects in the Enclosure system shall be repaired immediately upon discovery.

E. At any time during Abatement Work, following barrier installation, if visible debris is observed outside of the Regulated Area or damage occurs to the barriers, stop Work immediately. Repairs shall be performed to the barriers and debris/residue shall be cleaned up with appropriate HEPA Vacuuming and wet wiping methods. These incidents shall be recorded in the daily Project log.

F. If air samples collected outside of the Work area during Abatement Work indicate airborne fiber concentrations greater than 0.01 f/cc or the pre-measured background levels (whichever is lower) Work shall stop immediately. An inspection and repair of barriers shall be performed as required. Surface cleaning with HEPA Vacuums and wet wiping methods of areas outside of the Work area may be required by the Owner. Findings, observations, and corrective actions shall be documented in the daily Project log.

3.08 ENCAPSULATION AND BRIDGING AGENTS

A. Clean and isolate the Work area in accordance with "Work Area Preparation" of this Section.

B. Repair damaged and missing areas of existing materials with non-Asbestos containing substitutes. Material shall adhere adequately to existing surfaces and provide an adequate base for application of Encapsulating Material. Filler material shall be installed in accordance with manufacturers recommended specifications.

C. Remove loose or hanging Asbestos Containing Materials in accordance with the requirements of "Removal Procedures" in this Section.

D. Lockdown and Encapsulating Material, and bridging agents shall be reviewed by the Owner Consultant prior to the commencement of the Work of this section.

E. Encapsulating Material shall be sprayed applied with airless spray equipment. Nozzle pressure shall be adjustable within a range of 400 to 1500 PSI.

F. Lock down coat shall be spray applied with low pressure providing a continuous even coat.

G. Bridging agents shall be a palm or brush grade.

H. Colorless lock down materials, Encapsulating Material, and bridging agents shall be furnished with a compatible color additive. A different color shall be furnished for each separate coat of applied material.

I. Install penetrating type Encapsulating Material to penetrate existing sprayed applied Asbestos Containing Materials to a depth as required.

J. During installation of the penetrating type Encapsulating Material; remove selected random core samples of the Asbestos Containing Materials in the presence of the Owner Consultant to verify depth of penetration.

K. Lock down coating and Encapsulating Material for installation on hot water, steam, or any other high temperature equipment shall be manufactured and recommended for installation on high temperature systems.

3.09 CLEAN UP PROCEDURES

A. Asbestos Clean Up Procedures:

1. Unless decontaminated daily, reusable footwear and kneepads shall be stored in the Equipment Room when not in the Work area. Upon completion of Abatement Work, these shall be disposed of as Asbestos contaminated waste or may be decontaminated at the completion of Abatement Work.

2. Remove and containerize visible accumulations of Asbestos Containing Material and Asbestos contaminated debris with rubber dustpans and rubber squeegees. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to flooring materials.

3. Remove containerized waste from the Abatement Work area and the waste container airlock.

4. Wet wipe surfaces in the Regulated Area with clean rags, mops, and sponges as appropriate.

5. After cleaning remove the top layer of polyethylene sheeting from walls and floors.

6. Clean the second layer of polyethylene sheeting by wet wipe and HEPA Vacuuming. Windows, doors, HVAC system vents, and other critical seals shall remain sealed until the Abatement Work area passes final clearance. The air filtration units shall remain in continuous operation and the Decontamination Enclosure System shall remain in place and be utilized.

7. Decontaminate tools and equipment and remove at the appropriate time in the cleaning process.

8. Provide notification to the Owner at least one day in advance when Abatement Work will be completed and ready for final visual inspection. If, upon inspection, Abatement Work is not completed or the area does not pass final visual inspection, finish or correct the Abatement Work as required before notifying the Owner. Subsequent inspections shall commence not later than one day following notice.

9. The Owner Consultant shall inspect the Work area for visible residue. If residue is observed, it shall be deemed to contain Asbestos and the cleaning process shall be repeated. The lock down coat shall be applied only after inspection by the Owner Consultant and during non-school hours.

10. The second layer of isolation shall only be removed after the Owner Consultant inspects the lock down coat or installed Encapsulation, but in no case prior to overnight drying of lock down coat or Encapsulation.

11. Following completion of air clearance monitoring the remaining barriers shall be removed and properly disposed of. A final visual inspection by the Owner Consultant shall be performed to verify that no contamination remains in the Abatement Work area. Unsatisfactory conditions may require additional cleaning and air monitoring.

## 3.10 WASTE HANDLING AND TRANSPORTATION

A. Asbestos Waste Handling

1. As the Work progresses, to prevent exceeding available storage capacity on the Project site, sealed and labeled containers of Asbestos Containing Waste shall be removed and transported to the prearranged disposal location.

2. Waste disposal shall occur at an authorized site in accordance with regulatory requirements of NESHAP and applicable State and Local regulations.

3. Once the drums, bags, and/or wrapped components have been removed from the Work area, they shall be loaded into an enclosed truck for transportation.

4. Waste shall not be transported from the work are to the storage container or waste hauler's vehicle while students or staff are present in the path of travel. Where a path of travel cannot be cordoned off the movement of waste must be completed prior to or after the presence on site of students and staff.

5. Personnel loading Asbestos waste shall be protected with disposable clothing and at a minimum half-face, air purifying, dual cartridge respirators furnished with HEPA Filters.

## 3.11 TRANSPORTATION OF NON HAZARDOUS WASTE

A. Waste shall be containerized, labeled, and transported in accordance with federal, state, and local regulations.

B. Waste shall be transported under cover a non-Hazardous Waste manifest.

C. Containers shall be enclosed during transportation.

3.12 TRANSPORTATION OF HAZARDOUS WASTE

A. Dump receipts; trip tickets, transportation manifests, weight certificates or other documentation of disposal shall be delivered to the Owner Consultant within 48 hours of disposal. As the material and responsibility for the material changes hands, the generator or designee, the transporter(s), and the Disposal Site Operator shall sign the Uniform Hazardous Waste Manifest. If a separate waste hauler is employed, the name, address, U.S.E.P.A. ID number, and signature of the transporter shall also be affixed onto the manifest.

B. The enclosed cargo area of trucks or containers shall be free of debris and lined with 6 mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the sidewalls. Wall sheeting shall be overlapped and taped into place.

C. Drums shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural components shall be secured to prevent shifting, with bags placed on top.

D. Access openings on large metal containers, which are used for storing or transporting Asbestos waste, shall have doors and tops that can be closed and locked. Materials not properly bagged shall not be placed in these containers nor shall these containers be used for non-Asbestos waste or nonhazardous asbestos waste. Bags shall be placed, not thrown, into these containers to avoid damage.

3.13 MONITORING

A. Abatement Project Management and Inspection:

1. Owner has the right to perform air and performance monitoring at any time.

2. The Owner has unlimited access to the regulated and surrounding areas at times during progress of the Work, including, but not limited to, use of ladders, scaffolds, and other equipment required to gain access to the Work surfaces.

B. Work Area Monitoring:

1. Visual inspections and air testing may be performed at any time during the progress of the Abatement Work. Provide corrective measures as required to maintain the Work area in compliance with this Specification and regulatory requirements.

C. Contractor's Employee – Personal Air Monitoring:

1. Provide air monitoring as required California Code of Regulations, Title 8, Section 1529. Results shall be provided to the Owner Consultant within ten working days of sampling. Negative Exposure Assessments utilizing prior project monitoring require submittal of applicable data for approval before work proceeds.

D. Clearance Air Monitoring:

1. Following the completion of Abatement Work and clean up operations, lock down coat application, and visual inspection by the Owner, clearance air monitoring shall be performed by the Owner Consultant.

2. The Owner Consultant shall arrange for sampling of the air in the Abatement Work area for airborne fiber concentrations. Unauthorized interference or tampering with air sampling equipment may result in termination of the Contract and/or removal of the Abatement Contractor from the List of Prequalified Abatement Contractors.

3. If air-sampling results are within the limits of 40 CFR, Part 763, Subpart E (AHERA), the Abatement Work area shall be released for occupancy.

4. Areas failing clearance monitoring shall be cleaned as required in article 3.09, CLEAN UP PROCEDURES, and tested until satisfactory levels are provided in accordance with this Specification where required.

3.14 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS

A. Reestablishment of the Work area shall only occur following the completion of final inspection and clearance air monitoring.

B. Critical barriers shall be removed at this time.

C. Accompanied by the Owner Consultant, visually inspect the Abatement Work area for any remaining visible residue. Evidence of contamination will require additional cleaning requirements.

D. Install and secure Moveable Objects.

E. Relocate Moveable Objects that were removed to temporary locations back to their original positions.

F. Reestablish HVAC, mechanical, and electrical systems to the condition prior to commencement of the Work of this section.

G. Repair areas of damage deemed to be a result of the Abatement Work.

H. Restore the Work area and auxiliary areas utilized during the Abatement to conditions equal to or better than original. Any damage caused during the performance of Abatement Work, including, but not limited to, damage caused by tape, adhesive, staples, nails, water, Encapsulating Material, or any other material shall be repaired as required.

I. Prior to occupancy of a space following clearance monitoring, HVAC systems filters associated with the Work area shall be removed and disposed of as Asbestos waste. Decontaminate filter assembly and surrounding area with HEPA Vacuums and wet cleaning methods.

END OF SECTION

# SECTION 02 8216
# ASBESTOS ABATEMENT OF NON-FRIABLE FLOOR TILE

## PART 1 – GENERAL

### 1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division 01 apply to this section.

B. Section Includes:

1. Abatement of building and/or structure related Asbestos.

2. Disturbance of building and/or structure related Asbestos.

3. Attachment A.

C. Regulatory Requirements shall include, but not be limited to:

1. U.S. Environmental Protection Agency Regulations for Asbestos (Title 40, Code of Federal Regulations, Part 61, Subpart M, and Part 763, Subpart E.)

2. Title 8, Article 4, California Code of Regulations Construction Industry Safety Orders, Section 1529 "Asbestos" or current revised California regulations.

3. South Coast Air Quality Management District (SCAQMD) Rule 1403.

### 1.02 SECTION DEFINITIONS AND ACRONYMS

A. Abatement – Procedures to control fiber release from Asbestos Containing Materials or Asbestos Containing Construction Materials. Includes Removal, Encapsulation, Enclosures, Repair, Demolition, and Renovation activities but does not include Asbestos Related Disturbance.

B. AHERA - Asbestos Hazard Emergency Response Act, 40 CFR, Part 763, Subpart E, and subsequent amendments.

C. Air Filtration and Ventilation System - A portable exhaust system, equipped with HEPA filtration, and capable of maintaining a constant

air flow into a Regulated Area from adjacent areas and exhausted outside the Regulated Area.

D. Amended Water - Water to which a surfactant (wetting agent) has been added.

E. ANSI - American National Standards Institute.

F. Asbestos - Means the asbestiform varieties of chrysotile (Serpentine); crocidolite (Riebecktite); amosite (cummingtonitegrunerite); anthophyllite; tremolite; and actinolite.

G. Asbestos Containing Construction Material (ACCM) – Means any manufactured construction material which contains more than one tenth of one percent (0.1 percent) Asbestos by weight.

H. Asbestos Containing Material (ACM) – Means any material containing more than one-percent (1 percent) Asbestos.

I. Asbestos Containing Waste (Non-hazardous) – Non-Friable Asbestos Containing Material including, but not limited to, floor covering, roofing materials and cementitious materials requiring disposal.

J. Asbestos Containing Waste (Hazardous) – Friable Asbestos Containing Materials and Asbestos contaminated objects and debris requiring disposal.

K. Asbestos Related Disturbance – Is the drilling, coring, removal or similar disturbance of ACCM or ACM not to exceed three square feet in any one opening and not to disturb 100 square feet or greater cumulatively on any one project (contract).

L. ASTM - American Society for Testing and Materials.

M. Building ID Number or Code - A six digit alphanumeric identification code assigned to each building on an Owner site, also referred to as the insurance code, ID number or similar terms.

N. Bulk Samples - Samples of building or other materials collected for analysis to determine the presence and quantities of Asbestos.

O. Class I, II, III, and IV asbestos work has the meaning as defined in California Code of Regulations Title 8, Section 1529.

P. Clean Room - An uncontaminated area or room, which is a part of the

worker Decontamination Enclosure System with provisions for storage of worker's street clothes and clean protective equipment.

Q. Competent Person - Has the same meaning as defined in the California Code of Regulations Title 8, as it relates to, "Competent Person."

R. Controlled Disturbance – An activity by which a contractor disturbs an asbestos containing material or an asbestos containing construction material using the work practices allowed for in this specification and in compliance with regulatory limitations.

S. Curtained Doorway – A device to allow ingress and egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Other effective designs may be submitted for review.

T. Decontamination – The process of eliminating Asbestos contamination from building surfaces, objects, and property, by cloths, mops, or other utensils dampened with water and disposed of afterwards as Asbestos contaminated waste.

U. Decontamination Enclosure System – Means an enclosed area, which is adjacent and connected to the Regulated Area, consisting of an Equipment Room, Shower Room, and Clean Room for the Decontamination of workers, materials, and equipment contaminated with Asbestos.

V. Demolition - The wrecking or taking out of any load supporting structural member of a facility together with any related handling operations.

W. DOSH - Division of Occupational Safety and Health or Cal/OSHA.

X. DOT – Department of Transportation.

Y. DTSC – Department of Toxic Substances Control.

Z. Encapsulating Material - A liquid material applied to Asbestos Containing Materials which controls the possible release of Asbestos fibers from the material either by creating a membrane over the surface (bridging agent) or by penetrating into the material and binding

its components together (penetrating Encapsulating Material).

AA. Encapsulation - The application of an Encapsulating Material to Asbestos Containing Materials to prevent the release of Asbestos fibers into the air.

BB. Enclosure - The construction or application of an airtight, impermeable, permanent barrier around Asbestos Containing Material to control the release of Asbestos fibers into the air.

CC. Equipment Room - A room within the worker Decontamination Enclosure System with provisions for storage of used clothing and equipment and for controlled transfer of materials and equipment into and out of the regulated area.

DD. Facility Component – Means any part of a facility including equipment.

EE. FETU – Facilities Environmental Technical Unit.

FF. Fixed Object - A piece of equipment, furniture, or improvement in the Work area, which cannot be removed from the Work area.

GG. Friable Asbestos - Asbestos Containing Material which, when dry, can be crumbled, pulverized or reduced to a powder by hand pressure or as defined by current regulations.

HH. Glove Bag Technique - A method with limited applications for removing small amounts of Asbestos Containing Material from short piping runs, valves, joints, elbows, and other non-planar surfaces in a Work area. The glove bag assembly is a manufactured or fabricated device consisting of a glove bag (typically constructed of 6 mil transparent polyethylene or polyvinyl chloride plastic), two inward projecting long sleeves gloves, an internal tool pouch, and labeled for Asbestos waste. The glove bag is constructed and installed in such a manner that it surrounds the object or material to be removed and contains all Asbestos fibers released during the process. All workers who are permitted to perform the Glove Bag Technique shall be thoroughly trained, experienced, and skilled in this method.

II. Hazardous Waste - Means Friable Asbestos generated and prepared for waste disposal. Does not include non-friable material or materials containing one-percent or less of Asbestos as determined by PLM and/or the point counting method.

JJ. HEPA Filter - Means a filtering system capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles 0.3 microns in diameter or larger. For respirators this shall include NIOSH rated P-100 cartridges only.

KK. HEPA Vacuum - A vacuum system furnished with HEPA filtration.

LL. High Volume Vacuum - A vacuum system with the capacity to collect material through a four inch diameter hose a minimum distance of 150 feet. This system shall be furnished with HEPA Filter at the air exhaust port and water applicators within the hopper.

MM. HVAC – Heating, Ventilation, and Air Conditioning System.

NN. Location Code - Refers to a unique four digit numeric code assigned by the Owner to each of its Project sites.

OO. Lockdown Coat – A material applied to surfaces where Asbestos has been completely removed. The manufacturer shall determine the concentration of this material.

PP. Member – A component part of a structure complete in itself.

QQ. Movable Object - A portable piece of equipment or furniture in the Work area, which can be removed from the Work area.

RR. NESHAP - National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61).

SS. NIOSH - National Institute for Occupational Safety and Health.

TT. Outside Air - Air outside of buildings and structures.

UU. Owner Consultant (OC) - Refers to the firm, company or individual designated by the Owner.

VV. PCM - Phase Contrast Microscopy as it relates to clearance air, personnel exposure assessment, and ambient air monitoring. This procedure must follow the NIOSH Method 7400, Asbestos Fibers by PCM.

WW. PLM - Polarized Light Microscopy used for bulk sample analysis with dispersion staining for the determination and quantifying of Asbestos in Bulk Samples building materials.

XX. Regulated Area - Designated rooms, spaces or areas of the Project in which asbestos Abatement actions are to be performed or which may become contaminated as a result of Abatement activities. A contained Work area is a Work area, which has been sealed and furnished with a Decontamination Enclosure System. A non-contained Work area is an isolated or controlled access Work area, which has not been sealed or furnished with a Decontamination Enclosure System.

YY. Removal – Means all operations where all ACM and/or PACM is removed or stripped from structures or substrates including Demolition.

ZZ. Renovation – Means the modifying of any existing structure, facility, or portion thereof.

AAA. SCAQMD – South Coast Air Quality Management District.

BBB. Shower Room - A room between the Clean Room and the Equipment Room in the worker Decontamination Enclosure System furnished with hot and cold running water controllable at the tap, and suitably arranged for complete showering during Decontamination.

CCC. Small Scale Short Duration – Such work not to exceed amounts greater than those which can be contained in a single glove bag or may not exceed amounts greater than those which can be contained in a single prefabricated mini-enclosure. Such an enclosure shall conform spatially and geometrically to the localized work area, in order to perform its intended containment function, and as completely defined in 40CFR, 763, Subpart E, Appendix C, Asbestos Model Accreditation Plan, section 8, a thru j.

DDD. Staging Area - Areas near the Waste Transfer Airlock where containerized Asbestos waste is temporarily placed prior to permanent removal from the Work area.

EEE. Surfactant - A chemical wetting agent added to water.

FFF. TEM - Transmission Electron Microscopy as defined for Asbestos clearance air monitoring within AHERA. This procedure must follow the NIOSH Method 7402, Asbestos Fibers by TEM.

GGG. TSI - Thermal System Insulation as defined in AHERA.

HHH. USEPA or EPA – United States Environmental Protection Agency.

III. Visible Emissions - Any emissions from a known or suspected Asbestos Containing Material that is visually discernible.

JJJ. Waste Transfer Airlock - A Decontamination system provided for transferring containerized waste from inside to outside of the Work area.

1.03 POLICIES AND PROCEDURES

A. The Owner has a zero tolerance policy for uncontrolled Asbestos releases during construction or Abatement Work. An Asbestos release requiring an emergency response is any uncontrolled release of Asbestos Containing Construction Materials. The Owner shall be immediately notified of all such uncontrolled releases.

B. Pre-qualified Asbestos Abatement Subcontractors are not permitted to subcontract any Abatement work to a lower tier Subcontractor without the prior written approval of the Owner.

C. Where ACM is damaged or disturbed, except during Controlled Disturbance or Abatement, all Work in that room shall cease, the room be vacated immediately, the Owner Consultant notified of the disturbance with corrective action provided as required by the Owner Consultant.

D. The following requirements shall be a part of the contract in conformance with Rule 1403 of the South Coast Air Quality Management District and Title 8, of the California Code of Regulations.

E. The asbestos-containing floor tile materials located in areas identified in the scope of work of this contract have been sampled, tested, and found to be a Class I non-friable asbestos-containing material under the provisions of Rule 1403, and contain greater than 0.1 percent asbestos as defined in the California Code of Regulations.

F. The following requirements apply to the notification, certification, work area preparation, removal, transportation, disposal, cleanup and clearance monitoring of non-friable asbestos-containing floor tile materials. The language herein shall not be construed to conflict with, or supersede any regulatory requirements in the law.

1.04 ROLES AND RESPONSIBILITIES

A. Roles and Functions:

1. Coordinate the Work of this section directly with the Owner and/or Owner Consultant.

2. All Work under this section shall be performed in strict accordance with all applicable Federal, State, and Local regulations, standards, and codes governing asbestos Abatement and any other Work performed in conjunction with the Asbestos Abatement Work.

3. The most recent edition of any relevant regulation, standard, document, or code is in effect. Where conflict among the requirements or with this Specification exists, the most stringent requirement shall be provided.

1.05 NOTIFICATION

A. Contractor shall be responsible for notifying AQMD as required by Rule 1403, and notice to the Division of Occupational Safety and Health and pay any related fees as required. A copy of these notifications shall be provided to the District prior to the start of work. If the site involved in this contract is located within the city limits of Los Angeles, a copy of the notification shall be sent to the Los Angeles City Fire Department (LAFD), marked courtesy copy. No fees to the LAFD are required for LAUSD projects.

1.06 CERTIFICATION

A. All employees involved in the removal of asbestos-containing materials in schools, whether friable or non-friable, shall be accredited as required by AHERA (40CFR, Part 763, Subpart E).

B. Each worker is required to have, at a minimum, a current certificate documenting asbestos worker accreditation.

C. The lead/competent person shall be designated by name, be on the site at all times during the abatement process, and shall have a certificate documenting contractor/supervisor accreditation.

D. The lead/competent person shall be responsible for ensuring all regulations, procedures, and contractual requirements pertaining to asbestos-containing material removal are strictly adhered to while performing the work required by this contract.

E. If more than one shift will be worked and more than one lead/competent person will work on this project, all shall be designated

by name, and at least one of these shall be on the site at all times during the abatement process.

1.07 PERSONAL PROTECTION

A. All persons entering the work area shall be required to wear, at a minimum, protective clothing and respiratory protection.

B. Respiratory protection shall be sufficient to protect employees from the determined concentration of asbestos in the work area as required by Title 8 of the California Code of Regulations, but never less than a half-face negative pressure respirator with dual P-100 HEPA filtered cartridges.

C. Hand and eye protection shall be worn when activities warrant it, including, but not limited to removal of "pop-ups" from the concrete.

1.08 WORK AREA PREPARATION

A. Shut off all air handling systems, where possible, within or affecting the area of containment, without disrupting use of other occupied areas of the building, or modify the system so as to restrict any source of air movement into or out of the work area through the air handling system.

B. Remove from the work area all objects not fastened to the structure prior to the commencement of area isolation. This includes, but is not limited to, items hanging from ceilings or walls. Boxes, equipment, etc., removed from the work area shall be stored as directed by the District Representative.

C. Unless otherwise specified, all baseboards, base shoe or toe kick covering floor tile shall be removed. Care shall be taken to prevent damage to the base. Fasteners shall be removed from the base. Base removed shall be marked with the room number and wall from which it was removed, and stored in a secure location as directed by the District representative. Upon clearance and tear down of isolation all base listed above shall be returned to the room from which these were removed.

D. Clean and cover with an airtight seal all porous, dropped, or perforated ceilings, stationary objects, doors, windows, vents, air circulating units, and registers (where the air handling system is turned off), in the work area, with 6-mil polyethylene sheeting, sealed around all edges.

This does not include the opening for ingress and egress of the isolated work space.

E. Cover all wall surfaces six (6) feet from the floor down to a maximum of two inches above the floor. Wall coverings shall be, at a minimum, one layer of 4-mil minimum thickness polyethylene sheeting. The integrity of the sheeting and the seals shall be maintained at all times until clearance is given to remove isolation.

F. Construct a dual chamber mini-enclosure with weighted flaps made of polyethylene sheeting at each passage opening including the separation in the center. The mini-enclosure shall be of at least sufficient size for comfortable changing of clothing without disrupting the flap seal.

G. Seal the mini-enclosure to the entrance sheeting in such a manner that the wall covering in the work area can be taken down at a later time without disturbing the seal of the mini-enclosure.

H. Enclosure installation shall not interfere with the closing and securing of any door. The door(s) shall be locked at the end of the workday.

1.09 REMOVAL

A. Adequately wet the surface area to be removed with amended water initially and continually during the entire removal and waste packaging process. This shall be applied with an airless sprayer at a low pressure setting.

B. Only manual pry bars, scrapers, and chisels or similar tools shall be used to remove these materials. Every effort shall be made to loosen the flooring material with the least breakage or chipping possible. If excessive breakage is unavoidable, the tile may be heated with electric heat guns to facilitate removal with limited breakage. Ground fault interrupters shall be used with electrical devices.

C. Combustible products including, but not limited to, adhesive removing chemicals or solvents shall not be permitted within a school building for use on this type of work.

D. Flooring shall be removed in small manageable sections and debris shall be cleaned and containerized before proceeding with the next section. A manageable section in this requirement is defined as an abatement area that can be cleaned and containerized as removal

occurs. All containers shall be removed from the work area to the storage facility by the end of the shift.

E. All excess material, backing, and/or adhesive on the floor surface shall be scraped off while applying amended water. Bonded residues from the adhesive may remain but all three dimensional ridges and accumulations shall be removed. No petroleum or citrus-based materials shall be applied to the floor for any purpose.

F. "Pop-ups" (rock explosions) and raised concrete on floors shall be removed by hammering while applying amended water. Do NOT sand, grind, shot peen or sandblast adhesive or mastic. Do NOT dry scrape.

G. The use of mechanical systems including, but not limited to, bead blasters are not permitted without written approval by the Facilities Environmental Technical Unit.

1.10 CLEANING AND CLEARANCE

A. Gather remaining water and debris on the floor surface using a floor squeegee or similar tool. Do NOT use tools that can cause fibers to be rendered airborne, such as brooms, blowers, etc.

B. Place the debris in clear 6-mil polyethylene bags. Seal all bags by "goose-neck" twisting and taping. All waste bags shall be labeled as required by SCAQMD, Rule 1403.

C. Clean all surfaces within the work area by HEPA vacuuming, wet mopping, or wiping with amended water.

D. Dustpans, squeegees, shovels, etc., shall be non-metallic. No brooms shall be permitted for abatement purposes.

E. Once the area is cleaned, that is, there is no visible residue or debris as determined by the authorized District representative, a continuous coat of post removal lock-down material shall be applied to the removal substrate. It is the responsibility of the contractor to ensure the compatibility of the lock-down material with the replacement material to be applied on the substrate.

F. All over spray on walls, floor base, molding, etc. shall be removed while the lock-down material is wet.

G. After the lock-down material settles and dries, the wall sheeting shall be removed, placed in 6-mil waste bags labeled in accordance with current local, State and Federal regulations and transported to the storage or waste container. Clean any residual debris that may exist from surfaces under the sheeting by wet wipe and HEPA vacuuming. The owner shall be notified when this has been accomplished.

H. An inspection of the work area by the authorized owner representative shall be performed. If the area fails to pass the visual inspection the contractor shall be required to re-clean the work area and, at the discretion of the authorized District representative, apply an additional lock-down coat in the work area.

I. The contractor shall be responsible for costs incurred by the owner for additional inspections and clearance air monitoring resulting from a failure or failures to pass the clearance air testing.

J. Only after clearance is provided by the owner's authorized representative may the critical barrier sheeting and mini-enclosure be removed, sealed in 6-mil polyethylene waste bags, and placed in the disposal container.

1.11 TRANSPORTING AND DISPOSAL

A. The storage/transportation container for the waste generated from floor removal shall be lockable and fully enclosed.

B. Contractor shall transport the waste material from the work area to the disposal bin or waste container in an enclosed container (drum, carboy, plastic bags, etc.). At no time shall the Contractor transport the waste to the container while students and staff are occupying the route to the container.

C. The contractor shall comply with regulations of the Department of Transportation, Department of Health Services and all other regulatory agencies as it pertains to labeling, transporting and disposal of friable and non-friable asbestos-containing waste.

D. The floor tile waste shall be disposed of as a non-friable/non-hazardous asbestos-containing waste at a landfill approved to accept such waste. Before waste is removed from the site, the contractor shall notify the owner of the landfill to be used, indicating the name and address. The contractor shall comply with all requirements and

regulations enforced or imposed by the landfill in the course of disposing waste generated from a site.

E. The contractor shall provide and complete the NON-hazardous waste manifest for transporting this waste.

F. Waste, including used personal protective equipment and isolation materials, shall be disposed of as hazardous waste. A hazardous waste manifest shall be submitted to the owner upon transport and disposal of this waste.

1.12 GENERAL REQUIREMENTS

A. Licensing and Registration: The contractor shall provide the owner with written proof of asbestos certification as required by the Contractor State License Board and registration with the Division of Occupational Safety and Health.

B. Product Compatibility: Provide written approval from the manufacturer of replacement materials indicating its compatibility with the encapsulating material to be used. A list of encapsulating materials that have been tested and approved for use on projects and have been approved for compatible use by floor covering adhesives manufacturers, is attached.

C. Training Certification: Certificates documenting current AHERA accreditation for all workers and competent/lead persons shall be provided prior to the start of any work. Contractor shall provide a copy of each certificate for all workers arriving on sites for the purpose of working on setup, removal or cleanup of the floor tile removal project. Any worker arriving without a certificate will be denied access to work on the project until a current certificate is provided. Each certificate shall require review and approval by the owner before the individual employees of the contractor are permitted to work on the project.

D. Medical and Respiratory Clearance: All persons entering the work area are required to have been medically tested and approved to wear respiratory protection and to work in an asbestos contaminated environment. Documentation of this approval is required prior to entry into the work area.

E. Fit Testing: All persons required to wear respiratory protection shall be fit tested as required by the Title 8 CCR. Documentation of fit testing shall be provided prior to entry into the work area.

F. Plastic Sheeting Requirements: All polyethylene sheeting, plastic or visqueen to be used in the performance of this contract shall be virgin grade (with no holes) and a fire retardant type. Abatement contractor shall provide documentation from the manufacturer verifying this requirement.

G. First Aid and CPR: At least one employee of the Contractor trained and certified in first-aid and CPR is required to be on the site for the duration of the project.

H. Maintenance of Working Area: The contractor shall keep the working area sufficiently clear of equipment, material, and implements of service to prevent endangering persons and damage to property and to avoid an unsightly condition. Removal of such items shall be performed promptly upon completion of work. The contractor shall not use facilities for disposal of debris and waste material, whether hazardous or non-hazardous, or asbestos-containing or non-asbestos-containing.

I. Storage of Materials: The contractor shall confine the storage of material and equipment on site to the area designated by the owner's representative.

J. Safety and Security:

1. Comply with all laws, ordinances, rules and regulations applicable to the work.

2. Provide adequate protection for all persons and all property within the working area or approaches thereto, and shall furnish and erect temporary barricades where necessary.

3. Upon entering a school site with a vehicle, the contractor, contractor's employees, subcontractors or their agents shall not drive on school premises while children are present, shall have a guide employed by the contractor to walk ahead of the vehicle in the path of the vehicle while the vehicle moves at a slow and careful speed to ensure no injury or damage occurs, and the guide shall remain with the vehicle until the motor has been turned off and the parking brake has been set.

K. Work Schedules and Coordination: The contractor shall plan a schedule of work with the owner's representative to provide vacated areas while work is in progress. Care shall be exercised by the contractor to minimize the inconvenience and danger to students and personnel.

L. Access: The contractor, its employees, subcontractors, or other representatives, have no tenancy and shall be admitted to the grounds only for the proper execution of the work under this contract.

M. Workmanship and Labor: All employees of the contractor, subcontractors or other representatives, shall be skilled in the type of work for which they are employed on this project and shall work under direction of competent superintendent. Should the owner deem anyone employed in the work incompetent or unfit for their duties, the contractor shall remove such employee from the work and shall not reemploy them on work within this project or any other project without written permission.

N. Fees, Permits, Licenses, Patents, Royalties and Payment Thereof: The contractor and contractor's employees and agents shall secure and maintain in force such licenses and permits as are required by law and shall conform to all Federal, State, and local laws, ordinances, and regulations covering the work under the contract. All operations and materials shall be in accordance with applicable laws, ordinances, and regulations.

O. Billing: All work performed under this contract shall be invoiced in triplicate and delivered to the project manager.

P. Definitions:

1. For purposes of this contract, amended water is water with the addition of a surfactant, or wetting agent that provides a surface tension of 29 dynes/cm as tested using ASTM method D1331, Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface-Active Agents. All such wetting agents shall be approved before application. Supply technical data sheets and material safety data sheets.

2. Owner's representative are the person or persons under whose direction the service shall be performed shall be of the Los Angeles County Public Works and assigned agents including the Asbestos Technical Supervisor.

3. Unless indicated otherwise in these documents, regular working hours for performance of any work under this contract shall be Monday through Friday, 7:00 A. M. To 5:00 P. M., excluding holidays.

1.13 CLOSE-OUT DOCUMENTS

A. Provide the following close out documentation:

1. Filter change logs for all air filtration units (where applicable), water filtration units, and respirators.

2. Foreman's daily job reports.

3. Employee entry/exit logs for all containments.

4. Visitor entry/exit logs for all containments.

5. Manometer printout reports for all applicable containments.

6. Air sample results for personal monitoring or workers.

7. Air Samples for Abatement Work areas, and air filtration units (where applicable).

8. Copies of all Hazardous and Non-Hazardous Waste Manifests.

9. All Hazardous Waste weight tickets.

10. All signed Daily Personnel Report Forms.

11. Signed code of conduct form from each employee working on a Project.

12. Signed asbestos Abatement Project Personnel Logs.

B. Receipt of the last workday attendance log and the daily personal monitoring results shall be submitted within two days upon completion of the Abatement Work of this section.

1.14 LEAD RELATED DISTURBANCE

A. “Renovation, repair or painting work performed on buildings constructed prior to 1978 require special handling and environmental monitoring when coated surfaces including, but not limited to, painted,

varnished, and glazed surfaces are impacted. Coated surfaces applied prior to 1978 are assumed to be lead-based. All work shall be performed in compliance with Facilities Standard Specification, Section 02 8333, "Lead Abatement and Lead Related Construction Work." XRF testing methodology is not acceptable in determining negative for lead content for Cal/OSHA compliance purposes, except for notification requirements. XRF may be used in determining lead-based paint for compliance with the U.S.E.P.A. Renovator, Repair, and Painting Rule. Disturbance of coated surfaces by contractors will be monitored by qualified staff or Environmental Consultant sufficient to ensure that proper training and work procedures, cleanup, and waste handling are employed."

B. All loose and flaky paint or coating that will or may be disturbed in the course of completing the scope of work shall be stabilized prior to abatement setup.

PART 2 – PRODUCTS

2.01 LOCK-DOWN PRODUCTS

A. The following products have been approved for use as an encapsulant/lock-down material on projects, as well as compatible with replacement materials.

1. Fiberset PM 7475 clear by Fiberlock Technologies, Inc., compatible with flooring.

2. Fiberset PM 7470 white by Fiberlock Technologies, Inc., compatible with flooring.

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 02 8333

LEAD ABATEMENT AND LEAD RELATED CONSTRUCTION WORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Abatement, Lead Related Construction Work or painting of lead-containing materials and/or Lead Based Paint.

2. Transportation and disposal of lead-containing materials and/or Lead Based Paint.

B. Related Requirements:

1. Section 02 2600 – Abatement of Hazardous Materials.

2. Division 01 - General Requirements.

3. Cal/OSHA Title 8, California Code of Regulations (CCR).

4. California Air Resources Board Ambient Air Quality Standard, Title 24 CCR.

5. California Department of Public Health, Title 17, CCR.

6. Cal/EPA, Title 22 CCR.

7. California Labor Code, Division 5, Part 1, as it pertains to safety in employment and with the applicable provisions of the Title 8, CCR as it pertains to Occupational Safety and Health in the work place.

8. Environmental Protection Agency, 40CFR, Part 745.

9. UD – Title X, Residential Lead-Based Paint Hazard Reduction Act of 1992.

10. Los Angeles County Public Health Code (Chapter 11).

1.02 DEFINITIONS AND ACRONYMS

A. AAS - Atomic Absorption Spectrophotometry used for lead paint chip and dust wipe sample analysis.

B. Abatement – Any set of measures designed to reduce or eliminate lead hazards or Lead Based Paint for public buildings but does not include containment or cleaning.

C. Action Level – Means the Action Level as defined in Title 8, California Code of Regulations, Section 1532.1.

D. ANSI – American National Standards Institute.

E. ASTM – American Society for Testing and Materials.

F. Building ID number or code (Maximo) – A six digit alphanumeric identification code assigned to each building on an Owner site, also referred to as the insurance code, ID number or similar terms.

G. Certificate – Means the document issued by CDPH to an individual meeting the certification requirements as described in CCR Title 17, Sections 35083, 35085, 35087, 35089, or 35091.

H. Clean Room – An uncontaminated area or room which is a part of the worker Decontamination Enclosure System with provisions for storage of worker's street clothes and clean protective equipment.

I. Clearance Inspection – Means visual examination and, as applicable, collection of environmental samples upon completion of the Work of this section.

J. Component – Means a structural element or fixture, including but not limited to, walls, floors, ceilings, doors, window molding, trim, trestles, tanks, stairs, railings, cabinets, gutters, or downspouts.

K. Curtained doorway – A device to allow ingress and egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an exiting or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Other effective designs may be submitted for review.

L. Decontamination – The process of eliminating lead contamination from building surfaces, and property by cloths, mops, or other utensils dampened with water and disposed of as lead contaminated waste.

M. Decontamination Enclosure System – A minimum a two-stage Decontamination unit consisting of a compartment for Decontamination, and a Clean Room. Unless otherwise specified, it shall be adjacent to the Abatement area.

N. Demolition – The wrecking or taking out of any load supporting structural member of a facility together with any related handling operations.

O. Deteriorated Lead Based Paint – Means Lead Based Paint or a surface coating that is cracking, chalking, flaking, chipping, peeling, non-intact, failed, or otherwise separating from the substrate to which it is applied to.

P. CDPH– California Department of Public Health.

Q. CDPH-Approved Course – Means any lead construction course that satisfies the requirements specified in CCR Title 17, Sections 35056, 35061, 35066, or 35067 as determined by CDPH pursuant to Sections 35076 and 35078.

R. DOSH – California Division of Occupational Safety & Health or Cal/OSHA.

S. DOT – Department of Transportation.

T. DTSC – California Department of Toxic Substances Control.

U. Encapsulating Material – Are coatings or rigid materials adhesively applied to Lead Based Painted surfaces in the Encapsulation process.

V. Encapsulation – The application of an Encapsulating Material to Lead Based Paint to provide a barrier between the Lead Based Paint and the environment.

W. Enclosure – A rigid durable barrier mechanically attached to building Component, with edges and seams sealed with caulk or other sealant.

X. EPA; Renovation, Repair and Painting (RRP) – Means a lead-related construction course that satisfies the requirements specified in 40 CFR, Part 745, Section 745.90.

Y. FETU – Facilities Environmental Technical Unit.

Z. Firm – Means a company, partnership, corporation, sole proprietorship or individual doing business, association, or other business entity; a Federal, State, Tribal, or local government agency; or a nonprofit organization and satisfies the requirements specified in 40 CFR, Part 745, Section 745.89.

AA. Fixed Object – A piece of equipment, furniture, or improvement in the Work Area, which cannot be removed from the Work Area.

BB. Hazardous Waste – Means any waste stream determined by an Owner approved laboratory to exceed the regulatory thresholds for lead hazardous waste.

CC. HEPA Filter – Means a filtering system capable of trapping and retaining at least 99.97 percent of mono-dispersed particles 0.3 micrometers in diameter or larger.

DD. HEPA Vacuum – A vacuum system furnished with HEPA filtration.

EE. HUD – United States Department of Housing and Urban Development

FF. HVAC – Heating, Ventilation, and Air Conditioning system.

GG. ICP-AES – Means Inductively Coupled Plasma-Atomic Emission Spectroscopy used for heavy metal analysis, including lead.

HH. Lead Based Paint – Means paint or other surface coatings that contain an amount of lead equal to or greater than 0.7 milligrams per square centimeter (0.7 $mg/cm^2$) or equal to or greater than 0.5 percent by weight.

II. Lead Containing Paint – Means paint or other surface coatings that contain lead in an amount equal to or greater than 0.06 percent lead dry weight (600 ppm) but does not meet the definition of Lead Based Paint. In the absence of paint chip or surface coating bulk sample results, any surface coating shall be assumed to be above 0.06 percent lead dry weight (600 ppm) until surface coating samples are collected and analyzed that indicate

otherwise. Lead concentration shall be determined by a method that has an accuracy of not less than plus or minus 25 percent at 0.06 percent lead dry weight, to a confidence level of 95 percent.

JJ. Lead Contaminated Dust – Means dust that contains an amount of lead equal to, or greater than, forty micrograms per square foot (40 $\mu g/ft^2$) for interior floor surfaces; two hundred and fifty micrograms per square foot (250 $\mu g/ft^2$) for interior horizontal window surfaces; and eight hundred micrograms per square foot (800 $\mu g/ft^2$) for exterior floor and exterior horizontal window surfaces.

KK. Lead Contaminated Soil – Means bare soil that contains an amount of lead equal to, or greater than, four hundred parts per million (400ppm).

LL. Lead Hazard – Means deteriorated Lead Based Paint, Lead Contaminated Dust, Lead Contaminated Soil, the disturbance of Lead Based Paint or Presumed Lead Based Paint without containment, or any other operation that may result in persistent and quantifiable lead exposure.

MM. Lead Inspection – Means a surface by surface investigation to determine the presence of Lead Based Paint as described in Chapter 7: Lead Based Paint Inspection, " Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing," U.S. Department of Housing and Urban Development, 1997 Revision.

NN. Lead Related Construction Work – Means any construction, alteration, painting, Demolition, salvage, Renovation, repair, or maintenance of any residential or public building, including preparation and cleanup that, by using or disturbing lead-containing material or soil, may result in significant exposure of adults or children to lead.

OO. Lead Safe Schools Program – Means the training program for lead safe working practices as developed by the Labor Occupational Health Program at U.C. Berkley.

PP. Location Code (Maximo) – Refers to a unique four digit numeric code assigned by the Owner to each of its Project sites.

QQ. Member – A Component part of a structure complete in itself.

RR. Movable Object – A piece of portable equipment or furniture in the Work Area, which can be removed from the Work Area.

SS. NESHAP – The National Emission Standards for Hazardous Air Pollutants (40 CFR Part 50.12).

TT. NIOSH – The National Institute for Occupational Safety and Health.

UU. Owner Consultant (OC) – Refers to the firm, company or individual designated by the Owner.

VV. Painting Contract – For purposes of this section, a painting contract is a Contract with the Owner to perform painting on existing facilities where Lead Based Paint, Lead Containing Paint, Presumed Lead Based or Presumed Lead Containing Paint will be disturbed or abated.

WW. P.E.L. – Means permissible exposure limits as defined in Title 8, California Code of Regulations, Section 1532.1.

XX. Plasticize – To cover floors, walls, and equipment with plastic sheeting as specified herein.

YY. Portable Mechanical Ventilation System – A portable exhaust system furnished with HEPA filtration and capable of providing a constant air flow into regulated Work Area from adjacent areas and exhausted outside the regulated area.

ZZ. Presumed Lead Based Paint – Means paint or surface coating affixed to a Component in or on a structure, excluding paint or surface coating affixed to a Component in or on a residential dwelling constructed on or after January 1, 1979, or a school constructed on or after January 1, 1993.

AAA. Removal – Means operations where Lead Based Paint is removed or stripped from structures or substrates including Demolition.

BBB. Renovation – Means the modifying of any existing structure, facility, or portion thereof.

CCC. Replacement – Means Removal of an entire building Component coated with Lead Based Paint and replacing it with a lead free Component.

DDD. SCAQMD – South Coast Air Quality Management District.

EEE. STLC – Means Soluble Threshold Limit Concentration used in the State of California in conjunction with TTLC to determine lead hazardous waste limits. If the STLC result is equal to or exceeds 5 mg/L the waste is deemed to be hazardous.

FFF. Surfactant - A chemical wetting agent added to water.

GGG. TCLP – Means Toxicity Characteristic Leaching Procedure used to determine the federal Resources Conservation Recovery Act (RCRA) lead hazardous waste limits. If the results equal or exceed 5 mg/L the waste is deemed to be hazardous.

HHH. TTLC – Means Total Threshold Limit Concentration used in the State of California in conjunction with STLC to determine lead hazardous waste limits. If the results are equal to or exceeds 1000 mg/kg, the waste is deemed to be hazardous.

III. Visible Emissions – Any emissions from a known or suspected lead-containing material that is visually discernible.

JJJ. Wet Cleaning – The process of eliminating lead contamination from building surfaces and/or objects by cloths, mops, or other utensils dampened with amended water and afterwards being disposed of as hazardous waste.

KKK. Work Area – Means an area where known or Presumed Lead Based Paint is disturbed or Abatement is conducted.

LLL. X-Ray Fluorescense (XRF) Analyzer – Means a direct reading instrument that determines the lead content of the surface coatings in milligrams per square centimeter ($mg/cm^2$) using the principle of x-ray fluorescence.

1.03 POLICIES AND PROCEDURES

A. The Owner has a zero-tolerance policy for uncontrolled lead releases during Lead Related Construction Work, Lead Containing Paint disturbance, or Abatement activities. A lead release requiring an emergency response is any disturbance resulting in the uncontrolled release of lead containing materials. Upon observation of any visual emissions, immediately stop the Work, vacate the Work Area, and provide written notification to the Owner Consultant.

B. Pre-qualified Abatement Subcontractors are not permitted to subcontract any Abatement Work to a lower tier Subcontractor without the prior written approval of the Owner.

C. Do not furnish a reduced pressurization and filtration system in violation of, or in infringement upon, any patent.

D. Owner Consultant shall provide oversight for Projects that have the potential to disturb lead containing or Lead Based Paint. Prior to the commencement of such Work, provide written notification to the Owner Consultant.

E. The following paragraph regarding impacts to coated surfaces shall be part of the contract:

1. "Renovation, repair or painting work performed on buildings constructed prior to 1978 require special handling and environmental monitoring when coated surfaces including, but not limited to, painted, varnished, and glazed surfaces are impacted. Coated surfaces applied prior to 1978 are assumed to be lead-based. All work shall be performed in compliance with Specification, Section 02 8333, "Lead Abatement and Lead Related Construction Work." XRF testing methodology is not acceptable in determining negative for lead content for Cal/OSHA compliance purposes, except for notification requirements. XRF may be used in determining lead-based paint for compliance with the U.S.E.P.A. Renovator, Repair, and Painting Rule. Disturbance of coated surfaces by contractors will be monitored by qualified District staff or Environmental Consultant sufficient to ensure that proper training and work procedures, cleanup, and waste handling are employed."

1.04 COORDINATION

A. Coordinate the Work of this section directly with the Owner and/or Owner Consultant.

1.05 SITE SECURITY

A. The Work Area is restricted to authorized, trained, and protected personnel. A list of authorized personnel shall be established and posted at the entrance of the Work Area by the Owner Consultant prior to commencement of the Work.

B. Report to the Owner Consultant any unauthorized entry into the Work Area. Following notification, a written report of the incident shall be provided to the Owner Consultant.

C. A logbook shall be maintained at the entrance of the Work Area. Persons entering the Work Area shall record name, company affiliation, time in, and time out for each entry and exit.

D. Access to the Abatement Work Area shall be through the Decontamination Enclosure System only. Other means of access shall be blocked or locked so as to prevent entry to or exit from the Work Area. Emergency exits shall be operable from inside the Work Area.

E. Maintain Work Area security during Abatement and/or Lead Related Construction Work. Work Areas and ancillary equipment accessible to non-authorized personnel shall be protected from unauthorized access by constructing a minimum barrier of 3/8 inch CDX plywood supported by 2 by 4 studs, 16 inches on center. An access door shall be provided with hasp and padlock sufficient to prevent unauthorized entry. A key shall be provided to the Owner and Owner Consultant. Required barriers within an occupied building shall be furnished with sheathing as required by state and local fire protection regulations.

F. Remove barriers upon the completion of the Work of this section and unless otherwise specified, repair and/or replace to its original condition, damage resulting from installation, use, and removal of the barriers.

1.06 EMERGENCY PLANNING

A. Emergency planning and procedures shall be developed, submitted, reviewed, and agreed to by the Owner Consultant prior to the commencement of lead-related construction and/or Abatement Work.

B. Emergency procedures shall be provided in the written languages understood by employees working on the Project and shall be prominently posted at the entrance of the Decontamination Enclosure System. Prior to entering the Work Area, parties must read and sign these procedures to acknowledge receipt and understanding of the Work Area layout, location of emergency exits, and emergency procedures.

C. Emergency planning shall consider the effects of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces, and heat related injury. Develop and provide written procedures and training to employees.

D. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

E. In the event of non-life threatening situations requiring medical treatment, injured or otherwise incapacitated employees shall decontaminate following normal procedures with assistance from fellow workers if necessary, before exiting the Work Area.

F. In the event of life threatening injury or illness requiring immediate medical treatment, worker Decontamination shall be given minimum priority. Provide measures to stabilize the injured worker remove them from the Work Area and secure proper medical treatment.

G. Telephone numbers of emergency response personnel shall be prominently posted at the entrance of the Decontamination Enclosure System along with the location of the nearest telephone. In addition to the 911 emergency number, post the address and telephone number of the nearest emergency medical services provider.

H. Provide at least one employee on the Project site at times during progress of the Work that is trained and certified in first aid and cardiopulmonary resuscitation (CPR). This employee shall be identified by name and proof of training shall be provided to the Owner Consultant prior to the commencement of the Work of this section.

I. Provide at least one 4A/60BC dry chemical extinguisher in the Decontamination compartment. Workers shall be trained in the proper operation of fire extinguishers.

J. Emergency exits shall be provided and clearly marked with arrows or other clearly visible markings to permit easy identification from anywhere within the Work Area. Exits shall be secured to prevent access from uncontaminated areas while still permitting emergency egress. Exits shall be properly sealed with polyethylene sheeting, which can be cut to permit emergency egress. Emergency exits may lead through the Decontamination Enclosure System or other alternative exits as required by fire officials.

1.07 PRE-ABATEMENT MEETING

A. Attend a meeting to be held prior to the commencement of the Work of this section. Attending this meeting shall be representatives of the Owner, the Owner Consultant if applicable, and the testing and monitoring personnel who shall actually participate in the testing and monitoring program. Secure the attendance of the individual who will be the Project site competent person for the Abatement Work.

B. At this meeting provide required submittals except for those to be submitted during progress of the Work. In addition, provide detailed information concerning:

1. Preparation of Work Area and Shop Drawings.

2. Personal protective equipment, including respiratory protection and protective clothing.

3. Employees who will participate in the Project, including delineation of experience, training, and assigned responsibilities during the Work.

4. Decontamination procedures for personnel, Work Area, and equipment.

5. Abatement methods and procedures to be provided.

6. Required air monitoring procedures (pre-Abatement, Cal/OSHA mandatory, and SCAQMD requirement).

7. Procedures for handling and disposing of waste materials, including disposal facility.

8. Procedures for final Decontamination and cleanup.

9. A sequence of Work activities and performance schedule.

10. Procedures for dealing with heat stress.

11. Emergency procedures.

## PART 2 – PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

A. Products: The following products have been specifically approved for use ass encapsulants/lock-down or bridging agents for Owner asbestos abatement and asbestos related construction projects and lead abatement and lead abatement related construction projects. Products not approved by the Owner shall not be used.

1. L-B-C Lead Barrier Compound 5400 be Fiberlock Technologies, Inc.; coating encapsulant.

B. Materials:

1. Deliver materials in the original sealed packages, containers, or bundles bearing the name of the manufacturer and brand name.

2. Store materials, subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the Work Area until area is cleared for normal occupancy.

3. Damaged, deteriorating, or previously used materials shall not be furnished and shall be removed from the Project site and legally disposed of.

4. A sufficient supply of disposable mops, rags, and sponges for Work Area Decontamination shall be provided.

5. Unless otherwise specified, the Owner will provide water for construction purposes. Connect to existing system as required.

6. Products brought onto the Project site shall be accompanied by their respective Material Safety Data Sheet, which shall be maintained on the Project site.

7. Plastic, polyethylene sheeting or visqueen shall be a fire retardant type. Provide documentation from the manufacturer verifying compliance with this requirement.

8. Polyethylene sheeting furnished for the Decontamination Enclosure System shall be opaque white or black in color and shall be a minimum of 6-mil thick.

9. Surfactant (wetting agent) shall be a material that, when tested, demonstrates a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331-56-"Surface and Interfacial Tension of Solutions of Surface Active Agents." Where Work Area temperature may cause freezing of

the Amended Water solution, the addition of approved antifreeze in a manufacturer recommended amount is permitted.

B. Equipment:

1. Disposal bags shall be of 6-mil polyethylene, pre-printed with labels as required by applicable Cal/OSHA and DOT requirements.

2. Provide labels as per DOT requirements for disposal containers.

3. Provide warning signs as required by Cal/OSHA.

4. Disposal containers shall meet requirements of Title 22, CCR.

5. Provide a sufficient supply of scaffolds, ladders, lifts, and hand tools, as needed to complete the Work.

6. Provide sprayers with pumps capable of providing amended water in sufficient quantity to adequately wet the material to be abated or for Lead Related Construction Work.

7. Provide a sufficient supply of HEPA filtered vacuums to maintain a clean environment in compliance with this section.

8. When an enclosure requiring negative pressure is specified, a sufficient quantity of air-filtration ventilation units furnished with HEPA filtration and operated in accordance with ANSI Z9.2and EPA guidance documents shall be utilized to provide one workplace air change every 15 minutes and creating a pressure differential of -0.02 inches of water everywhere within the enclosure when compared to the area outside the enclosure. A log documenting the filter change history of each unit shall be required before use, and any unit without this log shall have filters changed and the unit decontaminated.

9. When rental equipment is to be used in Abatement areas or to transport lead contaminated waste, a written notification concerning the intended use of the rental equipment shall be provided to the rental agency with a copy submitted to the Owner.

10. When performing chemical Removal, provide portable eyewash station(s) that meet ANSI standards and are accessible to workers within 10 seconds.

11. Additional safety equipment, as necessary, shall be provided to workers and authorized visitors.

12. Equipment delivered to the Project site shall be free of debris suspect of containing lead. No equipment with suspect debris in or on it shall be permitted on Owner properties and/or the Project site.

13. When roll-off disposal containers are delivered to a Project site, four wheels of each container shall be moved and rested upon a minimum size sheet of plywood of 4-foot by 4-foot by ¾ inch.

14. Lighting shall be provided in an amount sufficient to illuminate the Work Area for the purpose of safe visual working conditions and to permit examination of surfaces where Work is performed.

## 2.02 EMPLOYEE PERSONAL PROTECTIVE EQUIPMENT

A. Respiratory Protection:

1. Submit NIOSH approvals for respiratory protective devices utilized on the Project site. Include manufacturer certification of HEPA filtration capabilities for cartridges and filters. Filter cartridges shall be furnished with the NIOSH P-100 designation.

2. Provide respiratory protection to employees in compliance with CCR Title 8, Sections 1532.1 and 5144, as determined by the employee exposure assessment.

3. In the absence of an exposure assessment, base respiratory protection on the requirements of Title 8, CCR Section 1532.1, specifically subsection (d).

4. In addition to P-100 filters, provide the appropriate respirator filter cartridges for exposure to other airborne contaminants generated during the Abatement process.

5. Provide authorized visitors with a respirator and cartridges sufficient to protect individuals from exposure to hazardous environments generated during the Abatement activity.

B. Fit Testing:

1. Perform fit testing in accordance with Title 8 CCR, Section 5144.

2. Submit documentation of respirator fit testing for individuals entering the Work Area.

3. Maintain and submit to the Owner a copy of the written respiratory protection program.

C. Personal Protective Clothing and Equipment:

1. Provide eye protection to employees sufficient to protect employees from debris during work progress when full-face respirators are not being utilized.

2. Provide and require the use of eye protection when employees are working with a material that may splash or fragment, as specified by the Material Safety Data Sheet for a given product, or as required by Title 8, CCR.

3. Spectacle kits and eyeglasses must be provided for employees who wear glasses and who must wear full-face piece respirators. Provide respirators that have been tested and approved by the National Institute of Occupational Safety and Health for use in lead-contaminated atmospheres.

4. Provide full-body disposable protective clothing, including head, body, and foot coverings to workers and authorized visitors who enter the Work Area, in sizes

adequate to accommodate movement without tearing. A new suit shall be provided and donned for each separate entry.

5. If washable clothing is to be worn underneath disposable protective clothing, it shall be provided to Abatement workers.

6. Provide a clean staging area for workers and others to store street clothes and personal protective equipment.

7. Disposal suits shall be collected in an appropriate disposal container at the entrance of the Abatement Work Area.

8. Abatement workers are required to wear nonskid footwear sufficient to protect them from workplace hazards. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

9. Hand protection shall be provided, and workers shall be required to use lotion sufficient quantities to protect the worker when chemicals or other physical hazards exist.

10. As required by the Work site and applicable safety regulations, provide head protection and require the use thereof.

11. Worker protection equipment shall be ANSI approved.

## PART 3 - EXECUTION

### 3.01 LEAD RELATED CONSTRUCTION WORK

A. Work Area Preparation and Work Practices:

1. Where exposure monitoring indicates Worker exposure is below the P.E.L., comply with the requirements of this section and the "Monitoring" section of this Specification.

2. Disturbance of lead containing materials shall be performed using wet methods.

3. Work requiring overhead disturbances shall require a means of capturing debris, thus preventing an uncontrolled release on the worker or the surfaces below.

4. For disturbances utilizing local exhaust dust collection devices the equipment shall be designed and furnished with a HEPA filtered vacuum attachment approved by the manufacturer.

5. Where Components are to be removed, loose Lead Based Paint and Lead Containing Paint shall be removed by manual means using wet methods.

6. Where a Component is attached and painted onto another surface and the Component is to be removed from the adjoining surface the paint shall be cut with a razor knife to reduce the potential of paint chip debris during Component removal.

7. If a Component being removed will be disposed of rather than reinstalled, manually cut the Component into manageable sections for disposal using wet methods or mechanically cut using a manufactured approved HEPA filtered local exhaust dust collector.

8. If a Component is to be reused, loose paint or rough edges may require scraping or sanding. Scraping or sanding must be performed manually using wet methods or mechanically with a manufactured approved HEPA filtered local exhaust attachment.

9. For solid core surfaces where penetration or welding are required the lead containing material shall be removed from the area impacted using wet methods. Layers of Paint shall be removed before impact to the surface commences.

B. Clean Up Procedures:

1. During the entire process of Lead Related Construction Work, clean debris generated using wet methods and/or HEPA Vacuuming.

2. At the completion of the Lead Related Construction Work, clean surfaces within the impacted Work Area.

3. When HEPA filtered Vacuums are utilized, vacuum from the area of impact to the outer perimeter of the polyethylene sheeting to remove visible debris. If vacuuming cannot remove visible debris, wet wiping will also be required.

4. When wet wiping the Work Area, wipe from the area of impact to the outer perimeter of the polyethylene sheeting to remove visible debris.

5. Tools and equipment utilized in the Work Area shall be wet wiped to remove visible debris.

3.02 ABATEMENT

A. Work Area Preparation:

1. Clean areas to be isolated by HEPA Vacuum prior to installation of polyethylene sheeting.

2. Seal the Work Area with a layer of 6 mil thick polyethylene sheeting prior to any Lead Based or Lead Containing Paint Removal or disturbance by covering vents, windows, door openings, and any non-Moveable Objects such as lockers, etcetera.

3. Install a minimum of two layers of 6 mil thick polyethylene sheets on floors, fastened by waterproof tape and other means as necessary to secure the sheeting.

4. The covering on windows, exterior doors, and vents shall be installed from the outside to facilitate Work on them from the inside.

B. Decontamination Enclosure System:

1. At a minimum a two-stage Decontamination Enclosure System consisting of a compartment for Decontamination and a Clean Room shall be constructed and used.

2. Unless otherwise specified, the Decontamination Enclosure System shall be adjacent to the Abatement area.

3. Other enclosure methods may be used if submitted and approved by the Owner Consultant.

C. Removal and Replacement Substrates with Lead Based Paint:

1. Except as noted in the Specifications and Drawings, replace substrate with material of the same or better quality. Substrates include, but are not limited to doors, windows, moldings, casements, mantels, trims, skirting, baseboards, and associated hardware and fasteners.

2. Areas adjacent to substrate removal shall be protected from damage. Damages shall be repaired or replaced to original condition.

3. Substrates that are removed for replacement shall be wrapped and stored for disposal. Disposal shall be in accordance with the applicable codes and sections of this Specification.

4. After removal, the areas disturbed shall be cleaned and a Clearance Inspection performed in accordance with the procedures described in this Specification.

D. Abrasive Removers – Machine Sanders:

1. Machine sanders shall be furnished with a HEPA Vacuum system approved by the manufacturer.

2. Sanding shall only be performed on flat surfaces that allow the HEPA Vacuum dust collection attachment to come into tight contact with the surface being sanded.

3. Remove Lead Based Paint down to the bare substrate surface. If the pigment cannot be removed without damaging the substrate, submit a Request for Clarification to the Owner Consultant.

4. Protect adjacent surfaces from damage from machine sanding. Repair and/or replace damaged surfaces.

E. Chemical Removal-On-Site Chemical Removal:

1. No chemical Removal shall be performed on interior surfaces unless specifically called for and designed in the Specifications or the Abatement plan of the Project.

2. Owner approved chemical removers shall be compatible with and harmless to the substrate. On masonry surfaces chemical removers shall contain anti-stain formulation that inhibits discoloration.

3. Chemical Removal Agent Neutralizer: Use chemical Removal agent neutralizers on exterior surfaces only. Neutralizers shall be compatible with and not harmful to the substrate. Neutralizers shall be compatible with the Removal agent that has been applied to the surface substrate.

4. Apply chemical Removal agents and neutralizers in accordance with the recommendations of the manufacturer and the following:

   a. Adhere to health and safety regulations and other Specification section requirements. Stripping agents shall not be allowed to penetrate wood or other fibrous substrates.

   b. Remove the softened paint by scraping or wire brushing.

   c. Protect adjacent areas from damage from Removal agent during the course of Work.

F. Chemical Removal – Off-Site Chemical Removal – Structures of Historical Significance Only:

1. Remove and transport Lead Based Painted Component in accordance with this Specification. Transport the Component to an off-site location. Remove Lead Based Paint by chemical Removal. Neutralize and clean the Component. Return Component to the Project site free of lead-containing materials and reinstall.

2. Take extreme care in removing component to be taken off-site, to prevent damage. In addition:

   a. Component shall be marked and identified using an inconspicuous engraving, to insure reinstallation in original location.

   b. Hardware associated with a component shall be bagged and marked.

   c. If required, hardware shall be chemically stripped, cleaned, or reconditioned.

   d. Dispose of hazardous waste generated by the off-site stripping of Lead Based Paint as required by federal, state, and local regulations.

   e. Do not transport hazardous waste to Owner properties and/or facilities.

   f. Protect the component and the adjacent areas from which component are removed from damage by the removal and reinstallation procedures.

G. Water Jet Washing:

1. The purpose of the Water Jet Washing process is to remove Lead-Based and Lead Containing Paint from exterior masonry substrate.

2. If this procedure is selected, submit a Work plan to the Owner Consultant which includes, but is not limited to, interim controls, paint stabilization, and capture of waste water.

H. Encapsulation – Interior and Exterior - Coated Sealer System:

1. Materials: - Elastic acrylic coating shall be heavy bodied and warranted by the manufacturer to be compatible with the substrate. Elastic acrylic coating shall be long lasting and resist cracking, peeling, algae, and fungus.

2. Submittal: - Submit two Samples, 5 ½-inch by 8-inch of the encapsulation material to the Owner Consultant.

3. Encapsulation coatings shall be applied in accordance with the manufacturer's recommendations and the following conditions:

   a. Remove surface dust and debris by scrubbing with a non-residue detergent solution, and rinsing. Remove loose paint until a sound, intact edge is achieved. Remove and replace loose plaster prior to the coating application. Proper safety procedures and lead dust control method in this Specification must be utilized.

   b. Apply Encapsulation coatings to the substrate in a continuous coat to seal the surface being coated. The number of coats required and coverage rates shall be in accordance with the manufacturer's recommendations.

   c. Repair materials that lift and peel after the application of the Encapsulation coating by scraping until a sound surface is obtained. The edges shall be feathered, and a reapplication of an Encapsulation coating shall be applied.

   d. Remove, or cover as directed, existing fixtures located on surface to be coated, including but not limited to, electrical receptacles, switches, exhaust fans, and hardware.

   e. Protect adjacent surfaces and existing fixtures from damage by coating system. Damages to adjacent surfaces and existing fixtures due to lack of protection or improperly applied protection shall be repaired and/or replaced.

I. Encapsulation – Interior and Exterior - Flexible Wall Covering:

1. Materials: Wall covering shall be a reinforced fiber type that forms a secure bond with the substrate, resistant to peeling and formation of mold. The wall covering system shall form a seal over the substrate to which it is applied and not allow the passage of substrate dust into the environment.

2. Submittal: Prior to the start of Work, submit to the Owner Consultant for approval, manufacturer's descriptive literature, and two 5 ½-inch by 8-inch Samples of each wall covering system.

3. Install Encapsulation covering in accordance with manufacturer's installation instructions and the following provisions:

a. Remove foreign material by washing surfaces with a detergent solution. Remove loose plaster, loose paint, and loose wallpaper. Utilize dust control methods described in this Specification.

b. Repair larger damaged areas flush with surrounding wall surfaces prior to installation of wall covering system.

J. Enclosure Procedures - Gypsum Wallboard (interior surfaces only), plywood paneling, other enclosures of exterior substrate:

1. Surface preparation: Remove foreign material by wash-down with a non-residue detergent solution. Remove loose plaster, loose paint, and loose wallpaper in accordance with this Specification to stabilize the painted surfaces.

2. Affix warning labels stating surface contains “LEAD-BASED PAINT” to the surface prior to being enclosed. Labels shall be 3-inch by 5-inch and placed four feet apart at approximately five foot high on the surface being enclosed.

3. Install selected enclosure material in accordance with the relevant section of the Specification. Any disturbance to Lead Based Paint in the execution of this section shall comply with the Lead Related Construction Work section of this Specification.

K. Soil Abatement:

1. Surface Contamination:

a. Remove Lead Contaminated Soil from the locations and to a depth specified in the scope of Work.

b. In the absence of a specified depth of soil removal identified in the scope of Work, submit, prior to the bid, a Request for Clarification regarding the quantity of soil to be removed.

c. Submit a written soil abatement plan prior to initiation of the Project.

d. No soil abatement shall proceed until the Work plan has written approval by the Owner Consultant.

e. Refer to the waste handling and transportation section of this Specification for the handling, characterization, and disposal of waste.

L. Alternate Procedures:

1. If specified procedures cannot be utilized, a request must be made in writing to the Owner Consultant establishing details of the problem encountered and recommended alternatives.

2. Alternate procedures shall provide equivalent or greater protection than procedures that they replace.

3. Prior to implementation, alternative procedures shall be submitted and approved in writing by the Owner Consultant.

M. Clean Up Procedures

1. During the entire process of the Work of this section, perform continuous cleaning of debris generated using wet methods and/or HEPA filtered vacuuming.

2. At the completion of the Work of this section, clean surfaces within the impacted Work Area, including but not limited to, tools, equipment, and polyethylene sheeting to remove visible debris from the Work Area.

3. Tools and equipment utilized in the Work Area shall be thoroughly cleaned. Non-electrical tools and equipment shall be cleaned monthly and before Removal from the Work Area by HEPA vacuuming and washing using a lead specific detergent or other suitable cleaning agent.

4. Electrical tools and equipment shall be HEPA vacuumed and cleaned by wet wiping limiting the amount of water used to avoid electrical hazards.

5. Remove polyethylene sheeting, except for critical barriers, by folding it into itself beginning with the higher level polyethylene first.

6. Following Removal of polyethylene sheeting a final cleaning of surfaces in the Abatement workspace shall be performed by HEPA vacuuming, wet wiping, and a final HEPA vacuuming.

7. When HEPA vacuums are utilized, vacuuming shall be performed from the top down and from the area of impact to the outer edge of the polyethylene sheeting.

8. Apply no less than one continuous coat of approved paint or primer to abated surfaces, where applicable.

9. At the completion of the final clean up, the CDPHcertified supervisor shall inspect the Work Area for visible debris. If debris is identified, repeat the final cleaning process.

10. Wet wiping, washing, and cleaning required by this section shall include the Removal of visible debris by cleaning with a lead specific detergent or other suitable cleaning agent in clean water followed by a rinsing with clean water and clean rags, following the same sequence of cleaning as the vacuuming.

11. Refer to the waste handling and transportation section of this Specification for disposal of waste generated by this process.

## 3.03 WASTE HANDLING AND TRANSPORTATION

A. Characterization of Waste:

1. Until analytical results are available, waste materials (including water containing paint chips) shall be treated as hazardous. Visible paint chips shall

be separated from waste water before characterization. Following removal of solids the waste water shall be characterized to determine disposal requirements. The paint chips removed from the waste water may be disposed of as assumed RCRA hazardous waste or characterized to determine disposal requirements.

2. Characterize waste streams as follows:

   a. Collect a representative sample of the waste material.

   b. For a pile of waste take one sample of a proportionate combination of Component in the pile. If a large quantity of waste is generated no less than four samples may be required.

   c. For large wood Component, such as windows, doors, etcetera, a representative sample of each Component of similar characteristics, paint history, etcetera, shall be collected and tested. A full depth core sample, not less than one inch diameter, of the Component is to be collected. The core sample shall include the substrate and paint coatings on both sides of the Component, as applicable.

3. Analysis for the waste characterization samples shall be performed as follows:

   a. Waste generated by chemical stripping shall, in addition to the requirements for determining the solid and soluble lead concentrations, shall be tested for corrosiveness and other contaminants, as applicable, resulting from the chemical stripping process.

   b. Analyze samples for Total Threshold Limit Concentration (TTLC):

      1) If results are less than 50 mg/kg (milligrams/kilogram) the waste is not hazardous and shall be disposed as general construction waste.

      2) If sample results are 50 mg/kg or greater, the waste shall be tested for Soluble Threshold Limit Concentration (STLC).

   c. Where waste is required to be tested for STLC the following shall apply:

      1) If the STLC result is less than 5 mg/L (milligrams/liter) the material shall be disposed at a Class II waste landfill. Evidence of such results of the STLC testing will be required by the landfill before waste is accepted. No further testing is required.

      2) If the STLC results are 5 mg/L or greater, the waste is a California regulated waste and the material shall be tested using the federally mandated Toxicity Characterization Leaching Procedure (TCLP).

   d. Where waste is required to be tested by TCLP the following shall apply:

1) If the TCLP is less than 5 mg/L, the waste is a California regulated hazardous solid waste (non-RCRA). This material shall be disposed in a Class I hazardous waste landfill.

2) If the TCLP is equal to or greater than 5 mg/L, the waste is a federally regulated hazardous waste solid (RCRA). The waste shall then be disposed in a Class I hazardous waste landfill.

e. Personal and commercial wash water with lead contamination shall be handled as follows:

1) Filter the waste water through cheesecloth, or other similar filtering media, to remove the gross debris. Separate the waste streams and characterize these in compliance with this Specification.

2) If the waste water is identified as a RCRA or California regulated hazardous waste (Non-RCRA) by STLC and TCLP, filter the waste water by power pumping it through a 20 micron pore size filter. The filtered water shall be tested as described for waste in this Specification.

3) If test results categorize the filtered water as non-hazardous, it may be disposed of in the sewer system.

4) Wastewater, filtered or otherwise, shall not be discharged in storm drains, gutters or allowed to sheet flow over the surface of the ground.

B. Waste Handling:

1. Waste, hazardous and non-hazardous, shall be disposed of at an authorized site in accordance with provisions of this Specification and applicable Federal, State, and local laws.

2. Any waste determined to be hazardous, through analytical testing, shall be kept in a secured area or lockable container that is inaccessible to persons other than authorized personnel working on the Project. Hazardous waste containers shall be labeled “Hazardous-Waste – Contains Lead” and labeled with the date waste collection commenced.

3. Hazardous waste shall not remain on the Project site beyond 90 days of the date it was generated. It shall be removed from the Project site and transported to an approved landfill before the 90 days has elapsed.

4. Waste shall not be transported from the work are to the storage container or waste hauler’s vehicle while students or staff are present in the path of travel. Where a path of travel cannot be cordoned off the transportation of waste must be completed prior to of after students and staff are not on site.

5. Once hazardous waste is removed from the Project site, ensure it is disposed of in an approved landfill within 6 days. The waste shall not be transported to another

site for commingling of waste from a source other than the site of original generation. This requirement shall be documented by the proper execution of a Uniform Hazardous Waste Manifest signed by the landfill operator.

6. Hazardous and non-hazardous waste shall be kept in different containers and stored in separate locations. Commingling of waste is not permitted.

7. As the Work progresses, to prevent exceeding available storage capacity on the Project site, sealed and labeled containers of lead waste shall be removed and transported to the prearranged disposal location.

8. Containers used for hazardous waste shall meet the requirements of EPA and DOT for hazardous waste storage and transport. At a minimum, disposal packaging of Lead Based Paint fragments, dust, and debris shall be in 6-mil polyethylene (plastic) bags that are airtight and puncture resistant.

9. Any debris or residue observed on containers or surfaces outside of the Work Area resulting from clean up or disposal activities shall immediately be cleaned using HEPA filtered vacuum equipment and/or wet methods as appropriate.

10. Materials not contained in bags or other appropriate disposal containers shall not be placed in lead waste storage containers, nor shall storage containers be used for non-lead waste. To avoid damage, packaged waste shall be placed, not thrown, into the storage containers.

11. Lead Contaminated Soil shall be transported in plastic lined containers.

C. Transportation of Non-Hazardous Waste:

1. Receipts from the disposal facility, trip tickets, transportation manifests, weight certificates or other documentation of disposal shall be delivered to the Owner Consultant within 48 hours of disposal. The waste manifest shall be signed by the generator, the transporter(s), and the disposal site operator each time the responsibility for the waste material is transferred. If a separate hauler is employed, the name, address, and signature of the transporter shall also appear on the manifest.

D. Transportation of Hazardous Waste:

1. Hazardous waste shall be transported by a RCRA/DOT/EPA certified hazardous waste transporter. Provide evidence that the hazardous waste transporter meets the requirements of this Specification.

2. The Work of this section includes responsibility for actions of the hazardous waste transporter as it pertains to waste Removal and disposal related to the Work of this Specification.

3. Identify the facility to which the waste generated by this Specification will be taken. Evidence shall be provided verifying the facility is licensed/permitted to receive and handle non-hazardous lead containing waste and/or hazardous lead containing waste as applicable.

4. Waste disposed as hazardous shall be transported under a Uniform Hazardous Waste Manifest. The generator copy of this manifest shall be submitted to the Owner Consultant within five days of transport.

5. Dump receipts, trip tickets, transportation manifests, weight certificates or other documentation of disposal shall be delivered to the Owner Consultant within 48 hours of disposal. The Uniform Hazardous Waste Manifest shall be signed by the generator (or designee), the transporter(s), and the disposal site operator each time the responsibility for the waste material is transferred. If a separate hauler is employed, the name, address, U.S.E.P.A. ID number and signature of the transporter shall also appear on the manifest.

6. The enclosed cargo area of trucks or containers shall be free of debris and lined with 6-mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the walls. Wall sheeting shall be overlapped and taped into place.

7. During transport, drums and other containers shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural Component shall be secured to prevent shifting and bags placed on top.

3.04 MONITORING

A. Project Management and Inspection:

1. Owner has the right to perform air, wipe, and visual monitoring at any time.

2. Owner shall proceed in accordance with the terms and conditions of the Contract Documents whenever the Work or protective measures are not in compliance with applicable governmental regulations, Contract requirements, and/or threatens the adjoining environment with lead contamination.

3. Where exposure monitoring indicates exposure is at or above the P.E.L. comply with Title 8, CCR Section 1532.1 (e) through (n).

B. Employee – Personal Air Monitoring:

1. Provide air monitoring as required by Title 8 CCR, Section 1532.1. Results shall be provided within ten working days of sampling. If the intent is to utilize such as exposure assessment documentation, and Work is to commence earlier than ten working days, submit results 24 hours in advance of the start of Work.

C. Clearance Inspection:

1. Clearance Inspection for Lead Related Construction Work shall include:

a. A visual inspection of the Work Area by the Owner Consultant prior to occupancy for normal activity.

b. Do not remove barriers designating a regulated Work Area until a written release from the Owner Consultant is provided.

c. The Owner Consultant has the right to collect wipe samples as part of the Clearance Inspection.

2. Clearance Inspection for Abatement shall include:

a. A visual inspection of the Work Area by the Owner Consultant prior to collection of environmental samples (dust, wipe, and/or soil samples, as applicable).

b. Owner Consultant shall collect environmental samples.

c. Results of samples shall comply with Title 17, CCR before the Work Area is released for normal occupancy.

d. Where samples fail to meet regulated clearance levels of Title 17, CCR, clean the Work Area as required for final cleaning in the Clean Up Procedures section of this Specification.

e. Following cleaning, the visual inspection and environmental sampling will be repeated as described above. This process shall continue until the clearance level of Title 17, CCR is provided.

## 3.05 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS

A. Re-establishment of the Work Area shall only occur following the completion of clean-up procedures and after a Clearance Inspection has been performed and documented to the satisfaction of the Owner Consultant.

B. Re-secure Moveable Objects removed from their former positions during area preparation activities.

C. Relocate Moveable Objects that were removed to temporary locations back to their original positions.

D. Reestablish HVAC, mechanical and electrical systems to the condition prior to commencement of the Project.

E. Repair areas of damage that occurred as a result of Abatement or Lead Related Construction Work.

## 3.06 PROJECT COMPLETION DOCUMENTATION

A. Provide to the Owner Consultant of the following close-out documentation:

1. Filter change logs for air filtration units, water filtration units and respirators

2. Foreman's daily job reports

3. Employee entry and exit logs for Work Areas

4. Visitor entry and exit logs for Work Area

5. Air sample results for personnel

6. Copies of hazardous and non-hazardous waste manifest

7. Hazardous waste weight tickets

8. Analytical data and chain of custody for waste characterization

9. Signed Daily Personnel Report Forms

B. Provide Owner Consultant with as-built drawings identifying surfaces where Lead Based Paint has been encapsulated or enclosed.

END OF SECTION

# SECTION 02 8400
# POLYCHLORINATED BIPHENYL (PCB) REMEDIATION

## PART 1 – GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Abatement and PCB-Related Construction Work.

2. Transportation and disposal of PCB-containing materials.

B. Related Requirements:

1. Section 02 2600 – Abatement of Hazardous Materials.

2. Division 01 - General Requirements.

C. Regulatory Requirements:

1. California Division of Occupational Safety & Health (Cal/OSHA) Title 8, California Code of Regulations (CCR).

2. California Air Resources Board Ambient Air Quality Standard, Title 24 CCR.

3. California Department of Health Services, Title 17 CCR.

4. California Department of Environmental Protection (Cal/EPA), Title 22 CCR.

5. Cal/EPA Department of Toxic Substances Control (DTSC). California Health and Safety Code (HSC), Division 20, Chapter 6.5.

6. California Labor Code, Division 5, Part 1, as it pertains to safety in employment and with the applicable provisions of the Title 8, CCR as it pertains to Occupational Safety and Health in the work place.

7. United States Environmental Protection Agency, 40 Code of Federal Regulations (CFR) Part 761.

8. Los Angeles County Public Health Code (Chapter 11).

9. Occupational Safety and Health Administration (OSHA), 29 CFR 1910 and 29 CFR 1926.

10. Department of Transportation (DOT), 49 CFR Parts 171-173.

1.02 DEFINITIONS AND ACRONYMS

A. µg/100 $cm^2$ – Microgram(s) per 100 square centimeters

B. Abatement – Any set of measures designed to reduce or eliminate PCB hazards or PCB material for public and residential buildings, but does not include containment or cleaning.

C. Abatement Area – Means an area where Abatement is conducted.

D. Air Sampling and/or Dust Suppression Plan – Means a plan as described in paragraph 1.09.A.3 of this Section.

E. ANSI – American National Standards Institute.

F. Building ID number or code (Maximo) – A six-digit alphanumeric identification code assigned to each building on an OWNER site, also referred to as the insurance code, ID number or similar terms.

G. Cal/EPA – California Environmental Protection Agency.

H. CCR – California Code of Regulations.

I. CFR – Code of Federal Regulations.

J. Clean Room – An uncontaminated area or room which is a part of the worker Decontamination Enclosure System with provisions for storage of worker's street clothes and clean protective equipment.

K. Cleanup Level – Means Cleanup Levels as defined in 40 CFR §761.61(a)(4).

L. Clearance Inspection – Means visual examination and, as applicable, collection of environmental samples upon completion of the Abatement Work.

M. Component – Means a structural element or fixture, including but not limited to, walls, floors, ceilings, doors, window molding, trim, trestles, tanks, stairs, railings, cabinets, gutters, or downspouts.

N. CPR – Cardiopulmonary resuscitation.

O. Curtained doorway – A device to allow ingress and egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway. Other effective designs may be submitted for review.

P. Decontamination – The process of eliminating PCB contamination from building surfaces and property using cloths, mops, and/or other utensils dampened with mineral spirits or water.

Q. Decontamination Enclosure System – At minimum a two-stage Decontamination unit consisting of a compartment for Decontamination, and a Clean Room. Unless otherwise specified, it shall be adjacent to the Abatement Area.

R. Demolition – The wrecking or taking out of any load supporting structural member of a facility together with any related handling operations.

S. DOSH – California Division of Occupational Safety and Health or Cal/OSHA.

T. DOT – United State Department of Transportation.

U. DTSC – California Department of Toxic Substances Control.

V. Enclosure – A rigid durable barrier mechanically attached to building Component, with edges and seams sealed with caulk or other sealant.

W. Environmental Consultant – Refers to the firm, company, or individual designated by the OWNER to provide third-party oversight.

X. EPA ID number – Means hazardous waste generator number assigned by the USEPA or DTSC.

Y. Fixed Object – A piece of equipment, furniture, or improvement in the Work Area, which cannot be removed from the Work Area.

Z. FLB – Fluorescent light ballast

AA. Hazardous Materials Survey – A survey conducted to identify and characterize hazardous materials, which may include but is not limited to PCBs, lead, and asbestos, in Site building materials.

BB. Hazardous Waste – Means any waste stream presumed or determined using generator knowledge or based on laboratory analytical results to be hazardous waste, including but not limited to that which exceeds the regulatory thresholds for PCBs for the toxicity characteristic, as specified in 22 CCR § 66261.24.

CC. HAZWOPER – Hazardous Waste Operations and Emergency Response Standard.

DD. HEPA – High-Efficiency Particulate Air.

EE. HEPA Filter – Means a filtering system capable of trapping and retaining at least 99.97 percent of mono-dispersed particles 0.3 micrometers in diameter or larger.

FF. HEPA Vacuum – A vacuum system furnished with HEPA filtration.

GG. HSC – California Health and Safety Code.

HH. HVAC – Heating, Ventilation, and Air Conditioning system.

II. LACPW – Los Angeles County Public Works.

JJ. Location Code (Maximo) – Refers to a unique four digit numeric code assigned by the OWNER to each of its Project Sites.

KK. Member – A Component part of a structure complete in itself.

LL. Movable Object – A piece of portable equipment or furniture in the Work Area, which can be removed from the Work Area.

MM. mg/kg – milligrams per kilogram (equivalent to parts per million)

NN. mg/l – milligrams per liter (equivalent to parts per million)

OO. MSHA – Mine Safety and Health Administration.

PP. $ng/m^3$ – nanograms per cubic meter

QQ. NIOSH – The National Institute for Occupational Safety and Health.

RR. Non-Porous Surface – Means a smooth, unpainted solid surface that limits penetration of liquid containing PCBs beyond the immediate surface. Examples include: smooth, uncorroded metal; smooth glass; smooth glazed ceramics; impermeable polished building stone such as marble or granite; and high density plastics, such as polycarbonates and melamines that do not absorb organic solvents.

SS. OAR – OWNER Authorized Representative.

TT. OSHA – Occupational Safety and Health Administration.

UU. OWNER – LACPW.

VV. PCB – Polychlorinated Biphenyl.

WW. PCB Bulk Product Waste – Means PCB Bulk Product Waste as defined in 40 CFR §761.3. Generally, PCB bulk product waste is waste derived from manufactured products containing PCBs in a non-liquid state at any concentration, where the concentration at the time of designation for disposal was ≥50 ppm PCBs. PCB bulk product waste includes, but is not limited to:

1. Non-liquid bulk wastes or debris from the demolition of buildings and other man-made structures manufactured, coated, or serviced with PCBs.

2. Applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking and window glazing; adhesives.

3. Fluorescent light ballasts containing PCBs in the potting material.

XX. PCB Cleanup and Disposal Plan ("the Plan") – A plan developed to ensure all applicable Federal, state and local regulatory requirements pertaining to PCB cleanup and disposal, as well as this Section, are met.

YY. PCB Materials – Any non-liquid material, item, structure or component that has been determined or is presumed to contain and/or be contaminated with PCBs.

ZZ. PCB Remediation Waste – Means PCB Remediation Waste as defined in 40 CFR §761.3. Generally, PCB remediation waste is waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the concentrations specified in 40 CFR §761.3. PCB remediation waste includes but is not limited to:

1. Soil, rags and other debris generated as a result of any PCB spill cleanup.

2. Buildings and other man-made structures (such as concrete floors, wood floors, or walls contaminated from a leaking PCB or PCB-Contaminated Transformer), porous surfaces, and non-porous surfaces.

AAA. PCB Warning Label – Means the labels described in paragraph 2.01.B of this Section.

BBB. PCB Work –PCB abatement and/or PCB-related construction work. Also referred to as "Work".

CCC. Plasticize – To cover floors, walls, and equipment with plastic sheeting as specified herein.

DDD. PM10 – Particulate matter less than 10 micrometers in diameter.

EEE. Portable Mechanical Ventilation System – A portable exhaust system furnished with HEPA filtration and capable of providing a constant air flow into regulated Work Area from adjacent areas and exhausted outside the regulated area.

FFF. Porous Surface – Means any surface that allows PCBs to penetrate or pass into itself including, but not limited to: paint or other coating on metal; unglazed ceramics or ceramics with a porous glaze; porous building stone such as sandstone, travertine, limestone or coral rock; low-density plastics; coated (varnished or painted) or uncoated wood; concrete or cement; plaster; plasterboard; wallboard, fiberboard; chipboard; asphalt; or tar paper. For the purposes of cleaning and disposing of PCB remediation waste, porous surfaces have different requirements than non-porous surfaces.

GGG. ppm – parts per million (equivalent to milligrams per kilogram or milligrams per liter).

HHH. Project – Means the specific PCB Work project for which this Section was issued.

III. Project Site – Means a location, identified by a unique four digit numeric Location Code, where a project is taking place or will be carried out.

JJJ. Project Supervisor – Means the individual described in paragraph 1.08.B.3 of this Section.

KKK. RCRA – Resource Conservation and Recovery Act.

LLL. Removal – Means operations where PCB materials are removed or stripped from structures or substrates including Demolition.

MMM. Renovation – Means the modifying of any existing structure, facility, or portion thereof.

NNN. Replacement – Means Removal of an entire building Component containing PCBs and replacing it with non-PCB Component.

OOO. SCAQMD – South Coast Air Quality Management District.

PPP. SDS – Safety Data Sheet (formerly Material Safety Data Sheet)

QQQ. STLC – Means Soluble Threshold Limit Concentration used in the State of California in conjunction with TTLC to determine characteristic hazardous waste limits. If the STLC result for PCBs is equal to or exceeds 5 mg/l the waste is deemed to be hazardous.

RRR. Surfactant - A chemical wetting agent added to water.

SSS. TSCA – Toxic Substances Control Act.

TTT. TTLC – Means Total Threshold Limit Concentration used in the State of California in conjunction with STLC to determine characteristic hazardous waste limits. If the results for PCBs are equal to or exceed 50 mg/kg, the waste is deemed to be hazardous.

UUU. Uniform Hazardous Waste Manifest – Means the shipping document that travels with hazardous waste from the point of generation, through transportation, to the final treatment, storage, and disposal facility. Manifest forms must be obtained from an organization approved by the USEPA Manifest Registry to print the RCRA hazardous waste manifest.

VVV. USEPA – United States Environmental Protection Agency.

WWW. Wet Cleaning – The process of eliminating PCB contamination from building surfaces and/or objects by cloths, mops, or other utensils dampened with mineral spirits or water.

XXX. Work Area – Means an area where known or presumed PCB materials are disturbed or Abatement is conducted.

## 1.03 POLICIES AND PROCEDURES

A. The policy mandates the use of this procedure to guide various departments to consult with LACPW for any projects where potential PCB-containing building materials will be disturbed. Projects of such are; lighting retrofits, window & door replacements, painting projects, and restroom renovations, HVAC upgrade and replacement or any other demolition and renovation projects.

B. LACPW has oversight responsibilities over projects involving PCBs. LACPW will provide direction to environmental consultants and abatement contractors concerning the proper handling and disposal of any PCB-containing building materials.

C. For any project where potential PCB-containing building materials will be disturbed, a PCB Engineering Assessment (Phase 1) must be conducted by an Environmental Consultant prior to starting work to identify any PCB-containing building materials.

D. The Assessment Report (Phase 1) will indicate if abatement is required for the project. If abatement is needed, an Environmental Consultant can be assigned to develop the Design of the Abatement (Phase 2). LACPW will review and approve the Phase 1 and Phase 2 Consultants documents.

E. OWNER has zero-tolerance policy for uncontrolled PCB releases during PCB Work. A PCB release requiring an emergency response is a disturbance resulting in the uncontrolled release of PCB-containing materials. Upon observation of visual emissions, immediately stop the Work, vacate the Work Area, and provide written notification to the Environmental Consultant.

F. Pre-qualified PCB Work subcontractors are not permitted to subcontract any PCB Work to a lower tier subcontractor without the prior written approval of the OWNER.

G. Environmental Consultant shall provide oversight for Projects that have the potential to disturb PCB-containing materials. Prior to the commencement of such Work, the CONTRACTOR shall provide written notification to the Environmental Consultant and the OEHS.

1.04 ROLES, RESPONSIBILITIES, AND COORDINATION

A. CONTRACTOR shall follow the procedures set out in this Section except where they are explicitly indicated to be the responsibility of another individual or group.

B. OAR and/or Environmental Consultant will oversee and/or support the Work in the manner indicated in this Section.

C. CONTRACTOR shall coordinate the Work of this Section directly with the OAR and/or Environmental Consultant.

1.05 SITE SECURITY

A. Work Area shall be restricted to authorized, trained, and protected personnel. A list of authorized personnel shall be established and posted at the entrance of the Work Area by the Environmental Consultant prior to commencement of the Work.

B. Report to the Environmental Consultant unauthorized entries into the Work Area. Following notification, a written report of the incident shall be provided to the Environmental Consultant.

C. A logbook shall be maintained at the entrance of the Work Area. Persons entering the Work Area shall record name, company affiliation, time in, and time out for each entry and exit.

D. Access to the Work Area shall be through the Decontamination Enclosure System only. Other means of access shall be blocked or locked so as to prevent entry to or exit from the Work Area. Emergency exits shall be operable from inside the Work Area.

E. Maintain Work Area security during PCB Work. Work Areas and ancillary equipment accessible to non-authorized personnel shall be protected from unauthorized access using appropriate barriers with lockable access doors as approved by the OAR and/or Environmental Consultant. A key to the access door(s) shall be provided to the OAR and Environmental Consultant. Required barriers within an occupied building shall be furnished with sheathing as required by State and local fire protection regulations.

F. Remove barriers upon the completion of the Work of this Section and unless otherwise specified, repair and/or replace to its original condition damage resulting from installation, use, and removal of the barriers.

1.06 EMERGENCY PLANNING

A. Emergency planning and procedures, as described below, shall be developed, submitted, reviewed, and agreed to by the Environmental Consultant prior to the commencement of PCB Work.

B. Emergency procedures shall be provided in the written languages understood by employees working on the Project and shall be prominently posted at the entrance of the Decontamination Enclosure System. Prior to entering the Work Area, parties must read and sign these procedures to acknowledge receipt and understanding of the Work Area layout, location of emergency exits, and emergency procedures.

C. Emergency planning shall consider the effects of fire, explosion, toxic atmospheres, electrical hazards, slips, trips, and falls, confined spaces, and heat related injury. Develop and provide written procedures and training to employees.

D. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

E. In the event of non-life threatening situations requiring medical treatment, injured or otherwise incapacitated employees shall decontaminate following normal procedures with assistance from fellow workers if necessary, before exiting the Work Area.

F. In the event of life threatening injury or illness requiring immediate medical treatment, worker Decontamination shall be given minimum priority. Provide measures to stabilize the injured worker, remove them from the Work Area, and secure proper medical treatment.

G. Telephone numbers of emergency response personnel shall be prominently posted at the entrance of the Decontamination Enclosure System along with the location of the nearest telephone. In addition to the 911 emergency number, post the address and telephone number of the nearest emergency medical services provider.

H. Provide at least one employee on the Project Site at all times during progress of the Work that is trained and certified in first aid and cardiopulmonary resuscitation (CPR). This employee shall be identified by name and proof of training shall be provided to the Environmental Consultant prior to the commencement of the Work of this Section.

I. Provide at least one 4A/60BC dry chemical extinguisher in the Decontamination compartment. Workers shall be trained in the proper operation of fire extinguishers.

J. Emergency exits shall be provided and clearly marked with arrows or other clearly visible markings to permit easy identification from anywhere within the Work Area. Exits shall be secured to prevent access from uncontaminated areas while still permitting emergency egress. Exits shall be properly sealed with polyethylene sheeting, which can be cut to permit emergency egress. Emergency exits may lead through the Decontamination Enclosure System or other alternative exits as required by fire officials.

1.07 CONTRACTOR'S LICENSE

A. The Work of this Section shall be performed by an entity or entities duly licensed in the State of California in accordance with the provisions of Chapter 9 of Division 3 of the Business and Professions Code, as amended.

1.08 QUALIFICATIONS AND TRAINING

A. Only OWNER approved contractors qualified to perform PCB Work will be awarded a contract.

B. PCB Work shall be performed by personnel with the following training and qualifications, as applicable, which must be completed prior to commencing PCB Work and maintained throughout performance of the Work:

1. Individuals performing PCB Work shall complete the following:

a. Current 40-hour Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) certification.

b. Training and qualifications in the techniques of PCB handling, disposal of PCB-containing materials, and the subsequent cleaning of contaminated areas. Individuals performing the PCB Work specified herein must comply with applicable Federal, State, and Local regulations and must be capable of and willing to perform the Work.

c. Training specific to the operation and use of fire extinguishers.

2. Individuals performing PCB-related construction work must complete training specific to the performance of PCB-related construction work.

3. CONTRACTOR shall designate a full-time Project Supervisor who shall hold the following qualifications:

   a. Shall be trained in PCB removal and hazardous waste management, at a minimum via a 40-hour HAZWOPER and an 8-hour Hazardous Waste Supervisor training course.

   b. Shall have a minimum of one-year experience as a supervisor for PCB-related projects.

   c. Shall be able to read and write English fluently, as well as communicate in the primary language of the workers.

1.09 SUBMITTALS

A. Prior to performing the Work of this Section, submit the following procedures to the OWNER/OAR and Environmental Consultant:

1. PCB Engineering Assessment (Phase1) report, including results of bulk samples, surface wipe samples, collection of "step out " samples to determine the extent of cross-contamination of PCBs into the substrate materials and any interim measures taken to minimize potential risk of exposures to PCBs and

2. PCB Removal and Disposal Plan ("Phase 2" report) (if not already completed and provided as part of this specification) including, but not limited to:

   a. Detailed written description of the PCB Work, including methods of all Work, and locations of room(s) and building components where Work is planned.

   b. Detailed written description of the measures and management procedures, including, as necessary or applicable, any containment that will be utilized during PCB Work to prevent the spread of contaminants and occupant exposure to PCBs. Shop Drawings shall indicate the containment locations.

   c. Decontamination procedures for personnel, Work Area, and equipment.

   d. Procedures for handling and disposing of waste materials, including disposal facility.

   e. Procedures to be used for capturing debris while disturbing overhead materials.

   f. Procedures for final Decontamination and cleanup.

3. Written Health and Safety Plan (HASP) describing information and procedures necessary to protect workers and others at or near the Project Site from potential hazards associated with performing the PCB Work, including but not limited to:

   a. Procedures for dealing with heat stress during PCB Work.

   b. Emergency procedures during PCB Work.

   c. Respiratory protection and Personal Protective Equipment.

4. Within 30 calendar days before the start of PCB Work, submit an Air Sampling and/or Dust Suppression Plan, which may include one or more of the following:

   a. A plan to perform PCB Work using either:

      1) Depressurized, contained work area that uses HEPA-filtered air scrubbers to maintain a negative pressure (Primary Option), or

      2) Barrier-only work site that includes real-time airborne dust measurements to document effective dust containment (Alternative Option) as approved by the Environmental Consultant and OEHS.

   b. Proposed dust air monitoring methods and equipment that will provide real time dust measurement readings in the air of the contained work area and the area immediately outside of the work area;

   c. Laboratory extraction and analytical methods for air samples;

   d. Real-time aerosol monitoring equipment description(s); monitors shall be capable of data logging at intervals of 1 minute or less, have a lower limit of detection of 10 $\mu g/m^3$, a resolution of 1 $\mu g/m^3$, and an accuracy of ± 5% for PM10.

   e. Figures depicting air monitoring locations;

   f. Dust suppression methods;

   g. Proposed PCB dust levels not to be exceeded in ambient air to prevent exposures to PCBs, and those levels correlated to a volume of dust in air;

   h. Air monitor height;

   i. Methods to contain, prevent runoff, and containerize water that may be used for dust suppression;

   j. Reporting of PCBs as Aroclors; and,

   k. Measures to minimize exposure to dust that may contain PCBs if real-time dust levels are exceeded in air.

5. As applicable, required SCAQMD permits or registrations for portable equipment.

B. Prior to performing Work of this Section, submit the following Shop Drawings to the Environmental Consultant:

1. Preparation of Work Area.

2. Layout and construction of the Decontamination Enclosure System and barriers for isolation of the Work Area, as applicable, as described in this Section and required by applicable regulations.

C. Prior to performing the Work of this Section, submit the following documentation to the Environmental Consultant:

1. Product data relative to personal protective equipment including respiratory protection and protective clothing.

2. Safety data sheets (SDSs) and technical specifications for proposed materials.

D. Prior to performing the Work of this Section, submit the following documentation to the Environmental Consultant:

1. List of employees who will participate in the Project, including delineation of experience, training, and assigned responsibilities during the Project.

a. CONTRACTOR shall designate a full-time Project Supervisor who shall hold the qualifications listed in paragraph 1.08.B.3 of this Section.

b. Project Supervisor shall be responsible for the performance of the Work and shall represent the CONTRACTOR in all respects at the Project Site. The Project Supervisor shall be the primary point of contact for the OAR and Environmental Consultant.

c. Project Supervisor's responsibilities shall include, but not be limited to the following:

1) Project Supervisor shall remain on-Site while Work is being conducted until the Project is complete. If the Project Supervisor is not on-Site at any time whatsoever, all Work will be stopped.

2) Project Supervisor shall maintain a bound Daily Project Log that includes the Waste Disposal Log.

d. Project Supervisor cannot be removed from the Project without the consent of the OAR. Project Supervisor shall be removed from the Project if so requested by the OAR.

2. Proof satisfactory to the Environmental Consultant that required permits, site location, and arrangements for transport and disposal of hazardous waste and

waste containing or contaminated with PCBs has been performed in accordance with Federal, State, and local regulations.

3. Proof of the required training described in Article 1.08 of this Section for each worker who will perform PCB Work.

4. Manufacturer's certification that HEPA Vacuums, air filtration units, and other local exhaust ventilation equipment conform to ANSI Z9.2, as applicable.

5. When HEPA Vacuums are utilized on the Project, provide the maintenance and filter change log for these before they are brought onto the Project Site.

6. As applicable, provide the current SCAQMD permit or registration for each piece of portable equipment before it is brought onto the Project Site.

7. Workers are required to submit a signed OWNER Code of Conduct form.

E. Prior to performing the Work of this Section, submit the following samples to the Environmental Consultant:

1. Sample of forms to be used in documenting the Work of this Section.

F. Prior to performing the Work of this Section, submit the following schedule to the Environmental Consultant:

1. An intended sequence of Work and construction schedule. Coordinate both the sequence and durations with the OAR.

G. Prior to performing the Work of this Section, submit other required items to the OAR and Environmental Consultant.

H. During the performance of the Work of this Section, submit the following documentation to the Environmental Consultant:

1. Documentation from a physician certifying that employees who wear a negative pressure respirator are medically cleared to do so without suffering adverse health effects as required by DOSH regulations. The certification shall state that the employee or agent may wear a negative pressure respirator without restrictions. Provide information to the examining physician about unusual conditions in the workplace environment that may impact the employee's ability to perform Work activities.

2. Weekly job progress reports detailing PCB Work activities for Projects that will exceed thirty days. Include review of progress with respect to previously established Milestones and schedules, major problems and action taken, injury reports, equipment breakdown, and air and/or wipe sampling results.

3. Within five workdays of transport and disposal, submit copies of hazardous waste manifests, disposal receipts, analytical data, and weight certificates for waste

removed from the Work Area during the PCB Work. Weight certificates shall indicate by pounds the net weight of waste disposed of from the Project Site as indicated on the associated manifest.

4. Daily, copies of the Daily Project Log with information on worker and visitor access.

5. Weekly logs documenting filter changes on respirators, HEPA vacuums, HEPA filtered ventilation units, and other approved engineering controls, as applicable.

6. Results of air and/or wipe sampling data (as applicable) collected during the course of the PCB Work.

I. During the performance of the Work of this Section, submit other required items.

1.10 PRE-WORK MEETING

A. Attend a meeting to be held prior to the commencement of the Work of this Section. Attending this meeting will be representatives of the OWNER, the Environmental Consultant, and the testing and monitoring personnel who shall actually participate in the testing and monitoring program.

B. At this meeting provide required submittals except for those to be submitted during progress of the Work. In addition, provide detailed information concerning:

1. Preparation of Work Area and Shop Drawings.

2. Personal protective equipment, including respiratory protection and protective clothing.

3. Employees who will participate in the Project, including delineation of experience, training, and assigned responsibilities during the Work.

4. Decontamination procedures for personnel, Work Area, and equipment.

5. Abatement methods and procedures.

6. Required air monitoring procedures.

7. Procedures for handling and disposing of waste materials, including disposal facility.

8. Procedures for final Decontamination and cleanup.

9. A sequence of Work activities and performance schedule.

10. Procedures for dealing with heat stress.

11. Emergency procedures.

1.11 DELIVERY, STORAGE AND HANDLLING

A. Deliver materials in the original sealed packages, containers, or bundles bearing the name of the manufacturer and brand name.

B. Store materials subject to damage off the ground, away from wet or damp surfaces, and under cover sufficient to prevent damage or contamination. Movable Objects and replacement materials shall be stored outside of the Work Area until area is cleared for normal occupancy.

C. Damaged, deteriorating, or previously used materials shall not be furnished and shall be removed from the Project Site and legally disposed.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials:

1. A sufficient supply of disposable mops, rags, and sponges for Work Area Decontamination shall be provided.

2. Unless otherwise specified, the OWNER will provide water for construction purposes. Connect to existing system as required.

3. Products brought onto the Project Site shall be accompanied by their respective Safety Data Sheet, which shall be maintained on the Project Site.

4. Plastic, polyethylene sheeting (or visqueen) shall be a fire retardant type. Provide documentation from the manufacturer verifying compliance with this requirement.

5. Polyethylene sheeting used for the containment barriers shall be a minimum of 6-mil thick, fire retardant, and opaque or white in color. Black polyethylene may not be used for vertical barriers of containment systems.

6. USEPA-approved solvent shall be used for PCB-spill cleanup.

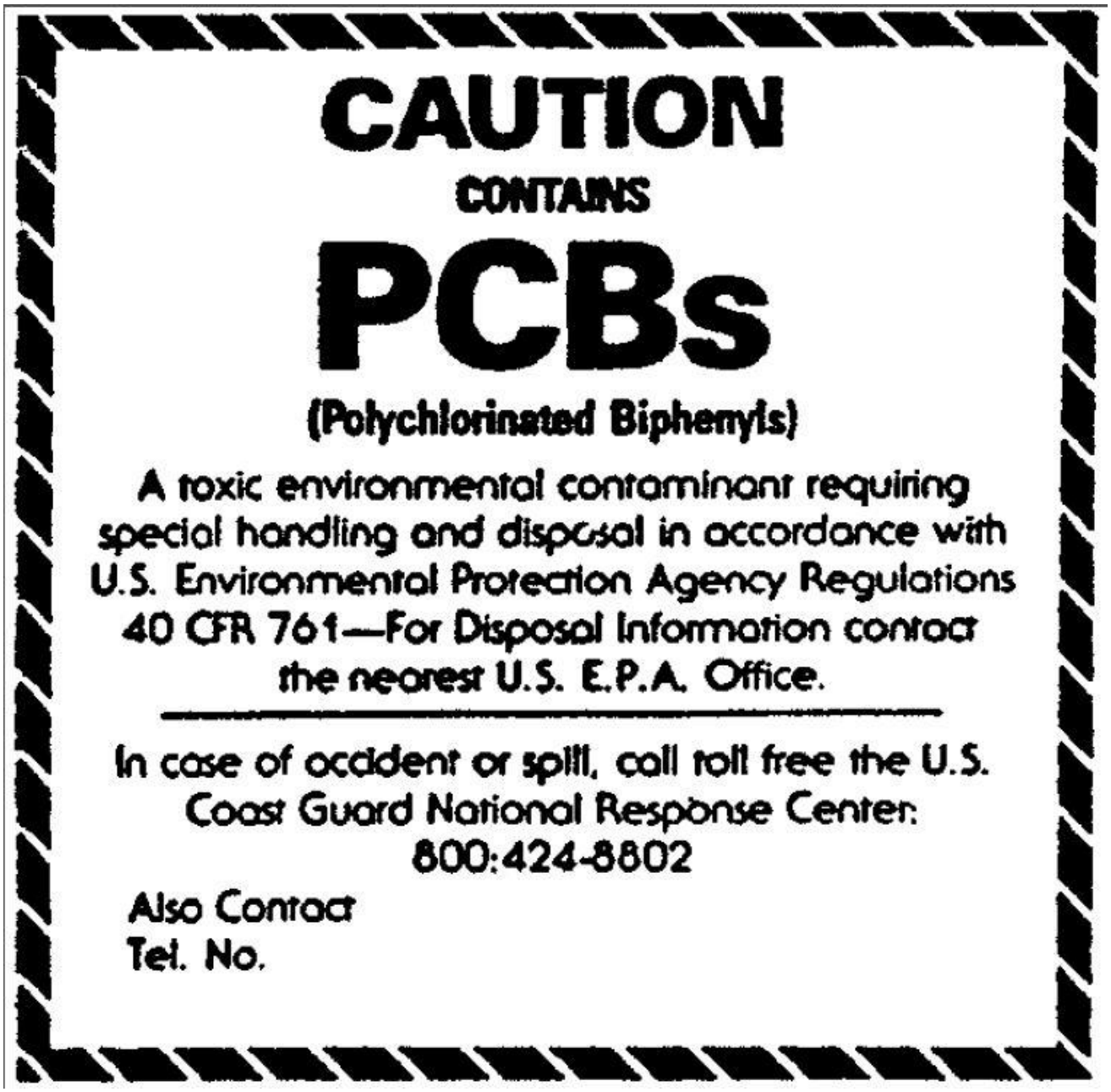
7. Surfactant (wetting agent) used shall be a material that, when tested, demonstrates a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using the current version of ASTM Standard D1331, "Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents."

B. Equipment:

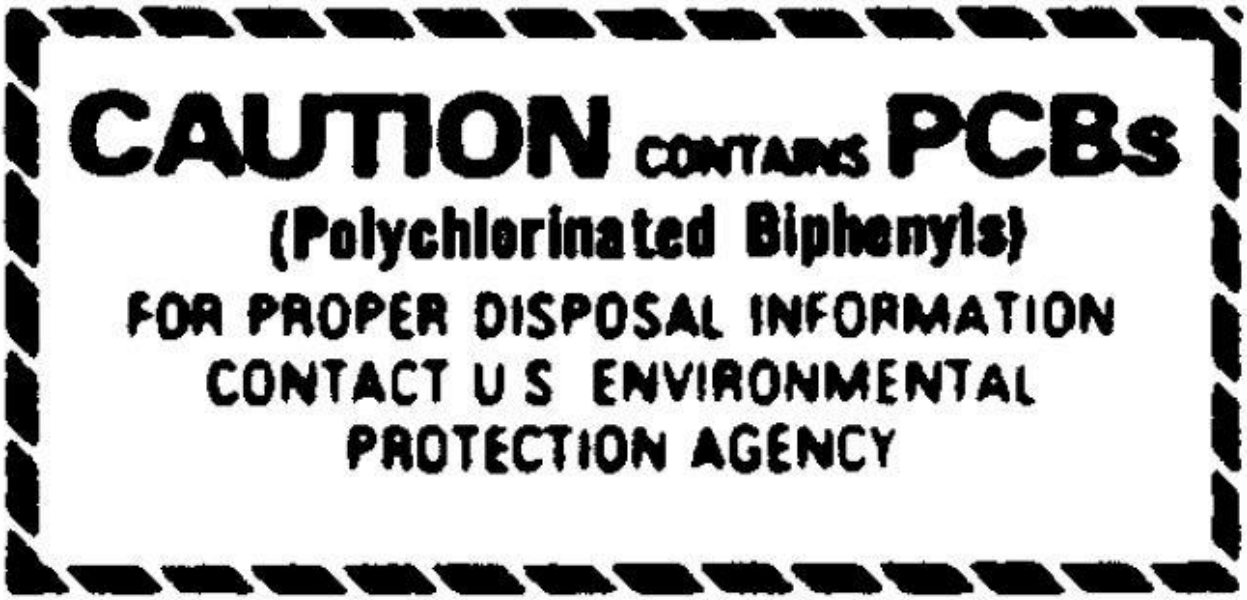
1. Disposal bags shall be of 6-mil polyethylene, pre-printed with labels as required by applicable Cal/OSHA and DOT requirements.

2. Warning signs and barrier tapes, including all those required by Cal/OSHA.

3. "Large PCB Marking" ($M_L$ per 40 CFR 761) or "Small PCB Marking" ($M_S$ per 40 CFR 761) as shown in the figures below, of sufficient size to be clearly legible, for display on waste containers (bags, boxes, roll offs, or drums) which will be used to contain or transport PCB contaminated material, in accordance with 40 CFR 761. In addition, 49 CFR Part §172.301 requires that the proper shipping name and UN number be marked on the non-bulk or bulk containers (as defined at 40 CFR §171.8, generally any container less than or greater than 119-gallon capacity, respectively) must be labeled: "Polychlorinated biphenyls, solid mixture. UN 3432".




**Large PCB Marking ($M_L$)**




**Small PCB Marking ($M_S$)**

4. "Hazardous Waste" labels of sufficient size to be clearly legible, for display on waste containers (bags, boxes, roll offs, or drums) which will be used to contain or transport PCB contaminated material, in accordance with 22 CCR 66262.32.

5. Disposal containers shall meet requirements of Title 22, CCR and 49 CFR 171 *et seq*.

6. Provide a sufficient supply of scaffolds, ladders, lifts, and hand tools, as needed to complete the Work.

7. Provide sprayers with pumps capable of providing amended water in sufficient quantity to adequately wet the material to be abated.

8. Provide a sufficient supply of HEPA filtered vacuums to maintain a clean environment in compliance with this Section.

9. When rental equipment is to be used in Work Areas or to transport PCB contaminated waste, a written notification concerning the intended use of the rental equipment shall be provided to the rental agency with a copy submitted to the OWNER.

10. When performing chemical removal, provide portable eyewash station(s) that meet ANSI standards and are accessible to workers within 10 seconds.

11. Additional safety equipment, as necessary, shall be provided to workers and authorized visitors.

12. Equipment delivered to the Project Site shall be free of debris suspected of containing PCBs. No equipment with suspect debris in or on it shall be permitted on OWNER properties and/or the Project Site.

13. When roll-off disposal containers are delivered to a Project Site, four wheels of each container shall be moved and rested upon a minimum size sheet of plywood of 4-foot by 4-foot by ¾ inch.

14. Lighting shall be provided in an amount sufficient to illuminate the Work Area for the purpose of safe visual working conditions and to permit examination of surfaces where Work is performed.

## 2.02 WORKER PERSONAL PROTECTIVE EQUIPMENT

A. Respiratory Protection:

1. Respirators will be selected from those approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

2. Respirators shall be individually fit-tested to personnel under the direction of an Industrial Hygienist on a yearly basis. Fit-tested respirators shall be permanently marked to identify the individual fitted, and use shall be limited to that individual. Fit-test records shall be maintained on Site for each employee.

3. No respirators shall be issued to personnel without such personnel participating in a respirator training program.

4. Air-purifying respirator with combination organic vapor and high-efficiency particulate air [HEPA] cartridges) shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR §1910.134.

5. A storage area for respirators shall be provided by the CONTRACTOR in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.

6. CONTRACTOR shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters will be removed and discarded whenever they are damaged, soiled, or if breathing becomes difficult.

7. Filters used with negative pressure air purifying respirators shall not be used any longer than their respective Service Life (as defined by OSHA at 29 CFR §1910.134).

8. Any authorized visitor, worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project Site and will not be permitted to return.

B. Fit Testing:

1. Perform fit testing in accordance with Title 8 CCR, Section 5144.

2. Submit documentation of respirator fit testing for individuals entering the Work Area. Authorized visitors must provide documentation of their own respirator fit testing.

3. Maintain and submit to the OAR and Environmental Consultant a copy of the written respiratory protection program.

C. Personal Protective Clothing and Equipment:

1. Provide eye protection to employees sufficient to protect employees from debris during work progress when full-face respirators are not being utilized.

2. Provide and require the use of eye protection when employees are working with a material that may splash or fragment, as specified by the Safety Data Sheet for a given product, or as required by Title 8, CCR.

3. Spectacle kits and eyeglasses must be provided for employees who wear glasses and who must wear full-face piece respirators. Provide respirators that have been tested and approved by NIOSH for use in PCB-contaminated atmospheres.

4. Provide full-body disposable protective clothing, including head, body, and foot coverings to workers who enter the Work Area, in sizes adequate to accommodate movement without tearing. A new suit shall be provided and donned for each separate entry.

5. Provide disposable Nitrile gloves to protect hands.

6. If washable clothing is to be worn underneath disposable protective clothing, it shall be provided to Abatement workers.

7. Provide a clean staging area for workers and others to store street clothes and personal protective equipment.

8. Disposal suits shall be collected in an appropriate disposal container at the entrance of the Abatement Work Area.

9. Abatement workers are required to wear nonskid footwear sufficient to protect them from workplace hazards. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

10. As required by the Work site and applicable safety regulations, provide head protection and require the use thereof.

11. Worker protection equipment shall be ANSI approved.

12. Authorized visitors will be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area. New disposable protective clothing shall be provided and donned for each separate entry.

## PART 3 - EXECUTION

### 3.01 WORK AREA PREPARATION AND GENERAL WORK PRACTICES

A. PCB warning signs shall be posted at all approaches to the Work Area. Post all emergency exits as emergency exits only on the Work Area side and post with PCB warning signs on the non-Work Area side. Provide all non-Work Area stairs and corridors accessible to the Work Area with caution tape at the base of stairs and beginning of corridors.

B. Work involving disturbance of PCB-containing materials shall be performed in accordance with Steps to Safe Renovation and Repair Activities (https://www.epa.gov/pcbs/steps-safe-renovation-and-repair-activities) and Steps to Safe PCB Abatement Activities (https://www.epa.gov/pcbs/steps-safe-pcb-abatement-activities).

C. Moveable Objects (un-affixed to the structure) shall be moved outside the Work Area.

D. Windows within the Work Area shall be closed.

E. Work Area shall be contained and separated from adjoining areas using 6-mil fire retardant polyethylene sheeting. Non-Moveable Objects and openings such as doors, windows, and vents shall be covered and sealed using 6-mil fire retardant polyethylene sheeting. In order to ensure an effective seal between the polyethylene sheets and room surfaces, dust and debris should be cleaned from areas where adhesive tape is used to attach the containment barriers prior to installation of polyethylene sheeting using a HEPA-filtered Vacuum cleaner and/or damp wiping with a wetted rag.

F. HVAC equipment intakes in the vicinity of the Work Area shall be isolated and sealed by temporarily shutting down units (or closing critical dampers) during Work and installing 6-mil fire retardant polyethylene sheeting over the opening(s).

G. If it has been determined that the HVAC system can be cleaned, it shall be cleaned by a contractor who specializes in cleaning ventilation systems and sealed to prevent potential recontamination.

H. For interior (indoor) Work:

1. Two layers of 6-mil polyethylene sheeting shall be installed on floors, fastened by waterproof tape and secured in place.

2. Dust isolation barriers with either a zippered door or a double flap shall be used at all entry points to the containment work area.

3. The containment area shall be maintained under negative air pressure by installing a negative air unit equipped with HEPA filters to prevent dust particles from being carried out of the containment area. The filtered exhaust from the fan shall be routed outside the containment area and vented outside of the building.

4. Contained work areas shall be constructed with a decontamination chamber to facilitate donning and doffing of protective clothing and staging of bagged waste prior to removal from Work Area.

I. For exterior (outdoor) Work:

1. Ground surfaces exterior to the Work Area shall have a layer of 6-mil fire retardant polyethylene sheeting attached to the building face and laid down on the surface below and to each side of the exterior Work Area, at least 10 feet wide or to the furthest point of gravity fall for dislodged debris by methods used, whichever is further.

2. Doors and windows within 20 feet of the Work Area shall be closed.

3. On multi-story buildings, close to the sidewalk, street, or property boundary, or when the building is more than three stories high, scaffolding sides shall be covered with a layer of 6-mil fire retardant polyethylene sheeting.

4. Avoid working in high winds if possible; however, if working when the wind is strong enough to move dust and debris, equipment (e.g., wind screens) shall be used to contain the Work Area.

J. Work requiring overhead disturbances shall require a means of capturing debris, thus preventing an uncontrolled release on the worker or the surfaces below.

3.02 REMOVAL OF PCB-CONTAINING MATERIALS - GENERAL

A. PCB-containing materials shall be removed in accordance with the existing State, Federal, and Local regulations.

B. Within a contained work area surfaces immediately adjacent to PCB-containing items not covered by containment barriers shall be decontaminated using a double wash-rinse technique as specified in 40 CFR 761, Subpart S and described below. These materials and surfaces typically include windows, doors, masonry, and all other building construction and components from which PCB materials (caulk) are removed:

1. First wash. Cover the surface with mineral spirit in which PCBs are soluble to 5% by weight or more. Scrub rough surfaces with scrubbing pad and mineral spirit such that the entire surface is very wet for 1 minute. Wipe smooth surfaces with a mineral spirit-soaked absorbent pad also for 1 minute. Absorb mineral spirit until no visible traces remain.

2. First rinse. Wet the surface with clean rinse mineral spirit such that the entire surface is very wet for 1 minute. Drain and contain the mineral spirit from the surface. Wipe the residual mineral spirit off the drained surface using a clean, disposable absorbent pad until no liquid is visible on the surface.

3. Second wash. Repeat the procedures in subparagraph 1. The rinse mineral spirit from the first rinse (subparagraph 2) may be used.

4. Second rinse. Repeat the procedures in subparagraph 2.

C. Mechanical cutting or grinding of PCB materials is not permitted unless equipped with HEPA filtered vacuums.

D. Before attempting to remove large components, such as window frames, remove small areas of readily accessible caulk that could be disturbed before cutting building components.

E. Removed material shall be placed into 6 mil plastic disposal bags or other suitable container upon detachment from the substrate.

F. Large components with PCB material that will not be removed shall be wrapped in two layers of 6 mil polyethylene sheeting. Sharp components likely to tear disposal bags shall be placed in fiber drums or boxes and then wrapped with sheeting.

G. Power or pressure washers are not permitted for PCB removal or cleanup procedures.

H. During the entire process of the Work of this Section, continuous cleaning of debris generated shall be performed using wet methods and/or HEPA filtered vacuuming.

I. Construction and demolition debris determined by the OWNER or Environmental Consultant to be contaminated with PCBs shall be handled and disposed of as PCB waste. If the double wash-rinse technique in paragraph 3.02.B is used on non-porous surfaces, sampling is not required and the material may be considered non-PCB.

J. The removal of the PCB materials may require the use of scrapers, solvents, mastic removal chemicals, or other methods/procedures to ensure complete removal. Any liquids generated are to be tested, stored and disposed of in accordance with this Section.

K. PCB waste must be collected in DOT-approved containers. The containers shall be marked, labeled, and/or placarded as required by DOT and discussed above. The date on which waste was first placed into the container shall be legibly marked on the outside of the container. Containers must be stored onsite in accordance with 40 CFR §761.65 and are to be removed for proper disposal as soon as possible and within 90 days of the waste being generated.

L. Temporary protection of the building (i.e., roof, window openings, construction joints, etc.) shall be provided at the end of each Work shift so as to maintain the building in a watertight condition.

M. Personal protective equipment, including respirators, shall be utilized and worn during removal operations until the Work Area is cleared.

N. Following completion of gross abatement and after all accumulations of PCB waste materials have been containerized, the decontamination procedures for immediately adjacent surfaces and containment materials, as described below, shall be performed.

O. Dry sweeping and any other methods that raise dust shall be prohibited.

## 3.03 WORK AREA CONTAINMENT AND EQUIPMENT AND AREA DECONTAMINATION

A. Work Area Containment for PCB Abatement:

1. Containment of Work areas shall include a Decontamination Enclosure System, which is a minimum two-stage Decontamination unit consisting of a compartment for Decontamination and a Clean Room. Decontamination of tools and packaging containers can take place within the Decontamination unit and workers can don and doff protective clothing.

2. Unless otherwise specified, the containment of work areas shall be depressurized by 0.02 inches of water column (5.0 Pascal) using a HEPA-filtered air scrubber and delivering at least 4 air volume changes per hour for the contained work area.

3. Barrier-only methods may be used if submitted and approved by the Environmental Consultant and supplementary dust monitoring and sampling are used.

B. When removal of PCB-containing materials is completed, the decontamination process shall consist of vacuuming (with a HEPA-filtered vacuum), wet wiping/mopping, and a repeated vacuuming (with a HEPA-filtered vacuum) of the entire Work Area. If visible dust is present, vacuum from the area of impact to the outer perimeter of the polyethylene sheeting to remove visible debris and wet wipe until space is clean. All surfaces inside the Work Area must be free of visible dust generated during the Work.

C. Tools and equipment shall be decontaminated before removal from the Work Area. Non-electrical tools and equipment shall be cleaned before removal from the Work Area by HEPA vacuuming and washing using a PCB-specific solvent or other suitable cleaning agent. Electrical tools and equipment shall be HEPA vacuumed and cleaned by wet wiping, limiting the amount of water used to avoid electrical hazards.

D. If dust or debris has migrated to areas beyond the contained Work Area, those areas shall be incorporated into the Work Area (as defined by the Environmental Consultant at their sole discretion) and thoroughly decontaminated to ensure all visible dust generated by the abatement activity is eliminated.

E. Dust barriers and other protective sheeting shall be removed, placed in disposable construction bags, and disposed. Remove polyethylene sheeting by folding it inward so that the clean side is facing out and taping the edges shut.

F. The area shall be visually inspected for any remaining dust or debris and additional decontamination performed if needed as described in paragraph A.

G. Upon completion of decontamination and removing temporary dust barriers, a final inspection shall be performed by the OWNER or Environmental Consultant. Cleaning or re-cleaning of affected areas identified during any visual inspection shall be completed at no additional expense to the OWNER.

H. Any liquids generated shall be tested, stored, and disposed according to regulations.

I. Refer to the waste handling and transportation part of this Section for disposal of waste generated by this process.

3.04 WASTE HANDLING AND TRANSPORTATION

A. Characterization of Waste:

1. Waste characterization will be documented in the Hazardous Materials Survey ("Phase 1" report provided by the OWNER) and the PCB Removal and Disposal Plan (Phase 2 report).

2. Characterize waste streams as follows:

a. PCB-Containing Fluorescent Light Ballasts (FLBs).

1) Leaking PCB-Containing FLBs.

2) Non-Leaking PCB-Containing FLBs.

b. Non-PCB-Containing FLBs.

c. Caulk Containing ≥ 50 ppm PCBs and Associated Building Materials.

d. Other Materials Contaminated with PCBs.

3. Personal and commercial wash water with PCB contamination shall be handled as follows:

a. Contaminated waste water shall be tested, stored, and disposed of in accordance with applicable regulations (22 CCR and HSC Division 20, Chapter 6.5) and the waste handling procedures described below.

b. If the waste water is identified as a RCRA or California regulated hazardous waste (Non-RCRA) by STLC and TCLP, dispose of it accordingly.

c. If test results categorize the filtered water as non-hazardous, it may be disposed of in the sanitary sewer system.

d. Wastewater shall not be discharged in storm drains, gutters or allowed to sheet flow over the surface of the ground.

B. Waste Handling:

1. CONTRACTOR shall submit for approval by the Environmental Consultant a plan for disposing of all waste generated by the PCB Work. Waste shall be disposed of only in accordance with the approved disposal plan.

2. PCB bulk product waste shall be handled in accordance with 40 CFR part 761.62 while PCB remediation waste shall be handled in accordance with 40 CFR part 761.61.

3. Waste, hazardous and non-hazardous, shall be disposed of at an authorized site in accordance with provisions of this Section and applicable Federal, State, and local laws.

4. Any waste determined to be hazardous through analytical testing shall be kept in a secured area or lockable container that is inaccessible to persons other than authorized personnel working on the Project. Hazardous waste containers shall be labeled "Hazardous-Waste – Contains PCBs" and labeled with the date waste collection commenced.

5. Hazardous waste shall not remain on the Project site beyond 90 days of the date it was generated. It shall be removed from the Project site and transported to an approved landfill before the 90 days has elapsed.

6. Waste shall not be transported from the work area to the storage container or waste hauler's vehicle while students or staff are present in the path of travel. Where a path of travel cannot be cordoned off the transportation of waste must be completed prior to or after students and staff are on site.

7. Waste shall not be transported to another site for commingling of waste from a source other than the site of original generation. This requirement shall be documented by the proper execution of a Uniform Hazardous Waste Manifest signed by the landfill operator.

8. Hazardous and non-hazardous waste shall be kept in different containers and stored in separate locations. Commingling of waste is not permitted.

9. As the Work progresses, to prevent exceeding available storage capacity on the Project Site, sealed and labeled containers of PCB waste shall be removed and transported to the prearranged disposal location.

10. Containers used for hazardous waste shall meet the requirements of USEPA/DTSC and DOT for hazardous waste storage and transport.

11. Debris or residue observed on containers or surfaces outside of the Work Area resulting from clean up or disposal activities shall immediately be cleaned using HEPA filtered vacuum equipment and/or wet methods as appropriate.

12. Materials not contained in bags or other appropriate disposal containers shall not be placed in waste storage containers, nor shall storage containers be used for non-PCB waste. To avoid damage, packaged waste shall be placed, not thrown, into the storage containers.

C. Transportation of Non-Hazardous Waste:

1. Identify the facility to which the non-hazardous waste generated by this Section will be taken. Evidence shall be provided verifying the facility is licensed/permitted to receive and handle non-hazardous PCB-containing waste as applicable.

2. Receipts from the disposal facility, trip tickets, transportation manifests, weight certificates or other documentation of disposal shall be delivered to the Environmental Consultant within 10 days of disposal. The waste manifest/trip ticket shall be signed by the generator, the transporter(s), and the disposal site operator each time the responsibility for the waste material is transferred. If a separate hauler is employed, the name, address, and signature of the transporter shall also appear on the associated paperwork.

D. Transportation of Hazardous Waste:

1. Hazardous waste shall be transported by a RCRA/DOT/USEPA certified hazardous waste transporter. Provide evidence that the hazardous waste transporter meets the requirements of this Section.

2. The Work of this Section includes responsibility for actions of the hazardous waste transporter as it pertains to waste Removal and disposal related to the Work of this Section.

3. Identify the facility to which the waste generated by this Section will be taken. Evidence shall be provided verifying the facility is licensed/permitted to receive and handle hazardous PCB-containing waste as applicable.

4. Waste disposed as hazardous shall be transported under a Uniform Hazardous Waste Manifest. The generator copy of this manifest shall be submitted to the Environmental Consultant within five days of transport.

5. Dump receipts, trip tickets, transportation manifests, weight certificates or other documentation of disposal shall be delivered to the Environmental Consultant within 10 days of disposal. The Uniform Hazardous Waste Manifest shall be signed by the generator (or designee), the transporter(s), and the disposal site operator each time the responsibility for the waste material is transferred. If a separate hauler is employed, the name, address, EPA ID number and signature of the transporter shall also appear on the manifest.

6. During transport, drums and other containers shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural Components shall be secured to prevent shifting and bags placed on top.

## 3.05 MONITORING

A. Project Management and Inspection:

1. OWNER or Environmental Consultant has the right to perform air, wipe, and visual monitoring at any time.

2. OWNER may act in accordance with the terms and conditions of the Contract Documents whenever the Work or protective measures are not in compliance with applicable governmental regulations, Contract requirements, and/or threaten the adjoining environment with PCB contamination.

B. Clearance Inspection:

1. Clearance Inspection for PCB-Related Construction Work shall include:

a. A visual inspection of the Work Area by the Environmental Consultant prior to occupancy for normal activity.

b. Do not remove barriers designating a regulated Work Area until a written release from the Environmental Consultant is provided.

c. The Environmental Consultant has the right to collect wipe samples as part of the Clearance Inspection.

2. Clearance Inspection for PCB Abatement shall include:

a. A visual inspection of the Work Area by the Environmental Consultant prior to collection of environmental samples (air, dust, wipe, and/or soil samples, as applicable).

b. Environmental Consultant shall collect environmental samples.

c. Results of samples shall comply with 40 CFR 761 before the Work Area is released for normal occupancy.

d. Where samples fail to meet regulated clearance levels of 40 CFR 761 for surfaces (10 µg/100 $cm^2$) clean the Work Area as required for final cleaning in the Equipment and Area Decontamination part of this Section.

e. Following cleaning, the visual inspection and environmental sampling will be repeated as described above. This process shall continue until the clearance level of 40 CFR 761 is achieved for the surfaces.

f. For air samples, exposure levels from USEPA will be used as summarized in the following table.

| **Age** | **Exposure Level** |
|---|---|
| 1-<2 years | 100 ng/$m^3$ |
| 2-<3 years | 100 ng/$m^3$ |

| | |
|---|---|
| 3-<6 years | 200 ng/$m^3$ |
| 6-<12 years<br>Elementary School | 300 ng/$m^3$ |
| 12-<15 years<br>Middle School | 500 ng/$m^3$ |
| 15-<19 years<br>High School | 600 ng/$m^3$ |
| 19+ years<br>Adult | 500 ng/$m^3$ |

Source: https://www.epa.gov/pcbs/exposure-levels-evaluation-polychlorinated-biphenyls-pcbs-indoor-school-air

## 3.06 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS

A. Re-establishment of the Work Area shall only occur following the completion of decontamination procedures and after a Clearance Inspection has been performed and documented to the satisfaction of the Environmental Consultant.

B. Re-secure Moveable Objects removed from their former positions during Work Area preparation activities.

C. Relocate Moveable Objects that were removed to temporary locations back to their original positions.

D. Reestablish HVAC, mechanical, and electrical systems to the condition prior to commencement of the Project.

E. Repair areas of damage that occurred as a result of PCB Work.

## 3.07 PROJECT COMPLETION DOCUMENTATION

A. Provide to the Environmental Consultant the following close-out documentation:

1. Filter change logs for air filtration units, water filtration units, and respirators.

2. Project Supervisor's daily job reports.

3. Employee entry and exit logs for Work Areas.

4. Visitor entry and exit logs for Work Areas.

5. Air sample results for project.

6. Copies of hazardous and non-hazardous waste manifests.

7. Hazardous waste weight tickets.

8. Analytical data and chain of custody for waste characterization, if applicable.

9. Signed Daily Personnel Report Forms.

END OF SECTION

# SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
2. Section 321313 "Concrete Paving" for concrete pavement and walks.

### 1.3 REFERENCES

A. Abbreviations and Acronyms

1. ACI – American Concrete Institute
2. NRMCA – National Ready Mixed Concrete Association

B. Definitions

1. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
2. W/C Ratio: The ratio by weight of water to cementitious materials.

C. Referenced Standards

1. ACI 301-10, “Specification for Structural Concrete Buildings”
2. ACI 117-10, “Specification for Tolerances for Concrete Construction and Materials”
3. AWS D1.4-11, “Structural Welding Code – Reinforcing Steel”

### 1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Concrete Subcontractor.

2. Review the following

    a. Special inspection and testing and inspecting agency procedures for field quality control
    b. Concrete finishes and finishing
    c. Curing procedures
    d. Construction contraction and isolation joints, joint-filler strips and semirigid joint fillers
    e. Forms and form removal limitations
    f. Shoring and reshoring procedures
    g. Vapor-retarder installation
    h. Anchor rod and anchorage device installation tolerances
    i. Steel reinforcement installation
    j. Floor and slab flatness and levelness measurement and methods for achieving specified floor and slab flatness and levelness
    k. Concrete repair procedures, and concrete protection

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

    1. Mechanical coupling devices for reinforcing steel. Include approved Evaluation Report.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

    1. Include the following for each mix design:

        a. Supporting strength test data not more than 12 months old. At the Engineer’s request, reports from the independent testing agencies may be required to document the test data. Reports from the independent testing agencies will be required if fly ash is used in the design mix.
        b. Statistical analysis in compliance with ACI 301.
        c. Gradation of fine and coarse aggregates not more than 90 days old (ASTM C 33). No substitution of aggregate type or size from those submitted will be permitted.
        d. Proportions of all ingredients, including all admixtures added either at time of batching or at job site. Aggregate weights shall be based upon saturated surface dry conditions.

e. Water/cement ratio.
f. Slump (ASTM C 143): When high range water-reducing admixtures are used, slump before and after addition of admixture are required.
g. Air content of freshly mixed concrete (ASTM C 231).
h. Material Certificates for the following:

1) Cementitious Materials
2) Admixtures

i. Certification that all ingredients in each mix design are compatible
j. Locations or intended use of each mix design.
k. Source of all materials.
l. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Embedded Item Placement Drawings: Drawings indicating the location and type of plates, anchorages, or other items to be embedded in the finished concrete surfaces. Include wall elevations, slab plans, and details required to locate and install embeds.

E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer and manufacturer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Waterstops.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Semirigid joint filler.
12. Joint-filler strips.
13. Repair materials.

D. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

F. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

## 1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

## 1.8 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## 1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F. for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F. at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

## PART 2 - PRODUCTS

### 2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301
2. ACI 117

### 2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

C. Retain one of first four subparagraphs below or revise to suit Project. First subparagraph imparts glossy finish, second imparts matte finish, and third and fourth impart coarser-textured finish, depending on face-ply characteristics.

D. High-density overlay, Class 1 or better.

E. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.

F. Structural 1, B-B or better; mill oiled and edge sealed.

G. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

H. Overlaid Finnish birch plywood.

I. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

J. Forms in "Forms for Cylindrical Columns, Pedestals, and Supports" Paragraph below leave joint impressions in spiral or straight lines. Limit types of forms if a particular pattern of joint is required. Different release treatments of forms also affect appearance of as-cast surfaces.

K. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

L. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

M. Retain void forms, sometimes called "carton forms," in "Void Forms" Paragraph below if required for expansive soils or block outs.

N. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

O. Retain "Chamfer Strips" Paragraph below if chamfering is permitted.

P. Chamfer Strips: Wood, metal, PVC, or rubber strips, ¾ x ¾ inch, minimum.

Q. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

R. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

S. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

## PART 3 - GENERAL

### 3.1 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

C. Mechanical Coupling Devices: Conform to ACI 318, 18.2.7.1 and Tested according to ICC-ES Acceptance Criteria for Mechanical Connector Systems for Steel Reinforcing Bars (AC133).

1. Type 1: Provide in locations that do not require Type 2 as noted below.
2. Type 2: Provide where mechanical splices are specified in in concrete moment frames, shearwalls, concrete diaphragms, and where indicated in the drawings.
3. Where not specifically indicated on the drawings, mechanical devices is subject to approval of the architect.

D. Headed deformed bars: ASTM A970, Class HA

## 3.2 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type II, gray.
2. Fly Ash: ASTM C 618, Class F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag cement.

C. Normal-Weight Aggregates: ASTM C 33/C 33M coarse aggregate, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

Retain coarse-aggregate size from three options in "Maximum Coarse-Aggregate Size" Subparagraph below; insert gradation requirements if preferred. Aggregate size limits relate to spacing of steel reinforcement, depth of slab, or thickness of concrete member.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches, nominal
    a. Unless noted otherwise, limit max coarse aggregate as follows:
        1) Three-fourths of the minimum clear spacing between reinforcing bars.

2) One-fifth of the narrowest dimension between the sides of the forms.
3) One-third of the thickness of the slabs or toppings.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Lightweight Aggregate: ASTM C 330/C 330M, 3/4 inch nominal maximum aggregate size.

E. Water: ASTM C 94/C 94M and potable.

## 3.3 ADMIXTURES

A. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Air-Entraining Admixture: ASTM C 260/C 260M.
2. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
3. Mid-Range Water Reducing Admixture: ASTM C 494/C 494 M, Type A and F
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. Retarding Admixture: ASTM C 494/C 494M, Type B.
6. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
7. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
9. Workability-Retaining Admixtures: ASTM C 494/C 494M, Type S.

B. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Products:

a. Axim Italcementi Group, Inc.; CATEXOL CN-CI.
b. BASF Construction Chemicals – Building Systems; Rheocrete CNI.
c. Euclid Chemical Company (The); Eucon, CIA.
d. Grace Construction Products, W.R. Grace & Co.; DCI.
e. Sika Corporation; Sika CNI.

C. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Available Products:

a. BASF Construction Chemicals – Building Systems; Rheocrete 222+.
b. Cortec Corporation; MCI 2000 or 2005NS.
c. Grace Construction Products, W.R. Grace & Co.; DCI-S.
d. Sika Corporation; FerroGard-901.

D. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Color: As selected by Architect from manufacturer's full range.

## 3.4 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Profile: As indicated.
2. Dimensions: 6 inches by 3/8 inch thick; nontapered.

## 3.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products:

a. Fortifiber Building Systems Group; Moistop Ultra 15
b. Meadows, W.R., Inc; Perminator 15 mil.
c. Raven Industries Inc.; Vapor Block 15.
d. Reef Industries, Inc; Griffolyn 15 Green
e. Stego Industries, LLC; Stego Wrap 15 mil Class A.

## 3.6 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

## 3.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

## 3.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

## 3.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

2. Provide concrete mixtures that meet the durability requirements of ACI 301, based on exposure categories noted in the drawings.

B. Retain first option in "Cementitious Materials" Paragraph below if required for replacing part of the portland cement, which would otherwise be used in concrete, with other cementitious materials. Retain second option if limiting percentage of cementitious materials that can replace portland cement. Neither ACI 301 (ACI 301M) nor ACI 318 (ACI 318M) limit amount of cementitious materials that can replace portland cement unless concrete is exposed to deicing chemicals. Identify parts of building or structure affected by these limits unless extending them to all concrete.

C. Compressive Strength: As indicated on Drawings

D. Unit Weight: As indicated on Drawings

E. Cementitious Materials:

1. Maximum W/C Ratio: As indicated in drawings.
2. Minimum Cementitious Materials Content for Slabs:
    a. 470 lb/cu. yd. for maximum aggregate of 1-1/2 inches
    b. 520 lb/cu. yd. for maximum aggregate of 1 inch
    c. 540 lb/cu. yd. for maximum aggregate of 3/4 inch
    d. 310 lb/cu. yd. for maximum aggregate of 3/8 inch
3. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
    a. Fly Ash: 25 percent.
    b. Combined Fly Ash and Pozzolan: 25 percent.
    c. Slag Cement: 50 percent.
    d. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

F. Slump Limit: 4 inches plus or minus 1 inch

1. Water reducing or plasticizing admixtures are permitted to increase the slump to a maximum of 8 inches for concrete with a verified slump of 2 to 4 inches before adding the water reducing or plasticizing admixtures.

G. Air Content: As required to meet durability requirements of ACI 301 for exposure indicated in drawings.

1. Do not allow air content of trowel-finished floors to exceed 3 percent.

H. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

I. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

3.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

3.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F , reduce mixing and delivery time to 60 minutes.

PART 4 - EXECUTION

4.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.

2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

## 4.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

## 4.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

## 4.4 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

## 4.5 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

## 4.6 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Mechanical Coupling Devices: Install per manufacturer's written instructions and code Evaluation Report.

G. Headed Deformed Bars: Install per manufacturer's written instructions and code Evaluation Report.

## 4.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

## 4.8 WATERSTOP INSTALLATION

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

## 4.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time

necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

## 4.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches

adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

## 4.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
    a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.
    b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
    c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.

d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

## 4.12 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
3. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

## 4.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing

operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

4.14 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 28 days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

4.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

4.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

4.17 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections: As indicated in the Statement of Special Inspection

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 150 cu. yd. or 5,000 sf of surface area of slabs or walls, or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

    a. ASTM C 231/C 231M, pressure method, for normal-weight concrete
    b. ASTM C 173/C 173M, volumetric method, for structural lightweight concrete

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

## 4.18 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 03 30 00

**SECTION 05 12 00**

**STRUCTURAL STEEL FRAMING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Prefabricated building columns.
3. Field-installed shear connectors.
4. Grout.

B. Related Requirements:

1. Section 053100 "Steel Decking" for field installation of shear connectors through deck.
2. Section 055000 "Metal Fabrications" for miscellaneous steel fabrications not defined as structural steel.

1.3 REFERENCE

A. Abbreviations and Acronyms

1. AISC: American Institute of Steel Construction
2. AWS: American Welding Society

B. Definitions

1. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
2. Seismic-Force-Resisting System: Elements of structural-steel frame designated as "SFRS" or along grid lines designated as "SFRS" on Drawings, including columns, beams, and braces and their connections.
3. Heavy Sections: Rolled and built-up sections as follows:
    a. Shapes included in ASTM A 6/A 6M with flanges thicker than 2 inches for elements not part of the SFRS.

b. Shapes included in ASTM A 6/A 6M with flanges thicker than 1 1/2 inches for SFRS elements.
c. Welded built-up members with plates thicker than 2 inches.
d. Column base plates thicker than 2 inches.

4. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are restricted.
5. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "DCW" on Drawings.

C. Referenced Standards

1. AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC 360, "Specifications for Structural Steel Buildings"
3. AISC 341, "Seismic Provisions of Structural Steel Buildings"
4. RCSC, Specifications for Structural Joints Using High Strength Bolts"
5. AWS D1.1, "Structural Steel Welding Code"
6. AWS D1.8, "Structural Welding Code – Seismic Supplement"

1.4 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars and runoff tabs that are to be removed and supplemental fillet welds where backing bars are to remain.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. For slip-critical connections, identify faying surface and required preparation.
6. Identify members and connections of the Seismic-Force-Resisting System (SFRS).
7. Indicate locations and dimensions of protected zones.
8. Identify demand critical welds.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1 for each welded joint whether prequalified or qualified by testing. Provide only those procedures relevant to the project. Including the following with each WPS and PQR:

1. Identify Demand Critical Welds on the WPS

    a. Certification that filler metal for demand critical welds meets heat input envelope testing requirements specified in AWS D1.8.

2. Electrode manufacturer and trade name, including data sheets showing recommended parameters.
3. Power source (constant current or constant voltage).

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. Installer
2. Fabricator

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

1. Include CVN testing for heavy sections per subparagraph 2.1I.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control and special inspection reports.

1.8 QUALITY ASSURANCE

A. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: As indicated on drawings

B. Channels, Angles Shapes: As indicated on drawings

C. Plate and Bar: As indicated on drawings

D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: As indicated on drawings.

E. Cold-Formed Hollow Structural Sections: As indicated on drawings.

F. Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.

G. Steel Pipe: As indicated on drawings.

1. Weight Class: Standard, UNO on drawings.
2. Finish: Black except where indicated to be galvanized.

H. Welding Electrodes: Comply with AWS requirements.

1. Weld Electrodes shall meet minimum CVN requirements as follows:

a. All Welds: 20 ft-lb @ 0 deg F.
b. Demand Critical Welds: 40 ft-lb @ 70 deg F.

I. Heavy Sections: All heavy sections shall meet the ASTM A6 supplementary requirement S30, as modified by AISC 360, section A3.1C, for Charpy V-Notch Testing.

## 2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts: ASTM A325, Type 1, heavy hex, where indicated on drawings.

1. Nuts: ASTM A 563, Grade C, heavy-hex carbon-steel
2. Washers: ASTM F 436, Type 1, hardened carbon-steel
3. All with plain finish.
4. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts.

1. Nuts: ASTM A 563, Grade DH, heavy-hex carbon-steel
2. ASTM F 436, Type 1, hardened carbon-steel
3. All with plain finish.
4. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish.

C. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.
2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: As indicated on the drawings, assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain

E. Shear Connectors: As indicated on the drawings

F. Anchor Rods: As indicated on the drawings.

1. Configuration: As indicated on the drawings
2. Nuts: ASTM A 563 heavy-hex carbon steel.
3. Plate Washers: ASTM A 36 carbon steel.
4. Washers: ASTM F 436, Type 1, hardened carbon steel.
5. Finish: Plain

G. Threaded Rods: As indicated on the drawings.

1. Configuration: As indicated on the drawings
2. Nuts: ASTM A 563 heavy-hex carbon steel.
3. Washers: ASTM F 436, Type 1, hardened carbon steel.
4. Finish: Plain

H. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

I. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

J. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

## 2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

1. Use type acceptable to governing air quality management officials

B. Galvanizing Repair Paint: ASTM A 780.

## 2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
2. Thermal cutting of Heavy Sections shall comply with AISC 360, section M2.2.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Slip Critical Joints: Prepare the faying surface at slip critical joints to Class B.

F. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

H. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members. Holes not identified in drawings are subject to review and approval by Architect.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, unless noted as “Pretensioned” or “Slip Critical” in drawings

B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## 2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Surfaces enclosed in interior construction.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

## 2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M after fabrication.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2. Galvanize structural steel and miscellaneous steel exposed to weather or moisture, unless called out to be painted on the drawings. See drawings for additional structural steel required to be galvanized.

2.9 SOURCE QUALITY CONTROL

A. Comply with the Quality Control and Quality Assurance requirements of AISC 360, Chapter N and AISC 341, Chapter J.

B. Quality Assurance Inspector (QAI)

1. Owner will engage a qualified testing agency to perform inspections identified in this article along with quality assurance tests and inspections in AISC 360, Chapter N and AISC 341, Chapter J and the statement of special inspection.
2. Provide Quality Assurance Inspector with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
3. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
4. The Quality Assurance Inspection requirement may be waived if fabrication is done on the premises of a fabricator registered and approved to perform such work without special inspection by the Authority Having Jurisdiction.

a. Where Quality Assurance Inspections are waived, the fabricator shall submit a certificate of compliance to the Architect, stating that the work was performed in accordance with the approved construction documents.

C. Quality Control Inspector (QCI)

1. The fabricator shall provide quality control inspections required by AISC 360, Chapter N and AISC 341, Chapter J.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

F. Inspections:

1. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

3. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:

a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
b. Conduct tests according to requirements in AWS D1.1 on additional shear connectors if weld fracture occurs on shear connectors already tested.

G. Prepare test and inspection reports.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

### 3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

## 3.4 PROTECTED ZONES

A. Do not damage, drill, cut, or gouge the steel elements in the protected zone. Do not make any attachment (bolt, rivet, shotpin, screw, weld, etc) to steel elements within the protected zone.

B. Take measures to identify the extent protected zones throughout construction. The method of identification shall be clearly visible from all sides, including from above where applicable.

C. Communicate restrictions to all parties performing work on the project.

D. Protected Zones on Beams: Permanently identify protected zones on beams by application of bright red or orange paint after application of fireproofing.

1. Provide a permanent metal sign adjacent to each protected zone that reads: “Protected Zone! Make no attachment to structural steel in painted area. Do not Drill, Bolt, Rivet, Shotpin, Screw, or Weld”

## 3.5 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless noted as “Pretensioned” or “Slip critical” in the drawings.

B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

a. Remove all runoff tabs from heavy sections.

3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

## 3.6 FIELD QUALITY CONTROL

A. Comply with the Quality Control and Quality Assurance requirements of AISC 360, Chapter N and AISC 341, Chapter J.

B. Quality Assurance Inspector (QAI)

1. Owner will engage a qualified testing agency to perform inspections identified in this article along with quality assurance tests and inspections in AISC 360, Chapter N and AISC 341, Chapter J and the statement of special inspection.
2. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

C. Quality Control Inspector (QCI)

1. The erector shall provide quality control inspections required by AISC 360, Chapter N and AISC 341, Chapter J.

D. Inspections:

1. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
2. Welded Connections: Visually inspect field welds according to AWS D1.1.
    a. In addition to visual inspection, test and inspect field welds according to AWS D1.1 and the following inspection procedures, at testing agency's option:
        1) Liquid Penetrant Inspection: ASTM E 165.
        2) Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
        3) Ultrasonic Inspection: ASTM E 164.
        4) Radiographic Inspection: ASTM E 94.
3. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
    a. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
    b. Conduct tests according to requirements in AWS D1.1 on additional shear connectors if weld fracture occurs on shear connectors already tested.

## 3.7 REPAIRS AND PROTECTION

A. Protected Zones: Repair errant connections made to protected zone or damage to steel in protected zones as directed by Architect.

B. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

C. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 05 12 00

# SECTION 05 12 10 - WELDING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Work included in This Section:

1. Provisions for the welding of all structural steel members. This includes both field and shop welding.
2. All Welding shall be performed in full accordance with the latest edition of the AWS D1.1-2015 Structural Welding Code-Steel, except as supplemented or modified by this specification. Reiteration or amplification of code provisions as contained in the specification shall not reduce the necessity of compliance with all other code requirements.
3. Shop welding may be by any of the AWS D1.1-2015 approved welding processes except electroslag (ESW) and electrogas (EGW) without specific approval by the engineer.

B. Related Sections:

1. All pertinent provisions of Division 01, “General Requirements.”
2. Section 03 20 00: Concrete Reinforcement
3. Section 05 06 50: Welded Stud Connectors
4. Section 05 12 00: Structural Steel Framing
5. Section 05 31 00: Metal Floor and Roof Decking

### 1.2 REFERENCES

A. References as specified in Section 05 12 00, “Structural Steel Framing.”

B. Applicable portions of specification section 05 12 00 apply to the work of this section. Contractor shall be responsible to incorporate all applicable portions of specification section 05 12 00 into this section.

### 1.3 SUBMITTALS

A. Comply with pertinent provisions of Division 01, Section 01 33 00, “Submittal Procedures.”

B. Welding Procedure specification (WPS):

1. All WPS's shall be submitted to the Structural Engineer of Record (SEOR) and OSHPD for review and approval prior to use.
2. For WPS's that have been qualified by test, the supporting Procedure Qualification Record (PQR) shall be submitted to the Engineer and OSHPD for review and approval. All WPS's and PQR's shall be in accordance with the forms shown in this section.

3. Manufacturer's product data sheets or catalog data for SMAW, FCAW and GMAW composite (cored) filler metals to be used. The data sheets shall describe the product, limitations of use, recommended or typical welding parameters, and storage and exposure requirements, including baking, if applicable.
4. Copies of the manufacturer's typical certificate of conformance for all electrodes, fluxes and shielding gases to be used. Certificates of conformance shall satisfy the applicable AWS A5 requirements. For demand critical welds, submit applicable manufacturer's certifications that the filler metal meets the supplemental notch toughness requirements.
5. Included shall be WPS for repair welds.

C. Submit current valid certificate issued by an independent testing agency for all welders, welding operators, and tack welders.

D. Submit qualification credentials of all inspectors.

E. Submit to the Engineer for approval, a step-by-step welding sequence for the field welding of beam-to-column CP-welded and beam-to-beam CP-welded splice connections.

F. Submit a quality control plan that addresses all inspection issues, including in-process and final inspection that are addressed in AWS D1.1.

## 1.4 QUALITY ASSURANCE

A. Comply with all pertinent provisions of Division 01, Section 01 40 00, "Quality Requirements."

B. Standards:

1. American Welding Society
    a. Structural Welding Code (AWS D1.1-2015)
    b. Structural Welding Code – Seismic Supplement (AWS D1.8-2016)

2. American Institute of Steel Construction
    a. Specification for Structural Steel Buildings (AISC 360-16)
    b. Code of Standard Practice for Steel Buildings and Bridges (AISC 303-10).
    c. Seismic Provisions For Structural Steel Buildings (AISC 341-16).

# PART 2 - PRODUCTS

## 2.1 WELDING PROCESSES

A. Weld Procedure Specifications, including Procedure Qualification Records shall be submitted and approved by the SEOR and OSHPD prior to welding. PQRs shall include test results that demonstrate all-weld metal CVN values meet the requirements of Paragraph 2.2A.1 and a minimum tensile strength of 70KSI. CVN and minimum tensile strength conformance of the filler metal may be

established by submitting with the PQR the results of heat input envelope testing as per AWS D1.8 section 6.3.1.2.

2.2 MATERIALS

A. Electrodes:

1. Filler metals shall conform to the requirements of the latest edition of ANSI/AWS Specifications for Electrodes as listed herein and shall meet Charpy V-Notch Impact Energy of 20 ft-lbs. at 0°F. Filler metals for demand critical welds shall meet Charpy V-Notch Impact Energy of 20 ft-lbs. at -20°F and 40 ft-lbs at 70°F as per Appendix X of AISC 341-05.

   a. SMAW A5.1 or A5.5 E70XX Low Hydrogen
   b. SAW A5.17 or A5.23 F7XX-EXXX or F7XX-EXXX-XX
   c. GMAW A5.18 or A5.28 ER70S-X
   d. FCAW A5.20 or A5.29 E7XT-X except T8-K6

   The Charpy V-Notch requirement above does not apply to welds used in the construction of stairs, elevator guiderail supports, steel supports for partitions or exterior walls, steel supports for exterior architectural appendages, steel supports for MEP equipment, rooftop screen walls, and light gage metal stud framing.
2. The use of E70-T4 Electrode is not allowed for any welding application.
3. The manufacturer shall certify that consumables used in the Work conform with AWS D1.1 and AWS D1.8.

PART 3 - EXECUTION

3.1 WELDING PROCEDURE SPECIFICATION (WPS)

A. All welding shall be performed in strict adherence to a written WPS, whether the WPS be pre-qualified or qualified by test. Electrodes shall be limited to the diameters listed herein and welding shall preferably use a stringer bead technique. If weave beads are used, they shall be limited to the following diameter widths:

1. SMAW – Maximum diameter (d) 3/16 inch and maximum widths shall be:

   a. 4d for 3/32 inch electrodes
   b. 3d for 1/8 inch electrodes
   c. 2 ½ d for 5/32 inch electrodes
   d. 2 d for 3/16 inch electrodes limited to flat and horizontal positions
   e. These weave widths shall be strictly adhered to except final (cover) pass(s) may be a maximum of 5/8 inches.

B. All WPS's shall be prepared by qualified individuals and the same individual responsible for the suitability of the WPS.

C. The written WPS shall be available to the welder, welding supervisor, and inspector.

D. All welding equipment shall be properly maintained. Current/amperage and voltage shall be tested for compliance to WPS required ranges by calibrated instruments and also such gauges on the equipment shall be checked for manufacturers stated accuracy.

E. WPS's for SMAW, SAW and FCAW-G may be pre-qualified providing they meet all the requirements of AWS D1.1-2015, paragraph 3.2.1. Any deviation from the pre-qualified WPS requirements shall necessitate qualifications by test.

F. WPS's that are not pre-qualified shall be subject to the qualification testing specified in AWS D1.1-2015, section 4. For WPS's that have not been qualified by test, the supporting procedure qualification record (PQR) shall be submitted with the WPS for approval by the Engineer.

G. The written WPS shall contain all the necessary information required by the code, this specification, and any other information necessary to produce the welds that are in compliance with these requirements.

H. The WPS shall list the applicable base metal types and thicknesses.

I. The WPS shall contain a sketch of the joint and shall list the welding joint details, including type, weld type, joint geometry, and applicable dimensions. Individual weld passes shall be identified in the sketch and numbered to identify the maximum layer thickness and bead widths. Layer thickness shall conform to AWS D1.1 table 3.6 or as qualified by the PQR.

J. The WPS shall list the applicable welding processes.

K. The WPS shall indicate the minimum preheat requirements. The preheat and inter-pass temperatures shall be determined in accordance with AWS D1.1 Table 3.3. Maximum inter-pass temperature shall be 550□F.

L. The WPS shall list all applicable electrical characteristics for the process employed and shall include, as a reference, the electrode manufacturer’s cutsheet. The product data sheets or catalog data for SMAW FCAW and The WPS shall clearly indicate the acceptable values required for each welding pass. These electrical characteristics shall include at a minimum the following:

1. Type of current, and acceptable ranges of current measures in amperage. For wire feed process both wire feed and amperage should be listed.
2. Voltage
3. Travel speed (range)
4. Electrode extension for wire feed processes
5. Amperage, voltage and electrode extension (as applicable) shall be within the filler metal manufacturer's recommendation

M. The diameter of the electrodes specified on the WPS shall not exceed the limits listed in section 3.1.A. of this specification section.

3.2 FABRICATION AND ERECTION

A. Assembly:

1. Assembly shall not exceed those for pre-qualified joint detail employed, or the limits of AWS D1.1-2015, Figures 5.3 and 5.4, as applicable. The minimum root opening dimension shall be maintained for the length of the joint. For joints where the minimum root opening dimension is less than the minimum requirement, compensation may be made by increasing the root opening by gouging, chipping or grinding. At the contractor's option, or alternate approved written WPS suitable for the smaller root opening may be employed. Root openings that exceed the maximum allowable may be corrected by welding to acceptable dimensions prior to joining the parts by welding. The Engineer shall be notified when the root opening exceeds the allowable tolerance range.

B. Tack Welds: All tack welds shall be of the same quality as the final welds. This includes the requirements for preheat except as noted in AWS D1.1 section 5.17.5.

C. Weld Access Holes: Weld Access holes shall be sized to ensure adequate access for the welding process being used. Minimum sizes shall be in accordance with AWS D1.1-2015, 5.16 and Figure 5.2

D. Weld Termination:

1. Weld tabs shall be employed as shown in the Structural Drawing. Minimum length shall be the thickness of groove joint or 1 inch, whichever is greater, but not exceed 2 inches as per AWS D1.8 section 6.16.1.
2. End dams shall not be allowed.
3. Weld tabs shall be removed in accordance with AWS D1.8 section 6.16.3.

E. Steel Backing: Remove steel backing where so indicated on drawings. If backing bars are removed, the removal area shall be tested for defects or a reinforcing fillet weld, at least ¼ of the flange thickness, but not greater than 3/8 inch, shall be applied.

F. Preheating: To ensure the work place is properly heated, the temperature of the part shall be measured at a distance from the axis of the weld equal to twice the thickness of the thickest part being welded, but in no case less than 3 inches in all directions, including the through thickness dimension of the part being welded, for the full length of the weld joint. Preheat shall be verified by the inspector before welding commences.

G. Peening: Peening shall not be allowed except if approved by the SEOR.

H. Technique for making Welds involving Weld Access Holes:

1. After the joint is assembled (bolts not fully torqued), the weld shall be completed as follows:

a. The root pass shall initiate near the center of the joint, in the area of the weld access hole. The welder shall extend the electrode through the weld access hole approximately 1" beyond the opposite side of the web. After the arc is initiated, travel shall progress toward the end of the joint, and the weld shall be terminated on the weld tab.

b. The half-length of root pass shall be thoroughly cleaned.
c. The start of the weld in the weld access hole area shall be visually inspected to ensure fusion, soundness, freedom from slag inclusions, and excessive porosity, the resulting lead profile shall be suitable for obtaining good fusion by the subsequent pass to be initiated on the opposite side of the beam web. If the profile is not conducive to good fusion, the start of the first root pass shall be ground, gouged, chipped or otherwise prepared to ensure adequate fusion.
d. The second half of the weld joint shall have the root pass applied before any other weld passes are performed. The arc shall be initiated in the area of the start of the first root pass, and travel shall progress to the end of the joint, terminating on the weld tab.
e. Each new layer shall be completed on both sides of the joint before a new layer is deposited.
f. Deviation from the preceding procedure may be made, providing the contractor submits in writing an alternate sequence that is approved by the Engineer and OSHPD prior to fabrication.

## 3.3 QUALITY CONTROL AND QUALITY ASSURANCE

A. Where there is a conflict with the above specifications and the drawings, the more stringent of the two shall prevail.

B. Comply with pertinent provisions of Division 01 Section 01 40 00 “Quality Requirements.”

C. Inspection provided by the Owner:

1. Qualifications: All inspectors shall meet the requirements of AWS D1.1, section 6.1.4 and hold current Certified Welding Inspector (CWI) certification.
2. Inspection Agency Responsibility: The inspection agency shall perform all required inspection including the requirements herein. The inspector(s) shall be present before during and after welding on all Complete Joint Penetration (CJP) weld and as necessary during all other welding operations. The inspector(s) shall also be present during removal of steel backing and run off tabs.
3. All full penetration groove welds shall be ultrasonic testing, as per AWS D1.1, Section 6 "Inspection, Part "F", Ultrasonic Testing of Groove Welds". All defective welds shall be repaired and retested with ultrasonic equipment at the Contractor's expense.
4. Flanges: An area extending 6" above and below point of attachment for CJP welds and flange edge shall be inspected visually, and the entire area ultrasonically for lamination, plate discontinuities and non-metallic inclusions.
5. Ultrasonic inspections of all CJP welds shall be conducted from both the top and bottom sides of the flange, and from the back side of the column flange as necessary to determine potential rejectable welding defects.
6. All weld tabs shall be removed. The affected area shall be ground smooth and magnetic particle tested for defects. Dye penetrant may be used where required.
7. Where backup bars are required to be removed, the weld root area shall be magnetic particle tested for defects.

8. Base metal thicker than 1½ inches, when subjected to through thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such weld before and after joint completion. Repairs if needed, to parent material shall comply with ASTM A6 Sec.9.
9. All Non-Destructive Testing (NDT) shall be performed after all welds are complete including, but not limited to, removal of steel backing and grinding of same, removal of reinforcement as per AWS D1.1 section 5.23.4 any postweld heat treatment. This is not intended to exclude in-house intermittent NDT programs.
10. All NDT except UT shall not be started before a minimum of 24 hours after subject weldments have cooled to ambient temperature.
11. NDT personnel, other than UT, shall also submit their experience and qualification on like type weldments when required by the Engineer.

WELDING PROCEDURE SPECIFIC ATION (WPS) Yes ☐
PREQUALIFIED ☐ QUALIFIED BY TESTING ☐
Or PROCEDURE QUALIFICATION RECORDS (PQR) Yes ☐

Company Name _____
Welding Process _____
Supporting PQR No. (s) _____

Identification # _____
Revision _____ Date _____ By _____
Authorized by _____ Date _____
Type: Manual ☐ Semi-Automatic ☐
Machine ☐ Automatic ☐

JOINT DESIGN USED
Type: _____ Single ☐ Double Weld ☐
Backing: Yes ☐ No ☐
Backing Material _____
Root Opening _____ Root Face Dim. _____
Groove Angle _____ Radius (J-U) _____
Back Gouging Y ☐ N ☐ Method _____

POSITION
Position of Groove Fillet: _____
Vertical Progression: Up ☐ Down ☐

ELECTRICAL CHARACTERISTICS
Transfer Mode (GMAW) Short Circuiting ☐ Spray ☐
Globular ☐
Current: AC ☐ DCEP DCEN ☐ Pulsed ☐
☐

BASE METALS
Material Spec. _____
Type or Grade _____
Thickness Groove _____ Fillet _____
Diameter (Pipe) _____

FILLER METALS
AWR Specification _____
AWS Classification _____
MNFR ID _____
SHIELDING
Flux _____ Gas _____
Composition _____
Electrode-Flux (Class) _____ Flow Rate _____
Gas Cup Size _____

PREHEAT
Preheat Temp. Min. _____
Interpass Temp. Min. _____ Max _____

Other _____
Tungsten Electrode (GTAW): Size _____
Type _____

TECHNIQUE
Stringer or Weave Bead _____
Multi-pass or Single Pass (per side) _____
Number of Electrodes _____
Electrode Spacing: Longitudinal _____
Lateral _____
Angles _____
Contact Tube to Work Distance _____
Peening _____
Interpass Cleaning _____

*POSTWELD HEAT TREATMENT*
Temp. _____
Time _____

WELDING PROCEDURE

| Pass or Weld Layer (s) | Process | Filler Metals | | Current | | Volts | Travel Speed | Joint Details |
|---|---|---|---|---|---|---|---|---|
| | | Class | Diam. | Type & Polarity | Amps or Wire Feed Speed | | | |
| | | | | | | | | |

PROCEDURE QUALIFICATION RECORD

| | |
|---|---|
| Fabricator | Test Date |
| Process | Filler Metal |
| Position | |
| Electrode(s) Mfg. Designation | |
| Flux Mfg. Designation | |
| Electrode Extension | |

| | Diam. | Current | WFS | Voltage | Current & Polarity |
|---|---|---|---|---|---|
| Electrode (1) | | | | | |
| (2) | | | | | |
| (3) | | | | | |

| | |
|---|---|
| Calculated Heat Input (see 5.2.4) | |
| Shielding Gas | Flow Rate |
| Dew Point | Travel Speed |
| Base Metal Specification & Thickness | |
| (attach certified copy of mill test report) | |

| | |
|---|---|
| Preheat Temp. | Interpass Temp. Minimum Maximum |

| SPECIMEN | TEST RESULTS |
|---|---|
| A Weld Metal Tension (AWMT) | Tensile Strength (psi) |
| | Yield Strength (psi) |
| | Elongation in 2 in. (%) |
| | Reduction in area (%) |

| | | | | |
|---|---|---|---|---|
| Side Bends | 1) | 2) | 3) | 4) |

| | | |
|---|---|---|
| Reduced Section Tension | Tensile Strength 1) | Location of Break 1) |
| | 2) | 2) |

| | | | |
|---|---|---|---|
| Charpy V-Notch Impact Toughness of Weld Metal | Avg. Ft. lb. | @ | Degrees F. |

| | | | |
|---|---|---|---|
| SMAW, SAW, FCAW, GMAW – 5 Reg. Toughness of Weld Metal | Avg. Ft. lb. | @ | Degrees F. |

| | | | | | |
|---|---|---|---|---|---|
| Chemistry of Deposited Weld Metal | C | Mn | Si | P | S |
| When Required by Contract Documents | Ni | Cr | Mo | V | Cu |

| | |
|---|---|
| REMARKS | Visual |
| | Radiographic Test |

Wire feed may be used in lieu of current when a correlation curve for the same electrode diameter and same electrode extension.

| | | |
|---|---|---|
| Test Witness: | Agency: | |
| Results Reviewed: | State Acceptance: | Date: |

END OF SECTION 05 12 10

# SECTION 05 40 00 – METAL STUD FRAMING SYSTEMS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:

1. Cold formed metal framing systems for interior or exterior walls.

B. Related Sections include the following:

1. Division 9 Section "Gypsum Board Assemblies" for non-load-bearing, metal-stud-framed assemblies for interior non-load-bearing partitions and ceilings.
2. Division 9 Section "Gypsum Board Assemblies" for cement backer board-based ex-terior sheathing for exterior metal-stud framing.
3. Division 9 Section "Gypsum Sheathing" for gypsum-based exterior sheathing for ex-terior metal-stud framing.

### 1.2 SUBMITTALS

A. Product Data: Submit framing manufacturer's literature, including a current ICC Evaluation Report, showing tabulation of structural properties, load capacities, dimensions, metal gages and type of coating for all framing and furring members. Submit powder driven fastener manufacturer's current ICC Evaluation Report.

B. Submit mill certificates signed by steel sheet producer or test reports from a qualified independent testing agency indicating steel sheet complies with requirements, including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, ductility, and galvanized-coating thickness.

C. Submit welding procedures for all welding applications to the Architect and SEOR for review.

### 1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Furnish and install wall framing and powder driven fasteners in accordance with the framing and fastener manufacturer's current ICC Evaluation Reports.

C. Fire Rated Assemblies: Comply with IBC, Chapter 7 - Fire-Resistant Materials and Construction.

1. Provide framing identical to that used in assemblies tested for fire resistance ac-cording to ASTM E 119 and listed by GA File Numbers in GA-600, "Fire Resistance Design Manual," or by design designations from UL's "Fire Resistance Directory" or from the listings of

another testing and inspecting agency acceptable to the authorities having jurisdiction over the work.

2. Provide fire resistive head of wall joint assemblies identical to those used in assemblies tested for fire resistance according to UL 2079 after cyclical movement in accordance with IBC Section 706 and listed by Underwriters Laboratories, Intertek Testing Services or other testing and inspecting agency acceptable to the authorities having jurisdiction over the work.

D. Pre-installation Conference: Before beginning installation of the metal framing systems, hold a conference with representatives of the installers of metal framing systems, door frames, plaster, gypsum board, mechanical and electrical construction, Contractor, in attendance. The conference shall assure a clear understanding of the drawings and specifications resolve possible conflicts and establish coordination between all parties involved.

E. Mock-Ups: Comply with the requirements specified elsewhere in these specifications.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project site and store them in adequately ventilated dry locations. If it is necessary to store materials outside, stack them off the ground on a platform and fully protected from the weather.

# PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

A. Available Manufacturers: Provide the product of any manufacturer complying with AISI standard S100-NAS (see also AISI D100-08), as well as the requirements of this specification section.

## 2.2 MATERIALS

A. Hot dip Zinc Coated Steel: ASTM A653, Grade SS, designation G60, 50,000 psi yield strength or greater.

B. Carbon Steel: ASTM A10003, Grade 50, Type H (50,000 psi) or greater. Provide framing components with electro galvanized finish, conforming to ASTM A633, Type RS or shop applied red oxide, zinc chromate or other similar primer.

C. Welding Electrodes: AWS A5.1 latest edition or A5.5 latest edition. E60xx and/or E70xx. For cold formed metal framing welded to structural steel use low hydrogen E70xx electrodes.

D. Expansion Anchors: All anchors shall have ICC approval in compliance with the 2018 IBC. Typical anchors shall be carbon steel. Stainless steel anchors are required for locations identified on specific details and where the anchors are exposed to weather.

E. Powder-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, and with ICC approval in compliance with the 2015 IBC. Provide the product of one of the following acceptable manufacturer or the equal product of another manufacturer approved in accordance with Division 01 Section "Substitution Procedures".

1. Hilti Corp.
2. ITW/Ramset/Red Head
3. Powder Power Tool Corp.

F. Mechanical Fasteners: Minimum no. 8 by 3/8 inch cadmium or zinc coated self-drilling, self-threading steel drill screws with low-profile head beneath sheathing, and manufacturer's standard head elsewhere unless otherwise noted on contract documents.

G. Galvanizing Repair Compound: High zinc dust content galvanizing repair paint meeting the requirements of ASTM A780 or hot applied zinc rich material. Provide one of the following available products or another product complying with the referenced standard:

1. American Solder & Flux; Drygalv
2. Kenco Div.; Galvicon
3. Metalloy Products Co.; Galvalloy

## 2.3 NON-LOAD-BEARING WALL FRAMING

A. Fabricate all framing members in interior or exterior walls from hot dip zinc coated steel.

B. Steel Studs: Manufacturer's standard C-shaped steel studs fabricate from hot dip zinc coated steel and complying with ASTM A1003. Minimum uncoated-steel thickness shall be 0.0538 inch. Web shall be punched and shall be of depths indicated. Flange width shall be not less than 1-5/8 inches unless otherwise noted on contract documents.

C. Steel Track: Manufacturer's standard U-shaped steel track fabricate from hot G60 galvanized steel and complying with ASTM A1003. Minimum uncoated-steel thickness shall be 0.0538 inch. Web shall be unpunched and shall be of depths indicated. Flange width shall be not less than 1-1/4 inches unless otherwise noted on contract documents.

D. Deflection Clips: Provide deflection clips, as shown in the contract documents, capable of accommodating upward, downward and horizontal displacements of primary structure.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with minimum yield strength of 33,000 psi unless noted otherwise on contract documents.

B. Provide accessories noted below, of thickness and configuration indicated on the Drawings. Where not indicated provide accessories manufacturer's standard of thickness and configuration.

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Stud kickers, knee braces, and girts.
4. Hole reinforcing plates.
5. Backer plates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.2 INSTALLATION

A. General: Conform to rules and practices set forth in the 2018 IBC, AISI “Specification for the Design of Cold-Formed Steel Structural Members”, ASTM C 1007, and with the manufacturer's printed instructions and recommendations, as applicable.

1. Cut stock neat and square. Cut framing members by sawing or shearing; do not torch cut. Provide members free of kinks and twists. Do not use damaged or dis-torted materials.
2. Erect straight, plumb, square, true to lines, levels or elevations indicated, free from excessive twists and bends and braced against racking.
3. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
4. Use pre-punched openings in the studs wherever possible to run 1½” outside diame-ter or smaller conduit or plumbing lines horizontally between studs, unless noted otherwise on the contract drawings. If larger or additional penetrations are required in studs, reinforce studs per the contract drawings.

5. Install 10’ long tracks (provide track splice for continuity where required) sized to match studs, unless noted otherwise in contract drawings. Align tracks accurately and securely anchor to supporting structure as indicated on contract documents.
6. Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges; wire tying of framing components will not be permit-ted.
    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Contract Drawings, with screw penetrating joined members by not less than three exposed screw threads.
7. Install supplementary framing, blocking, and bracing in metal framing system wher-ever walls or partitions are indicated to support fixtures, equipment, services, case-work, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Use backing plates per Contract Drawings and of proper size to ac-commodate fastenings.
8. Frame wall openings larger than 2 feet square per the Contract Drawings. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs per the Contract Drawings, and space jack studs same as full height studs of wall.
9. Connect vertical deflection clips to bypassing studs and anchor to primary building structure, per Contract Drawings.

10. Provide cold-rolled steel channel bridging, where required in Contract Drawings.

B. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of lath, sheathing, wallboard or other finishing materials.

C. Touch-up: Touch up abrasions, burns, and welding, including construction activities of other trades, with primers for primed steel or with galvanizing compound if galvanized. Remove oil, grease, rust, loose scale, loose coatings, welds slag, and other deleterious material before touch up.

## 3.3 FIELD QUALITY CONTROL

A. All inspection and testing shall be in compliance with 2018 IBC requirements.

END OF SECTION 05 40 00

SECTION 05 7300 – DECORATIVE METAL GUARDRAILS AND HANDRAILS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Stair and Balcony Guardrails.

1.02 RELATED REQUIREMENTS

A. Section 017419 - Construction Waste Management and Disposal: Additional requirements for cleaning.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless
Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2020.
C. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel 2013.
D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2014, with Editorial Revision (2017).
E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2020.
F. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2016.
G. ASTM A555/A555M - Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods 2020.
H. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
I. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings 2009 (Reapproved 2015).
Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures
B. Product Data: Submit manufacturer's product data, including description of materials, components, finishes, fabrication details, anchors and accessories.
C. Shop Drawings: Indicate railing system elevations and sections, finishes, details of profile, details of attachment of metal panels to supports, dimensions, sizes, tolerances, connection attachments, anchorage, size and type of fasteners, accessories and installation methods. Indicate anchor and joint locations, connections, transitions, and terminations.
D. Samples: Submit two (2) of each item below for each type and condition shown.
1. If requested, provide up to six different powder coat samples for submittal review.
2. 3 inch by 6 inch samples of powder coat. OR 2 inch by 2 inch Kynar color chips or anodized aluminum samples

3. Pattern Sample: Submit 12 inch by 12 inch flat panel, without finish. Pattern scaling may vary depending on selection.
4. Railing: 12 inch (305 mm) long section of handrail illustrating color, finish and connection detail.

E Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Verification and Coordination:

1. Verify actual locations of walls and other construction contiguous with the work of this Section using field measurements before fabrication. Indicate measurements on Shop Drawings.
2. Embedded Anchor Plates and Structural Connections: Coordinate support sizes and locations.

B. Engineering:

1. System to be engineered by manufacturer for standard loading criteria and geometry layout.
2. Custom Systems: Structural design to be performed by the manufacturer or a Registered Structural Engineer licensed in the State in which the Project is located.
3. Engineering for panels and panel assembly will be provided by manufacturer. Structural attachment or connections to be engineered by the Engineer of Record for the Project.

C. Installer to supply manufacturer with existing field dimensions of structure, bracket locations, and any other conditions that affect the location of work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original protective coverings and packaging with corresponding labels and identifying information.
B. Protect materials against damage during transit, delivery, storage, and installation at site. Protect against bending, warping, twisting or surface damage. Store in accordance with manufacturers written instructions and in a dry location.
C. Inspect materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.
D. Store in accordance with manufacturers written instructions. Do not stack panels. Store prefinished material off ground and protected from weather; prevent twisting, bending, or abrasion, and provide ventilation to stored materials; slope metal sheets to ensure drainage. Provide protection between panels.
E. Prevent contact with materials that may cause discoloration or staining of products.

1.07 WARRANTY

A. Warranty: Manufacturer's standard one year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.
B. Correct defective work within a five year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
C. Warranty: Manufacturer's standard five year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

D. Warranty on FEVE and PVDF Finishes: Provide [manufacturer's standard 10 year warranty] OR [manufacturer's extended 20 year warranty] on finish. Not all colors are available with extended warranties. If extended warranty is required, confirm color selection with manufacturer.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. BOK Modern, Inc.; www.bokmodern.com
B. Substitutions: See Section 013300 - Substitutions.

### 2.02 RAILING SYSTEMS PERFORMANCE REQUIREMENTS

A. Railing Systems - General: Factory- or shop-fabricated in design style indicated to suit specific project conditions and for proper connection to building structure in largest practical sizes for delivery to site.

1. Performance Requirements: Design and fabricate railings and anchorages to resist the following loads without failure, damage, or permanent set; loads do not need to be applied simultaneously.

a. Lateral Force: minimum code standard at any point, when tested in accordance with ASTM E935.

b. Distributed Load: minimum code standard, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.

c. Top Rail of Guards:

1) Concentrated load of 200 lbf (0.89kN) applied at any point and in any direction.

2) Uniform load of 50 lbf-ft. (0.07kN-m) applied horizontally and concurrently with uniform load of 100 lbf-ft. (0.14kN-m) applied vertically downward.

3) Concentrated and uniform loads above need not be assumed to act concurrently.

d. Handrails not Serving as Top Rails:

1) Concentrated load of 200 lbf (0.89 kN) applied at any point and in any direction.

2) Uniform load of 50 lbf-ft. (0.07kN-m) applied in any direction.

3) Concentrated and uniform loads above need not be assumed to act concurrently.

e. Guard Infill Area:

1) Concentrated horizontal load of 200 lbf (0.89 kN) applied to 1 sq ft at any point in system including panels, intermediate rails, balusters, or other elements composing infill area. Loads need not be assumed to act concurrently with loads on top rails in determining stress on guard.

2) Thermal Movements: Panels to allow for movements resulting from 120 Degrees F (49 Degrees C) changes in ambient temperatures and 180 Degrees F (82 Degrees C) surface temperatures and base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

3) Corrosion Resistance: Separate incompatible materials to prevent galvanic
corrosion.

2. Assembly: Join lengths, seal open ends, flanges, escutcheons and wall brackets.
3. Joints: Per manufacturers recommendation for seismic movement or thermal expansion and contraction.
4. Field Connections: Provide sleeves to accommodate site assembly and installation.
5. Welded Joints: Make visible joints butt tight, flush and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
   a. Ease exposed edges to a small uniform radius.
   b. Welded Joints:
      1) Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
      2) Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
      3) Corten: Perform welding in accordance with AWS D1.1 and D1.5. For A606 and
      A588 steel AWSA5.29 and E81T1-Ni1C wire shall be used.
      4) Aluminum: Perform welding in accordance with AWS D1.2 / D1.2M. Welding
      shall use alloy 5356 filler required for anodizing.

## 2.03 ORNAMENTAL PERFORATED METAL PANELS

A. Metal Surfaces: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations or blemishes; unless allowed for specific metal types and finishes.
B. Perforated Aluminum Sheet: AA5052-H32, 0.125-inch (3.17 mm) thick.
C. Perforated Stainless Steel Sheet: ASTM A240/A240M, Type 304, thick.
D. Perforated Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel Type B, [0.074-inch (1.88 mm)] thick.
E. Perforated Corten Steel Sheet: ASTM A242/A242M, [0.074-inch (1.88 mm)].
F. Material: Corten Weathering Steel
G. Material: Hot Rolled Steel
H. Laser Cut Proprietary Pattern: As selected by the Architect from manufacturer's full library.

## 2.04 FABRICATION

A. Fabricate metal panel assemblies to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish and anchorage, but not less than required to support structural loads.
B. Fabricate systems in accordance with approved shop drawings and manufacturers written instructions. Form work true to line and level with accurate angles and surfaces.
C. Assemble metal panels in the shop to greatest extent possible to minimize field splicing and assembly.

D. Cut, drill and laser cut metals cleanly and accurately. Remove burrs and ease edges; unless allowed for specific metal types and finishes. Remove sharp or rough areas on exposed surfaces.
E. Cut, reinforce, drill and tap as indicated to receive finish hardware, screws and similar items.
F. Use grommets, bushings and washers or methods as recommended by the manufacturer for separation of dissimilar metals.

2.05 FINISHES

A. Comply with NAAMM's MFM for recommendations for applying and designating finishes.
1. Appearance of Finished Work:
a. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples.
b. Noticeable variations in same piece are not acceptable except for steel and anodized aluminum.
c. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
B. Finishes for Aluminum; Anodized :
1. Clear Anodic Finish: AAMA 611, AA-M10C22A41 CLASS I, Architectural Class 1, 0.7 to 1.2 mil coating thickness.
2. Color Anodic Finish: AAMA 611, AA-M10C22A44 CLASS II, Architectural Class 1, 0.7 to 1.2 mil coating thickness.
a. Color: As selected by Architect from manufacturers full range
3. Pretreat according to manufacturers instructions and AAMA 2604 to withstand a minimum of 2000 hours (ASTM B117) or 1500 hours (ASTM G85) salt spray testing.
4. Apply Architectural Grade AAMA 2604 compliant topcoat at a minimum of 2.5 mils and process according to manufacturer's recommendations.
5. Color and Gloss: [As selected by Architect from manufacturer's full range of choices] Finishes for Aluminum; Fluoropolymer Coating to meet AAMA 2605:
6. Pretreat according to manufacturer's instructions and AAMA 2605 to withstand a minimum of 3000 hours (ASTM B117) or 2000 hours (ASTM G85) salt spray testing.
7. Apply standard available colors, high volume RAL, or high volume custom color matches in single coat powder finish containing no less than 100% FEVE (fluorinated ethylene vinyl ether) at a minimum of 2.0 mils and process according to manufacturer's recommendations.
8. Apply custom color matches for low volume as a 2-coat 70% min. PVDF (poly vinylidene fluoride) resin fluoropolymer powder or liquid system including specially formulated inhibitive primer where required by manufacturer and top color coat to total dry film thickness of 2-3 mils.
9. Apply specifically available pallet colors only as a 3-coat system including clear fluorocarbon topcoat using 70% min. PVDF (poly vinylidene fluoride) resin fluoropolymer liquid to total dry film thickness of 2-3 mils.
C. Finishes for Steel:
1. Mill finish.
2. Powder Coating:

a. Pretreat according to AAMA 2604 to withstand a minimum of 2000 hours (ASTM B117) or 1500 hours (ASTM G85 Annex A2).
b. Apply zinc rich primer for steel at minimum of 2.0 mils 50 percent or less cure to ensure proper inter coat adhesion to topcoat.
c. Apply AAMA 2604 compliant topcoat at a minimum of 2.0 mils and process according to manufacturer's written recommendations.
d. Color and Gloss: As selected by Architect from manufacturers standard range.

D. Stainless Steel:
1. Polished Finishes:
a. Grind and polish surfaces to produce uniform finish free of cross scratches.
2. Mill finish with no additional treatment to surfaces.
3. Orbital sanding

E. Pre-grained #4 finish on available gauge material.

F. Cor-ten or weathering steel unfinished mill material with no significant scratches or gouges.

## 2.06 ACCESSORIES

A. Non-Weld Mechanical Fittings for Stainless Steel Railings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

B. Non-Weld Mechanical Fittings for Aluminum Railings:In-line aluminum fittings, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.

D. Universal Bracket:
1. Stainless steel 2-part bracket. Installed per manufacturer's instructions.
2. Finish: Powder coat.
3. Color: As selected by Architect from manufacturers standard range.
4. Manufacturer: BOK Modern, Inc.; www.bokmodern.com.

E. Anchors and Fasteners:
1. Fasteners: Stainless Steel fasteners.
2. Select fasteners of type, grade and class required to product connections for anchoring metal panels to other types of construction indicated and capable of withstanding design loads.
3. Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
4. Do not use metals that are corrosive or non-compatible with materials joined. Avoid fastening dissimilar materials and separate with isolating hardware where necessary.
a. For anchorage to concrete, provide inserts to be cast into concrete for bolt anchors.
b. For anchorage to masonry, provide brackets to be embedded in masonry for bolt anchors.
c. For anchorage to stud walls, provide backing plates for bolt anchors.
d. Posts: Provide adjustable flanged brackets.
5. Exposed Fasteners: No exposed bolts or screws.

F. Carbon Steel Bolts and Nuts: ASTM A307.

G. Hydraulic Expansion Cement: ASTM C1107/C1107M.
H. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 0.015 inch (0.4 mm) dry film thickness per coat complying with ASTM D1187.
I. Sealant: Silicone; black.
J. Finish Touch-Up Materials: As recommended by manufacturer for field application.
K. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
L. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Prior to commencement of work, verify that substrate and site conditions are acceptable and ready to receive work.
B. Verify field dimensions and measurements are acceptable to suit assembly tolerances.
C. Verify supports and anchors are correctly positioned and set.
D. Notify Architect immediately of conditions that would prevent satisfactory installation.
E. Do not proceed with work until detrimental conditions have been corrected.
F. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

### 3.02 PREPARATION

A. Protect existing work.
B. Install in accordance with manufacturer's written instructions.
C. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
D. Provide items required to be cast into concrete or embedded in masonry with setting templates.
E. Take field measurements after permanent end terminations are in place and prior to preparation of shop drawings and commencement of fabrication to ensure fitting of work.
F. Prepare surfaces using methods recommended by the manufacturer for achieving the best result for the substrate under Project conditions.

### 3.03 INSTALLATION

A. Comply with Drawings and manufacturer's written instructions.
B. Install metal panels plumb, level, square, true to line and rigid. Fit exposed connections together to form tight, hairline joints per manufacturers recommendation for seismic movement or thermal expansion and contraction
C. Adjust metal panels before anchoring to ensure alignment at abutting joints.
D. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
E. Anchor securely to structure.
F. Use manufacturer's hardware for panel-to-panel connections.

G. Attach metal panels securely in place using anchorage devices and fasteners as approved by Engineer of Record.
H. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
I. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood or dissimilar metals, with a heavy coat of bituminous paint.
J. Universal Bracket: Install per manufacturers printed instructions.
K. Weld connections that cannot be shop welded due to size limitations.
1. Weld in accordance with AWS D1.1/D1.1M.
2. Match shop welding and bolting.
3. Clean welds, bolted connections, and abraded areas.
4. Touch up shop primer and factory-applied finishes.
5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.
L. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

## 3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
C. Maximum Out-of-Position: 1/4 inch (6 mm).

## 3.05 FIELD QUALITY CONTROL

A. Field Services: Provide the services of the manufacturer for field observation of installation of railings.

## 3.06 CLEANING

A. Remove protective film from exposed metal surfaces.
B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.

## 3.07 ADJUSTING AND PROTECTION

A. Touch-up and repair damage to exposed finishes to be indistinguishable from undamaged areas.
1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.
2. Obtain approved coating for repainting surfaces from manufacturer.
B. Return and replace items that cannot be repaired or refinished in field.
C. Protect installed components and finishes from damage after installation.

END OF SECTION 05 7300

SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Metal fabrications:

1. Steel tube reinforcement for low partitions.

2. Steel framing and supports for mechanical and electrical equipment.

3. Steel framing and supports for countertops.

3. Steel bollards.

4. Embedded edge angles in concrete.

5. Steel supports for coiling doors.

6. Steel framing and supports for operable partitions.

7. Grating, frames and covers.

8. Miscellaneous steel framing, supporting angles, plates, brackets, clips, anchors and bolts for equipment, and other work which is not specifically included in Section 05 1200, Structural Steel Framing.

9. Miscellaneous fabrications, as indicated on the Drawings.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 01 4523: Testing and Inspection.

3. Section 03 3000 – Cast-in-Place Concrete.

4. Section 05 5013: Hot-Dip Galvanizing.

5. Section 05 1200: Structural Steel Framing.

6. Section 05 1210: Welding

7. Section 05 7300: Decorative Metal Guardrails and Railing.

1.02 REFERENCES

A. ASTM International (ASTM):

1. ASTM A27 – Standard Specification for Steel Castings, Carbon, for General Application.

2. ASTM A36 – Standard Specification for Carbon Structural Steel.

3. ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.

4. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

5. ASTM A123 - Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

6. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

7. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

8. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

**9.** ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

10. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

11. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

12. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

13. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

14. ASTM D1187 - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

15. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

16. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

B. American Welding Society (AWS):

1. AWS D1.1 Structural Welding Code - Steel.

2. AWS D1.3 Structural Welding Code - Sheet Steel.

3. AWS D-19.0 Welding Zinc Coated Steel.

1.03 COORDINATION

A. Coordination between Steel Fabricator and Galvanizer:

1. Prior to fabrication, submit approved fabrication shop drawings to the galvanizer.

2. Notify galvanizer of steel fabrications that exceed the ASTM A385 recommended percentages for carbon, phosphorus, manganese and silicon, so special galvanizing processing techniques are used.

B. Coordinate installation of metal fabrications that are anchored to concrete or masonry, or that receive work specified by other Sections. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.

C. Field Measurements: Field verify dimensions prior to fabrication.

D. Coordinate selection of shop primers with galvanizing, and with paintings to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and paintings are compatible with one another.

1.04 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating provided materials, dimensions, anchoring detail, and details of termination or connection to adjacent construction. Indicate items that are purchased from a manufacturer and items that are shop fabricated. Indicate component parts requiring Project site fabrication or assembly.

B. Product Data: Submit Product Data for manufactured items. Submit Product Data for primers and finishes.

C. Material Samples: Submit Samples of primers and finishes on fabricated items.

D. Welding:

1. Welder’s Certificates: Field welders shall be Project certified in accordance with AWS D1.1.

E. Research/Evaluation Reports: ICC-ES for post-installed anchors.

1.05 QUALITY ASSURANCE

A. Inspection of Welding: Refer to Section 01 4523: Testing and Inspection.

B. Preassemble items in shop to greatest extent possible to minimize field welding. Mark units for reassembly and coordination of installation. Use marking method compatible with galvanizing.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store miscellaneous metal items above grade on platforms, skids, or other required supports.

B. Protect from damage and from corrosion, dirt, grease and other foreign matter.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel Shapes: ASTM A36.

B. Rolled Steel Plates: ASTM A36. Plates to be bent or cold-formed shall conform to ASTM A283, Grade C.

C. Round HSS: ASTM A500 Grade B or C.

D. Square and Rectangular HSS: ASTM A500 Grade B or C.

E. Steel Pipe: ASTM A53 Type E or S, Grade B, standard weight (Schedule 40), unless otherwise noted. Black finish.

F. Steel Sheet: ASTM A1008 or ASTM A1011.

G. Steel Bolts: ASTM A307, Grade A, or F3125 with hex steel nuts per ASTM A563 and washers. Galvanized in accordance with ASTM A153 for exterior locations.

H. Steel Bars: Conforming to ASTM A108 or ASTM A575.

I. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims, hot-dip galvanized per ASTM A153.

J. Nonshrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

K. Concrete Materials:

1. Concrete per Section 03 3000, Cast-in-Place Concrete.

2. Welded wire fabric and reinforcing per section 03 2000, Concrete Reinforcing.

2.02 FABRICATION

A. General:

1. Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces. Mark units for reassembly and installation.

2. Cut, drill, and punch metals cleanly and accurately. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated or specified. Remove sharp and rough areas on exposed surfaces. Form exposed work with accurate angles and surfaces and straight edges. Form exposed connections with hairline joints, flush and smooth. Locate joints where least conspicuous.

B. Welding:

1. Weld connections unless otherwise indicated.

2. Weld corners and seams continuously and in accordance with requirements of AWS D1.1 Structural Welding Code. Welds shall be inspected as required in Section 05 1200: Structural Steel Framing.

3. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

## 2.03 PREPARATION FOR GALVANIZING

A. Fabricate to the largest size possible and whenever possible use slip joints to minimize field welding.

B. Fabricate structural steel in accordance with Class I, II, III guidelines as described in AGA's Recommended Details for Galvanized Structures, to facilitate galvanizing process. Corners of gussets, stiffeners, and bracing shall be cropped to allow free flow of zinc during galvanizing process.

C. Remove welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing.

D. Marking for Identification: Avoid unsuitable marking paints for identification, such as oil based paints and markers and crayon markers. Use water soluble paints or markers acceptable to galvanizer or steel tags wired to the work.

E. Masking: Use masking materials recommended by the American Galvanizers Association (AGA) to produce ungalvanized areas for field welding and at slip critical bolts.

F. Galvanize fabrications per Section 05 5013, Hot-Dip Galvanizing, in accordance with ASTM A123 and ASTM A153.

## 2.04 SHOP FINISH

A. Metal fabrications shall be provided with a coat of primer, except those indicated to be hot-dip galvanized.

B. Primers:

1. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

2. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

3. Minimum dry film thickness of primer shall be 2.0 mils.

C. Preparation for Primer Painting: Miscellaneous ferrous metal, except items specified galvanized, shall be thoroughly cleaned and prepared for painting, including removal of shipping oils or protective coatings, mill scale, grease, dirt and rust. Prepare in accordance with SSPC recommendations. Deliver to Project site primed or galvanized as indicated, and ready to receive Project site applied finishes.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Examine the areas where metal fabrications are to be installed. Notify the OAR in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

A. Provide anchorage devices and fasteners as indicated in the drawings and where necessary for securing miscellaneous metal fabrications to in-place construction.

B. Cut, drill, and fit as required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of hot-dip galvanized fabrications intended for bolted or screwed field connections.

D. Alignment: Verify alignment of items with adjacent construction. Coordinate related work.

E. Grout: Follow manufacturer's recommendations for substrate preparation and application.

F. Corrosion Protection: Coat concealed surfaces of metals that will come into contact with grout, concrete, masonry, or wood, with a heavy coat of bituminous paint or zinc chromate primer. Protect dissimilar metals from galvanic corrosion by pressure tapes, coating, or isolators.

### 3.03 FIELD WELDING

A. Preparation of Weld Area of Galvanized Fabrications: Remove masking from fabrications. Remove remaining zinc coating between one inch and four inches from both sides of members to be welded, by grinding back the zinc coating, burning the zinc away or pushing back the molten zinc from the weld area.

B. Welding: Comply with AWS Code for procedures of manual shielded metal-arch welding, appearance and quality of welds made, methods used in correcting welding work.

1. Weld in accordance to AWS D-1.1.

2. Weld galvanized fabrications in accordance to AWS D-19.0.

C. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surfaces matches those adjacent.

D. Upon completion of welding plug vent, drainage and lifting holes of galvanized fabrications with appropriate diameter zinc plugs. Push in about half way by hand, and hammer to a tight fit. With a hand file or an abrasive tool, file away excess material. Repair scratches with a zinc rich coating.

1. Plug railing holes.

2. Plug visible holes of HSS members.

## 3.04 ADJUSTING AND CLEANING

A. Touch Up Damaged Surfaces:

1. Shop Painted Finishes: Comply with SSPC-PA-1 for touch-up; apply with brush to produce a minimum 2.0 mil dry film thickness.

2. Galvanized Surfaces: Clean field welds, connections and damaged areas. Apply two coats of Carbomastic 15, by Carboline or equal product approved by OWNER's OEHS. Brush or roll to a 4 to 6 mil thickness.

## 3.05 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

## 3.06 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

**SECTION 06 10 00**

**ROUGH CARPENTRY**

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants and nailers.
4. Sheathing.
5. Subflooring and underlayment.
6. Plywood backing panels.
7. Building wrap.
8. Related framing anchors and connectors

B. Related Work Specified Elsewhere:

1. Division 6 Section 06 20 00 - Finish Carpentry
2. Division 5 Section 05 12 00 – Structural Steel

1.2 REFERENCES

A. 2022 California Building Code (CBC), Chapter 23.

B. ANSI/AWS NDS 2018 – National Design Specification for wood Construction

C. WFCM 2018 – Wood Frame Construction Manual

D. SDPWS 2021 - Special Design Provisions for Wind and Seismic

E. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.

F. APA (American Plywood Association) - Guide to Plywood Grades.

G. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

H. ASTM D3498 - Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.

I. AWPA (American Wood Preservers Association) - Book of Standards.

J. AWPB (American Wood Preservers Bureau) - Book of Standards.

K. DFPA (Douglas Fir Plywood Association)

L. FS FF-S-325 - Shield, Expansion; Nail, Expansion; and nail, Drive Screw (Devices, Anchoring, Masonry).

M. FS TT-W-571 - Wood Preservation - Treating Practices.

N. NLMA (National Lumber Manufacturers Association) - National Design Specification for Stress-Grade Lumber and Its Fastenings.

O. WCLIB (West Coast Lumber Inspection bureau) – Grading Rules for West Coast Lumber

P. WWPA (Western Wood Products Association) - Western Lumber Grading Rules

## 1.3 SUBMITTALS

A. Product Data:

1. For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
2. Custom and heavy metal framing connectors.

B. For all field-applied adhesives, sealants, paints and coatings relating to work of this Section, complete the VOC REPORTING FORM (blank copy attached at end of Section 01 30 00 Submittals). For each product listed, indicate the Volatile Organic Compound (VOC) content in grams/liter or lbs. /gallon.

C. Provide back-up documentation to validate all information provide on the ENVIRONMENTAL MATERIALS and VOC REPORTING FORMS, except cost data. For each material listed on the Forms, provide documentation to certify each of the material attributes (e.g., recycled content, VOC content), per the requirements of Section 01 30 00 Submittals.

D. Provide product cut sheets with the Contractor’s or sub-contractor’s stamp, confirming that the submitted products are the products installed in the Project.

## 1.4 QUALITY ASSURANCE

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:

1. WCLIB - West Coast Lumber Inspection Bureau.
2. WWPA - Western Wood Products Association.

C. Industry Standards:

1. Lumber Grading Agency: Certified by WCLIB or WWPA as pertinent to product.

a. Do not apply inspection service grade mark on timber shown as exposed in the work and with transparent finish.
b. Submit certificate of grade compliance, obtained from grading agency with each shipment.

2. Plywood Grading Agency: Certified by APA.

D. Regulatory Requirements: Conform to Chapter 23 of LABC for member and fastener sizes and type of fasteners, unless otherwise indicated on Drawings.

E. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood products from one source from a single manufacturer.

F. All wood used on the project shall be Forest Stewardship Council (FSC) Certified, with no added urea or formaldehyde.

## 1.5 DELIVERY, STORAGE AND HANDLING

A. Lumber Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.

1. Stack lumber as well as plywood and other panels.
2. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

## 1.6 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Exposed Framing: Dimension lumber not concealed by other construction.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. RIS - Redwood Inspection Service.
3. APA – American Plywood Association.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

D. All lumber to be specified as FSC certified to the greatest extent possible.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

B. All lumber to be specified as FSC certified to the greatest extent possible.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
4. Provide dressed lumber, S4S, unless otherwise indicated on Drawings.
5. Concealed Lumber: provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated on Drawings.
6. Exposed Lumber: provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated on Drawings.
7. Sill or Sole Plates:
    a. As indicated on Drawings.
8. Top Plates:
    a. As indicated on Drawings.
9. Studs:
    a. As indicated on Drawings.
10. Posts:
    a. As indicated on Drawings.

11. Joists:

    a. As indicated on Drawings.

12. Non-load Bearing and Furring:

    a. As indicated on Drawings.

13. Rafters:

    a. As indicated on Drawings.

14. Miscellaneous Framing: For site structures and other exposed conditions, provide No. 2 grade Douglas Fir-Larch, unless otherwise indicated on Drawings, selected for appearance. At site structures, provide light sandblast finish on exposed wood framing.
15. Wane: Limit wane to 5 percent of members in accordance with WWPA standards. Do not locate members with wane at plywood sheathing joints, at solid blocking or at double plates.

2.2 WOOD STRUCTURAL PANELS

A. Plywood Panels for Roof Sheathing: Douglas fir, Structural I, APA RATED SHEATHING.

1. Exposure Durability Classification: EXTERIOR.
2. Thickness: As indicated on the Drawings.

3. Edge detail, low slope roofs: Square if all edges supported on framing or tongue-and-groove (T&G) if edges are unsupported. Plyclips will not be acceptable.

4. Span Rating = Not less than 24”

B. Plywood for Floor Sheathing: Douglas fir, Structural-I-Floor, APA RATED SHEATHING.

1. Exposure Durability Classification: EXTERIOR
2. Thickness: As indicated on the Drawings
3. Edge detail: Provide either tongue and groove (T&G) plywood edges or square edges with full support of edges on framing and blocking. Plyclips will not be acceptable.

4. Span Rating = Not less than 24”

C. Plywood Panels for Wall Sheathing: Douglas fir, Structural I, APA RATED SHEATHING.

1. Exposure Durability Classification: EXTERIOR
2. Thickness: As indicated on the Drawings
3. Edge detail: Square
4. Span Rating = Not less than 24”

2.3.1 PRESERVATIVE TREATED WOOD PRODUCTS

A. Wood Treatments, General: Where used for exposed locations, treatment materials shall be types guaranteed to not adversely affect durability and appearance of applied finishes.

1. Treatment materials having a highly persistent, noticeable residual odor will not be permitted.
2. After treatment, kiln or air dry lumber and plywood to a moisture content of 19 percent or less or as indicated on the drawings.

B. Preservative Treatment, Members Intended for Finishing: Water-borne salt preservatives for painted, stained, or exposed natural wood product, AWPB LP-2, above ground application and AWPB LP-22, ground contact application.

C. Preservative Treatment, Members Not Intended for Finishing: Oil-borne preservatives for any construction except when in contact with salt water, AWPB LP-33, ground contact application, light petroleum solvent.

2.3.2 FIRE RETARDANT TREATED WOOD PRODUCTS

A. Treatment shall be PYRO-GUARD manufactured by Hoover Treated Wood Products, Inc. PYRO-GUARD interior fire retardant treated wood is kiln dried after treatment (KDAT) to maximum moisture content of 19% for lumber and 15% for plywood.

B. PYRO-GUARD shall be produced in accordance with ICC Evaluation Service Report 1791 (ESR-1791) latest version.

C. Plywood treated with PYRO-GUARD shall be manufactured under US Product Standard PS 1 or PS 2. Panels shall have a minimum bond durability of Exposure 1.

D. Grade marked lumber treated with PYRO-GUARD shall be in accordance with PS 20.

E. PYRO-GUARD shall not be installed in areas where in service it is exposed to precipitation, direct wetting, or condensation.

F. As with untreated wood, avoid exposure to precipitation during shipping, storage, or installation. Apply a water resistive barrier or underlayment over dry sheathing as soon as practical to avoid precipitation on the panel. Panels that get wet should be allowed to dry before covering, or be replaced.

2.4 CONNECTORS

A. Framing Connectors:

1. Specified Manufacturer: Simpson Strong-Tie Co., Pleasanton, CA (510/460-9912 or 800/999-5099; local representatives, Brea, CA (714/871-8373 or 800/999-5099).
2. Acceptable other manufacturers: MiTek, USP. Equivalent products of these manufacturers will be considered in accordance with the substitution provision specified in Section 01600 - Product Requirements. Substitutions shall have equivalent values according to current ICBO Research Report and shall be submitted to SEOR and AOR for review and approval with documentation and applicable calculations to demonstrated compatibility.
3. Light framing connectors: Simpson Strong-Tie Connectors, formed of sheet steel, catalog number as indicated on the Drawings and to suit Project conditions.
4. Heavy framing connectors: Simpson Strong-Tie Connectors, formed of steel plate or heavy gage steel sheet, catalog number as indicated on the Drawings and to suit Project conditions. Provide custom or special-order framing connectors as necessary to suit Project conditions and as indicated on the Drawings.

    a. Stock framing connectors: Simpson - Strong Tie Connectors, catalog number as indicated on the Drawings and to suit Project conditions.
    b. Custom framing connectors: Fabricated as indicated on Drawings and as specified in Section 05 12 00 – Structural Steel.

B. Finishes:

1. Light framing connectors: Provide manufacturer's standard galvanized finish. Heavy framing connectors, exterior: Hot-dipped galvanized, equivalent to ASTM A525, Coating Designation G90.
2. Heavy framing connectors, interior: Plain steel with shop primer paint finish, as specified in Section 05 12 00 – Structural Steel.
3. Custom framing connectors: Fabricated as specified in Section 05 12 00 – Structural Steel at interior and concealed locations, provide plain steel with shop primer paint finish. At exterior locations, provide hot-dipped galvanized finish.

2.5 FASTENERS AND ANCHORS

A. Fasteners, General: Size and type as required by LABC requirements and as indicated on Drawings. Provide electro-galvanized finish at interior high humidity locations and exterior locations not directly exposed to weather. Provide hot-dipped galvanized at exterior locations directly exposed to weather. Plain finish may be provided elsewhere.

B. Anchor Bolts: ASTM A36/A307 or as indicated on Drawings, galvanized steel at exterior locations.

1. Do not upset threads on bolts.
2. Anchor bolts for hold-downs shall be headed.

C. Machine Bolts: ASTM A307, hex head and nut, full bearing on unthreaded shank, length for maximum 1-1/2 inch beyond nut, with steel washer under head and nut. Provide hot-dipped galvanized finish at exterior locations.

D. Lag Bolts and Screws: Fed Spec FF-S-588, size as indicated on Drawings.

E. Nails, Typical: Common wire, sizes as indicated on Drawings and as required by LABC Chapter 23, Table No. 2304.9.1 and applicable reference standard.

1. No box nails shall be used.
2. Machine applied nailing will be subject to approval as specified on the Drawings and as approved by code authority having jurisdiction.

F. Screws: Fed Spec FF-S-85, Fed Spec FF-S-92 and Fed Spec FF-S-111, type and grade best suited for the purpose, size as indicated on Drawings.

G. Construction Adhesive: APA Spec. AFG-01.

H. Grout for Sill Plates: Type S mortar cement grout.

## 2.6 WOOD PRESERVATIVE TREATMENTS

A. Wood Preservative Treatments, General: Where lumber or plywood is indicated as preservative-treated or is specified to be treated, comply with applicable requirements of AWPA C2 (Lumber) and AWPA C9 (Plywood).

1. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by American Lumber Standards Committee (ALSC) Board of Review.
2. Comply with LABC, Section 2303.1.8, Section 2304.9.5 and Section 2304.11.

B. Wood Members Located Above Ground: Pressure-treat above ground items with water-borne preservatives to a minimum retention of 0.25 pcf. After treatment, kiln dry lumber and plywood to a maximum moisture content of, respectively, 19 percent and 15 percent or as indicated on the drawings. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members related to roofing, flashing, vapor barriers and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.
3. Wood floor plates installed over concrete slabs directly in contact with ground.

C. Wood Members Located in Contact with Ground: Pressure-treat wood members in contact with ground or fresh water with water-borne preservatives to a minimum retention of 0.40 pcf.

D. Coordination with Fabrication: Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces in compliance with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

## 2.7 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inches (12.7 mm) thick.

## 2.8 MISCELLANEOUS MATERIALS

A. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.

1. Thickness: Not less than 3 mils.
2. Permeance: Not less than 10 perms.
3. Flame-Spread Index: 25 or less per ASTM E 84.
4. Allowable Exposure Time: Not less than three months.

C. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

D. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

E. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

F. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

G. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

H. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTIONS

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Published requirements of metal framing anchor manufacturer.
2. Table 2304.9.1, "Fastening Schedule," in chapter 23 of LABC.

D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; pre-drill as required.

E. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

3.3 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

B. Place horizontal members laid flat, crown side up.

C. Erect wood framing members level and plumb.

D. Do not splice structural members between supports.

E. Do not notch, bore, or cut members for pipes, vents, conduits or other reasons except as shown on the Drawings or specifically authorized by the Architect.

F. Construct double joists under discontinuous walls.

G. Coordinate delivery of glue laminated structural units and plywood web joists

H. Layout embedded items for entire project.

I. Shim, strip and furr as necessary to achieve described tolerances

## 3.4 WALL AND PARTITION FRAMING INSTALLATION

A. General: Arrange studs so wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal thickness whose widths equal that of studs. Anchor or nail plates to supporting construction, unless otherwise indicated.

1. Provide nominal 3-inch bottom plates where indicated on drawings.
2. Provide single bottom plate and double top plates, nominal 2-inches thick by width of studs.
3. Overlap double plates minimum of 4 feet or as indicated on Drawings and at corners and intersections. Face nail upper plate to lower top plate as indicated on Drawings.

B. Construct corners and intersections with three or more studs. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide continuous horizontal blocking at midheight of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as wall or partitions.

C. Fire block concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where fire blocking is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- thick lumber of same width as framing members.

D. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs. See structural Drawings for specific details.

E. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:

1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal size boards.
2. Diagonal bracing at 45-degree angle using metal bracing.
3. Plywood panels not less than 48 by 96 inches applied vertically.
4. Particleboard sheathing panels not less than 48 by 96 inches applied vertically.

3.5 FLOOR JOIST FRAMING INSTALLATION

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal. Attach floor joists as follows:

1. Where supported on wood members, by toe nailing or by using metal framing anchors. See structural Drawings for specific details.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. See structural Drawings for specific details.

B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches.

C. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-fourth at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches from top or bottom. See structural Drawings for specific details.

D. Provide solid blocking of 2-inch nominal thickness by depth of joist at ends of joists unless attached to header or indicated on the Drawings.

E. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches or securely tie opposing members together. Provide solid blocking of 2-inch nominal thickness by depth of joist over supports.

F. Provide solid blocking between joists under jamb studs for openings. See structural Drawings for specific details.

G. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

H. Provide bridging of type indicated below, at intervals of 96 inches o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.
3. Bridging may be omitted where joist depth is 12-inch nominal size or less and where indicated live load is 40 PSF or less.

## 3.6 CEILING JOIST AND RAFTER FRAMING INSTALLATION

A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal size or 2-by-4-inch nominal size stringers spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafter.

C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal size boards between every third pair of rafters, but not more than 48 inches o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

## 3.7 STAIR FRAMING INSTALLATION

A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

1. Stringer Size: 3-by-14-inch nominal size, minimum, unless noted otherwise on the Drawings.
2. Notching: Notch stringers to receive treads, risers, and supports; leave at least 9 inches of effective depth unless noted otherwise on the Drawings.
3. Stringer Spacing: 12” o.c, unless noted otherwise on the Drawings.

B. Provide stair framing with no more than 3/16-inch variation between adjacent treads and risers and no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

## 3.8 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.

1. Comply with "Code Plus" provisions in above-referenced guide.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

   a. Glue and nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

2. Subflooring:

   a. Glue and nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

3. Sheathing:

   a. Nail to wood framing.
   b. Space panels 1/8 inch apart at edges and ends.

4. Underlayment:

   a. Nail to subflooring.
   b. Space panels 1/32 inch apart at edges and ends.
   c. Fill and sand edge joints of underlayment receiving resilient flooring just before installing flooring.

5. Plywood Backing Panels: Nail or screw to supports.

## 3.9 BUILDING PAPER APPLICATION

A. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inches overlap.

3.10 BUILDING WRAP APPLICATION

A. Cover wall sheathing with building wrap as indicated.

1. Comply with manufacturer's written instructions.
2. Cover upstanding flashing with 4-inch overlap.
3. Seal seams, edges, and penetrations with tape.
4. Extend into jambs of openings and seal corners with tape.

3.11 SHEATHING TAPE APPLICATION

A. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

3.12 TOLERANCES:

A. Framing Members: 1/4 inch maximum from true position.

B. Surface Flatness of Floor: 1/4 inch in 10 feet maximum.

END OF SECTION 06 10 00

# SECTION 06 4000 - ARCHITECTURAL WOODWORK

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Architectural woodwork, casework, trim, hardware, countertops, and shelving as indicated on Drawings.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 06 1000: Rough Carpentry.

3. Section 06 2000: Finish Carpentry.

4. Section 09 9000: Painting and Coating.

5. Section 10 1100: Visual Display Units.

6. Division 26 – Electrical.

### 1.02 DEFINITIONS

A. "Sustainably managed" is defined as "forests that are being managed through a professionally administered forestry management plan in which timber growth equals or exceeds harvesting rates in both quantity and quality, protecting rivers and streams from degradation, minimizing damage to the forest when harvesting and promoting biodiversity".

### 1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide wood products from certified sustainably harvested sources.

### 1.04 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings of casework indicating materials and hardware, details of construction, dimensions, methods of fastening and installation details. Shop Drawings shall bear a Woodwork Institute (WI) Certified Compliance Label indicating that Shop Drawings fully meet requirements of the North American Architectural Woodwork Standards (NAAWS) grade or grades specified. Shop Drawings shall indicate grounds, backing, blocking, sleepers and other items required for installation of casework, which are to be provided and installed as part of the Work.

B. Certificates: Provide a WI Certified Compliance Certificate certifying that materials,

fabrication and installation will comply with the specified requirements.

C. Material Samples: Submit 2-inch by 3-inch plastic laminate and solid surfaces color Samples of manufacturer's entire color range.

D. Submit manufacturer’s product data for adhesives and finishes. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

E. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.

F. Closeout Submittals: Provide a WI Certified Compliance Certificate for Installation.

1.05 QUALITY ASSURANCE

A. Comply with the North American Architectural Woodwork Standards (NAAWS), latest edition, published jointly by the Architectural Woodwork Manufacturer’s Association of Canada and the Woodwork Institute of California, grades as specified herein.

B. Each elevation of casework shall bear a WI Certified Compliance Label indicating that casework fully meets requirements of the AWS grade specified.

C. Each plastic laminate countertop and/or solid surface top shall bear a WI Certified Compliance Label indicating tops fully meet requirements of the AWS grade specified.

D. Mock-ups: When required by the Architect, submit a full-scale base cabinet, countertop, and wall-hung cabinet, illustrating joinery and plastic laminate finish. Base cabinet shall incorporate a drawer, an adjustable shelf, and a door. Wall-hung cabinet shall incorporate two doors, one adjustable shelf and finished end, including required hardware.

1.06 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in undamaged condition, stored in fully covered, well ventilated areas, and protected from extreme changes in humidity and temperature. Refer to the North American Architectural Woodwork Standards (NAAWS) for recommended care and storage.

B. In event of damage immediately furnish necessary repairs or replacements.

1.07 PROJECT CONDITIONS

A. Store indoors, in ventilated areas with constant but minimum temperature of 60 degrees F. and maximum relative humidity of 25 percent to 55 percent. Do not install casework until building is enclosed and ambient conditions are within the temperature and humidity range to be expected during occupancy. Acclimatize materials to the installation temperature and humidity for at least 72 hours prior to installation. Maintain conditions until Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Laminate Faced Cabinets:

1. Plastic laminate: High pressure plastic laminate conforming to NEMA standard LD-3; Grade HGS 0.048 inches at horizontal surfaces, Grade VGS 0.028 inches at exposed vertical surfaces and edge bands, and HGP 0.039 inch minimum for post-formed countertops.

2. Plywood core or plywood core with MDF/Particle board facing, Particle Board Core Material: 45 lb. density, conforming to ANSI A208.1, Table 1, Grade 1-M-2.

3. Hardboard: Factory finished pressure sealed hardboard conforming to the requirements of PS 58. Oil tempered hardboard shall conform to CS 251.

4. Cabinet Liner: Semi-exposed surfaces shall be finished with 0.020 inch high-pressure laminate cabinet liner, conforming to NEMA Standard LD-3.

5. Edge Banding:

a. T-type extruded tenite-butyrate 1/16 inch minimum thickness, with serrated leg 3/8 inch in length. Use only when matching existing.

b. 0.028 inch minimum thickness plastic laminate.

c. PVC, 0.6 mm at cabinet sides, top, bottom divisions and shelves, 3 mm at doors, drawer fronts and false fronts.

6. Adhesive: Type II water-resistant, rigid type glue of formula conforming to PS 51.

7. The Owner will supply tote trays unless otherwise indicated.

B. Countertops:

1. 3/4 inch, Plywood, ANSI A208.1.

2. Solid Surfaces: Filled cast polymeric resin panel, with homogeneous composition throughout its thickness.

a. Corian.

b. Formica.

c. Wilsonart.

d. Equal.

C. Hardware:

1. Drawer Slides for Custom Grade Cabinetry: Extra heavy duty, soft close feature.

   a. Pencil drawers: Full extension type: Accuride 2006, Blum, Hafele, or equal.

   b. Drawers and box drawers, up to 24 inches wide: Accuride 3832E, Blum, Hafele, or equal.

   c. Lateral file drawers, up to 30 inches wide: Accuride 4034 overtravel or 4033 equal travel, Blum, Hafele, or equal.

   d. Lateral file drawers, more than 30 inches wide: Accuride 3640, Blum, Hafele, or equal.

2. Door Mutes: Rubber, approximately 1/4 inch diameter, colors to match adjacent finish.

3. Plastic Grommets: Doug Mockett, Alliance Express, Rockler, or equal; color as selected by Architect.

4. Hinges: Soft close feature, Five-knuckle overlay hinge with hospital tip - Rockford 376, or equal.

5. Pulls: Quality No. 179 x 180, Trimco No. 553P, Hafele, or equal.

6. Catches: Magnetic type - Epco No. 592, Lawrence No. SC1364-AL, or equal.

7. Four-way Tension Catch: Glynn-Johnson GJ21A, Trimco, Quality, or equal.

8. Noiseless Catch:

9. Elbow Catch: Schlage SP2A3, or equal.

10. Hardware Finish: With exception of finish hardware items which have finishes specified, hardware shall be furnished with dull chrome US 26D or dull stainless steel US 32D finish.

## 2.02 FABRICATION

A. Plastic Laminated Casework: Construction of plastic laminated casework shall conform to the material and construction requirements for North American Architectural Woodwork Standards Custom grade, flush overlay construction, except, modified as follows:

1. Exposed Exterior surfaces shall be High Pressure Decorative Laminate grade VGS.

   a. Edge Band: PVC 1 mm. for cabinet body and 3 mm. at drawer fronts.

2. Exposed Interior surfaces: Interior surfaces of open cabinets shall be laminated to match exteriors.

3. Semi-exposed Surfaces: Shall be cabinet liner grade CLS and edges of panels shall be edge banded per 2.01 A.

4. Cabinet bases may be integral or separate. Bases shall be 3/4 inch thick plywood securely jointed at four corners to a supporting block 1 ½-inch thick.

5. Drawers:

   a. Drawers shall be of dovetail or dowel construction. Sides, backs and sub-fronts shall be made of 1/2 inch thick clear birch or maple solid stock, or 9 ply plywood without knots or interior voids. Drawer bottoms shall be in accordance with AWI requirements, glued and nailed.

   b. Drawers shall be fitted with ball bearing slides accurately installed for smooth drawer operation.

   c. Drawer fronts shall be of 3/4 inch thick plastic laminate construction, fully edge-banded with plastic laminate T-banding to be used when matching existing. T-banding joint shall occur at center of bottom edge of panel.

6. Back Priming: Seal unfinished materials installed for backs, bases, self-edge backing, stripping and other concealed portions with a water-repellent sealer.

7. Banding:

   a. Edge banding shall be accurately fitted. Where edge band joins plastic surfaces, there shall be no open spaces, voids, or chipping of plastic laminate surface.

   b. Exposed cabinet surfaces shall be flush, and any protruding edges of banding shall be machined or trimmed to provide a flat smooth corner at intersection of banding and adjoining surfaces. Plastic laminate edge banding shall be installed on tops, webs, bottoms, ends, and inside partitions. T banding may only be installed on drawer fronts and door edges and when required to match existing.

B. Countertops:

8. Plastic Laminate Tops: Each plastic laminate countertop shall bear the WI Certified Compliance Label.

   a. Laminated plastic countertops shall be self-edged. Edge shall rise 1/8 inch above counter surface and back and return splashes shall be 6 inches high measured from exposed countertop surface, unless otherwise indicated.

   b. Cove and roll front sticking, for plastic laminate back-up, shall be kiln dried

clear sugar pine glued to core material. c. Square butt splashes, including end splashes shall be Deck Mount. Splashes shall be end applied and be set in mastic and secured to top with screws 8 inches on centers. Splash edges shall be self-edged and scribed to wall.

c. Joints shall be splined and fastened with screw clip fasteners on at least 8 inch centers. Water resisting mastic or glue shall be applied in joints. Joints shall not occur at sink cutouts. Sink cutouts shall be sealed.

d. Core material for counters and splashes shall be 3/4 inch thick Grade 130 MR50 MDF.

e. Installation of plastic laminate shall be in accordance with published specifications and recommended practices of the plastic laminate manufacturer.

9. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

a. Manufacturers:

1. Avonite Surfaces.

2. E. I. du Pont de Nemours and Company.

3. Formica Corporation.

4. Wilsonart International.

5. Equal.

b. Type: Provide Standard Type.

c. Colors and Patterns: As selected by Architect from manufacturer's full range.

d. Butt splash or seamless (coved) backsplash.

e. Provide drip groove.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Install Work of this section as specified in the North American Architectural Woodwork Standards (NAAWS), grade to match the grade of the work to be installed.

B. Cabinets: Install cabinets level, plumb, and secure to walls. Exposed screws shall have finish washers.

C. End Panels and Fillers: Furnish to match exposed surfaces and accurately scribe to walls and neatly and securely fit to cabinets.

D. Completion: Upon completion of installation, cabinets including drawers and shelves shall be cleaned. Doors and drawers shall operate easily and freely.

E. Scribe plastic laminated cabinets to walls and soffits. Installation of surface-applied moldings is not permitted.

F. Coordinate sink and penetration locations with 22 1000 Plumbing.

G. Install solid surface countertops per NAAWS custom grade.

3.02 CLEAN UP

A. Remove debris, rubbish and waste material and legally dispose of off the Project site.

3.03 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 064023 – INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work Included:
1. Plastic laminate clad shelves and other accessories
2. Plastic laminate cabinet tops (countertops)
3. Plastic laminate clad casework including soffit and other closure panel
5. Miscellaneous fasteners and brackets
6. Interior standing and running trim
8.. Shop finishing of all Interior Architectural Woodwork

B. Related Sections:

1. Section 061000 - Rough Carpentry.
2. Section 064116 - Plastic Surfacing Materials.
3. Section 123661 - Simulated Stone Countertops.
4. Section 220000 – General Plumbing Requirements.
5. Section 097416 – Wood Veneer Wallcovering
6. Section 092900 – Gypsum Wallboard

C. Fabricate and Install:
1. Plastic laminate finished countertops as detailed on the drawings.
2. Plastic laminate finished casework including base cabinets, wall cabinets, and shelving units as detailed on the drawings.
3. Simulated stone countertops, including those with integral sinks.

1.3 SUBMITTALS

A. Product data for each type of product and process specified in this section and incorporated into items of architectural woodwork during fabrication, finishing and installation.

B. Shop drawings showing location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples for initial selection purposes of the following in form of manufacturer's color charts consisting of actual units or sections of units showing full range of colors, textures, and patterns available for each type of materials indicated as applicable.

1. Plastic laminate samples: Deliver to the project site the following for review and approval of the Architect:

a. Plastic laminates, 12 by 12 inches, for each type, color, pattern, and surface finish and specified edge material applied to one edge.
b. Wood-grain plastic laminates, 24 by 24 inches, for each type, pattern and surface finish and specified edge material applied to one edge.
c. Thermoset decorative panels, 12 by 12 inches, for each color, pattern, and surface finish, with edge banding on one edge.

2. One typical base cabinet with drawer and one wall cabinet with full height double doors and shelves.
   a. Sample cabinets shall include at least one each of specified handles, hinges, locks, catches, and drawer rollers; one for each type and finish.
   b. Accepted sample units shall be used for comparison inspections at the project site. Sample units may be incorporated into the Work with the approval of the Architect.
3. 4" x 4" sample of all specified countertops including external corner.
4. Miter joints for standing trim.

## 1.4 QUALITY ASSURANCE

A. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.

B. For following types of casework, comply with indicated standard as applicable:

1. Casework and Countertops: AWI Section 400.
2. Shelving: AWI Section 600.
3. Miscellaneous Work: AWI Section 700.
4. Hardware: Except as otherwise indicated, comply with ANSI AI56.9 "American National Standard for cabinet hardware."

C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the product.

D. During all portions of the installation of the work in this section, provide the services of a representative of the manufacturer of the casework, who shall be present at the site, shall personally inspect all installation operations, and who shall certify upon completion of the installation that the installation was completed in strict accordance with the manufacturer's recommendations.

## 1.5 WARRANTY

A. All products specified in this section shall be warranted for a period of one year from the date of substantial completion against defects in materials or workmanship.

## 1.6 DELIVERY, HANDLING AND STORAGE

A. Deliver products cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of units.

B. Maintain environmental conditions and protect work during and after installation.

C. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Custom fabricated products subject to compliance with the requirements of this section and as indicated on the Finish Legend. Schedule indicates the basis-of design for product selections. Alternate manufacturers and products will be acceptable if they meet or exceed all the requirements of the basis-of design product.

B. Pre-manufacturered products may be acceptable only after compliance with the requirements of this section. Proposed substitutions shall be submitted to the architect for review in accordance with Section 012500 - Substitution Procedures.

## 2.2 HIGH PRESSURE PLASTIC LAMINATE

A. Laminate manufacturers and colors to be as indicated in the Finish Legend on drawings or Equal.

B. Provide plastic laminate thicknesses on countertops and casework as defined in Section 064116 - Plastic Surfacing materials.

## 2.4 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
   1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
   1. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
   2. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
   3. Beadboard Sheet paneling: Medium-density fiberboard, factory primed and field painted as outlined on Interior Finish & Material Schedule or Equal.

C. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
   1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
   2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
   3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

D. Particle board to be of 3/4" nominal thickness, 45 lb. density, and balanced construction with moisture content not to exceed 8%. All particle boards shall meet or exceed the requirements of ANSI A2081, 1-M-3.

E. Fire-Retardant Particleboard: Where indicated, provide panels complying with the following requirements that have fire-retardant chemicals bonded to softwood particles at time of panel manufacture to achieve flame spread of 20 or less and for smoke developed of 25 or less per ASTM E 84. Identify products with appropriate markings of applicable testing and inspecting organization.

1. Comply with ANSI A208.1 for Grade 1M1 except that minimums for modulus of elasticity and screw-holding capacity on face and edge shall be 250 lb and 225 lb, respectively.
2. Product: subject to compliance with requirements, provide “Duraflake FR” by Duraflake Div.; Willamette Industries, Inc.”

## 2.5 FABRICATION, GENERAL

A. General:
1. Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
2. Fabricate casework to dimensions, profiles, and details indicated on drawings.
3. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Cabinetry:
1. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
    i. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
2. Grade: Custom.
3. Type of Construction: Frameless.
4. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.
5. High Pressure Decorative laminate (HPDL) Cladding for Exposed Surfaces and interior surfaces where noted on the drawings:
    i. NEMA LD 3
    ii. Horizontal Surfaces (grade HGS)
    iii. Vertical Surfaces (grade HGS)
    iv. Edges (grade HGS)
    v. Pattern Direction: Vertically for drawer fronts, doors, soffits and fixed panels.
6. High Pressure Decorative Laminate Cladding for Semi-Exposed Surfaces:
    i. NEMA LD 3
    ii. Surfaces other than drawer bodies (grade VGS)
    iii. Drawer sides and backs (thermoset decorative panels with PVC or Polyester edge banding).
    iv. Drawer bottoms (thermoset decorative panels).
    v. Backs of panels with exposed surfaces (grade VGS).
7. Dust Panels:
    i. 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
8. Drawer Construction:

i. Fabricate with exposed fronts fastened to sub-front with mounting screws from interior of body.
ii. Join sub-fronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

B. Shelving: Provide PVC edge banding as follows.
a. Thickness: 3mm (1/8 inch thickness or .12 inch).

C. Countertops:
1. Backing: 3/4-inch nominal, 9 ply, marine grade plywood with 1-1/2" minimum built up edges or as indicated in the details.
2. Corners: Provide ¼" inch radius.
3. Backsplash: As indicated on drawings.

## 2.6 HARDWARE

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 - Door Hardware.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing, soft close feature.

C. Pulls: Type 1 Doug Mockett DP3B/2 – 4" typical for cabinet drawers and doors, Satin stainless steel finish or Equal. Finish: verify with Architect.

D. Pulls: Type 2 Kingsway Group Ligature Resistant Classic Cabinet Pull Code KG62 – 3 15/15" surface mounted pull handle, bolt fixed with security bolds or Equal. Finish: verify with Architect

E. Drawer Glides:
1. Grade 1: Extra Heavy duty, soft close feature, Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel with polymer rollers.
2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide grade 1.
5. For drawers more than 6 inches high or more than 24 inches wide, provide grade 1HD-100.
6. For computer shelves, provide grade 1HD-100
7. For trash bins not more than 20 inches high and 16 inches wide, provide grad 1HD-100.

F. Shelf Hardware:

a. Shelf Rests / Line Points: BHMA A156.9, B0413; Metal
b. Floating Shelf Brackets: Walnut Wood Works 24” Solid Steel Heavy Duty

G. Locks: Digital keyless cabinet four-digit keypad lock Kitlock KL1000 vertical tumbler, Silver Grey or approved equal.

H. Door and Drawer Silencers: BHMA A156.16, L03011

I. Grommets: Doug Mockett GRN1 – 2-3/8” Grin Desk Grommet or Equal. Doug Mockett & Co. (800) 523-1269 or equal.

a. Wire Access Type: Series EDP plastic grommets, 3" outside diameter or less, 2 1/2" hole. Color selected by Architect from manufacturer's full range. Provide minimum of (1) grommet per workstation area. Locate in field with Owner.

J. Concealed Counter Support: Concealed Wall Bracket: Rakks Inside Wall Mount EH Counter Support Bracket. Size as required to support countertop. Provide (1) bracket per four foot of counter.

2.7 CABINETRY ACCESSORY ITEMS

A. Cable Manager: Hafele 829.15.302, 98” pieces, color black, cut to lengths indicated. Apply with supplied adhesive tape and screw to studs. Provide at all open counters 36” wide or longer.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas to receive casework. Verify dimensions are correct and surface conditions acceptable.

B. Do not proceed with fabrication or installation until unsatisfactory conditions have been corrected.

3.2 FABRICATION:

A. General
1. Where specified laminate products have a directional pattern, the orientation of the pattern shall be indicated on shop drawings for review by the Architect. Patterns shall be installed with the same orientation on all exposed surfaces.

B. Coordinate with other trades.
1. Measurements: Before proceeding with fabrication of casework required to be fitted to other construction, obtain measurements and verify dimensions and shop drawing details as required for accurate fit.
2. Precut Openings: Fabricate casework with precut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or rough-in diagrams for proper size and shape. Smooth edges of cutoffs and, where

located in countertops and similar exposures seal edges of cutouts with vinyl grommet.

C. Countertops
1. Fabricate countertops indicated by the drawings to field dimensions with top and backsplash where indicated, with post front and backsplash in accordance with accepted industry standards.

3.3 INSTALLATION:

A. GENERAL
1. Install the work plumb, level, true and straight with no distortion. Shim as required using concealed shims. Install to tolerance of 1/8" in 8'-0" for plumb and level (including countertops); and with 1/16" maximum offset in flush adjoining surfaces 1/8" maximum offsets in revealed adjoining surfaces.
2. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
3. Anchor tops securely to base units and other support systems as indicated. Mechanically anchor backsplash to countertop with screws or dowels.
   a. Adhere solid surfacing to tops using manufacturer's standard color match silicone sealant.

B. Countertops:
1. Material shall be shop or job applied by method as recommended by the manufacturer.
2. Work shall be neatly and accurately fitted, mitered, butted or scribed to adjacent surfaces, joints to be kept to a minimum.
3. Faced edges shall be built up to detailed edge thickness.
4. Front edge of countertops to be capable of withstanding 250# load.
5. Install countertops level and securely anchored to cabinets, side and back walls.

C. Casework:
1. Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center door and drawer openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
2. Upper Cabinets to have an inside clear dimension of no less than 14" depth unless otherwise noted.
3. All Upper Cabinets to have 2 adjustable shelves unless otherwise noted. All Base Cabinets to have one adjustable shelf.
4. Shelves and inside of the cabinetry to be finished with white melamine unless otherwise specified.
5. Inside face of all cabinet doors and drawers to be finished in face laminate finish.
6. All visible surfaces of cabinets, open shelves to be finished in face laminate.
7. All Base Cabinets indicating File cabinets to be installed with a Pendaflex rail installed for filing front to back.
8. All exposed surfaces and support legs to be laminated with finish laminate.

## 3.4 CLEANING

A. Repair damaged and defective casework wherever possible to eliminate defects functionally and visually.
B. Clean hardware, lubricate and make final adjustments for proper operation.
C. Clean casework on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damage or soiled areas.

END OF SECTION 064023

SECTION 06 1643 - GYPSUM SHEATHING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Fiberglass-mat faced, moisture and mold resistant exterior gypsum sheathing.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 05 4100 - Structural Metal Stud Framing.

3. Section 06 1000 - Rough Carpentry.

4. Section 07 9200 - Joint Sealants.

5. Section 07 2719 Plastic Sheet Barriers.

1.02 PROJECT REQUIREMENTS

A. Design Requirements: Provide systems capable of resisting deflection.

B. Regulatory Requirements: Comply with CBC requirements for design and installation.

1.03 SUBMITTALS

A. Material Samples: Submit 5.5” inch by 8.5” inch sample of the exterior sheathing panel. Submit 5 screws to be utilized in attaching the exterior sheathing panel.

B. Product Data: Submit manufacturer's catalog data for the sheathing product and the attachment screws.

1.04 QUALITY ASSURANCE

A. Comply with following as a minimum requirement:

1. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

2. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

3. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.

4. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

5. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

B. Low-Emitting Materials table: Materials submitted shall meet the Low-Emitting criteria and be listed as Low-Emitting on the following web site: on UL website Greenguard.org as Greenguard Gold Certified.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, factory sealed packages, containers or bundles bearing brand name and name of manufacturer.

B. Materials shall be kept dry. Exterior Sheathing shall be neatly stacked flat; avoid sagging and damage to edges, ends, and surfaces.

C. Fire-rated materials shall have fire classifications numbers attached and legible.

D. Provide all means necessary to protect Exterior Sheathing systems before, during, and after installation.

E. Exterior sheathing showing any evidence of water damage shall not be installed. Exterior sheathing showing evidence of water damage after installation shall be removed and replaced.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND PRODUCTS

A. Georgia-Pacific - Dens Glass Gold sheathing.

B. National Gypsum Co. - Gold Bond eXP sheathing.

C. U.S. Gypsum Co. - SECUROCK brand UltraLight glass Mat.

D. Or equal.

2.02 MATERIALS

A. Exterior sheathing Type X (fire-resistant): 5/8 inch thick, 4-foot wide and up to 10 feet long conforming to ASTM C1177.

1. Edges: Square.

2. Surfacing: Fiberglass mat on face, back, and long edges.

3. Mold Resistance: score of 10 per ASTM D3273 in a test as manufactured.

2.03 ACCESSORIES

A. Fasteners: ASTM C1002, corrosion resistance of more than 800 hours per ASTM B117. In coastal environments or aggressive environments, stainless steel fasteners shall be used.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install in accordance with the fire rated assembly indicated on the drawings, GA-253, ASTM C1280 and the manufacturer's recommendations.

B. Prior to application of exterior system, attachment of sheathing to framing shall be able to withstand design wind loads of building.

3.06 CLEAN-UP

A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

3.07 PROTECTION

A. Protect Work of this section until Substantial Completion.

END OF SECTION

**SECTION 064116**
**PLASTIC SURFACING MATERIALS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. High Pressure Decorative Laminates.

1.2 RELATED SECTIONS

A. B.Section 064023 – Interior Architectural Woodwork.

1.3 SUBMITTALS

A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Samples:
1. Verification Samples: Submit three samples, each 12 inches square, illustrating each selected surfacing material in specified color, pattern, and finish.

C. Manufacturer's Instructions:
1. Submit manufacturer's printed installation instructions for each product.
2. Submit manufacturer's Safety Data Sheets (M.S.D.S.) for each adhesive.
3. Submit Manufacturer’s maintenance instructions for each product.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products in accordance with provisions of Section 016000.

B. Store surfacing materials to prevent breakage and marring of surfaces in accordance with manufacturer's printed instructions.

C. High pressure laminate should be stored horizontally with the top face-down and a caul board placed on top to protect material from damage and from warping. Laminate should be protected from moisture and from contact with floors or outside walls.

1.5 PRECONDITIONING

A. Laminate and substrate should be allowed to acclimate for at least 72 hours at the same ambient conditions. Optimum conditions are approximately 75°F (24°C) and relative humidity of 45% to 55%. Air circulation should be provided around product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Refer to finish legend for specific product and color specifications.

2.2 STANDARD DECORATIVE LAMINATES

A. Product Description: Decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.

B. Refer to Section 064023 – Interior Architectural Woodwork for location of each laminate grade in cabinetry and countertop construction.

C. Standard Decorative Laminate – Horizontal Surface Type (HGS): having the following physical characteristics:
1. Sheet thickness: 0.048-inch nominal (1.22mm)
2. Exceeding performance requirements of NEMA LD 3 current revision Grade HGS.
3. Surface burning characteristics in accordance with ASTM E 84; unbonded.
4. Patterns and Finishes: Indicated on drawings.
5. Use: On all exposed horizontal surfaces and high-wear areas.

D. Standard Decorative Laminate - Vertical Surface Type (VGS): having the following physical characteristics:
1. Sheet thickness: 0.028-inch nominal (0.71 mm)
2. Exceeding performance requirements of NEMA LD 3 current revision Grade VGS and VGP.
3. Surface burning characteristics in accordance with ASTM E 84; unbonded.
4. Patterns and Finishes: Indicated on drawings.
5. Use: On all exposed vertical surfaces and for cabinetry interiors.

E. PVC Edge Banding – Standard banding to match laminate colors.
1. Use: On all countertop and shelving edges and in locations as indicated in drawings.

2.10 ACCESSORY MATERIALS

A. Adhesives: Provide types as specified in manufacturer's printed installation instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface preparation: Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer's printed installation instructions.

3.2 INSTALLATION

A. Material equipment and workmanship should conform to industry-standard practices, conditions, procedures, and recommendations as specified by ANSI/NEMA LD3-2000

Annex A, DLPA (Decorative Laminated Products Association), AWI Quality Standards, and ANSI 161.2-1979 Standards.

## 3.3 APPLICATION, CARE AND CLEANING

A. Install materials in accordance with manufacturer's printed instructions and requirements of Section 064023, Casework and Counter Tops.

B. High-pressure decorative laminate is not a structural material and must be bonded to a suitable substrate such as particleboard or medium density fiberboard. Recommended adhesive types are contact, PVAc, and resorcinol. The surface must be smooth and free from grease, dust, etc. that would interfere with adhesion. Fabricators should follow adhesive manufacturer's instructions.

Laminate is designed for interior use only and is not recommended for direct application to plaster, gypsum wallboard, or concrete. Do not use in areas exposed to temperatures in excess of 275°F. Care should be taken to minimize excessive moisture imbalance between the laminate and substrate by conditioning the materials in the same environment for at least 72 hours. Consult N.E.M.A. (National Electrical Manufacturers Association) Publication LD 3-2000 or AWI quality standards for fabricating guidelines.

High-pressure decorative laminate may be cleaned with warm water and a mild soap or household cleaners.

END OF SECTION 064116

# SECTION 06 8316

# FIBERGLASS REINFORCED PANELS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Fiberglass reinforced plastic panels and accessories.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 09 2900 - Gypsum Board.

### 1.02 PROJECT REQUIREMENTS

A. Fiberglass reinforced plastic panels and accessories for kitchen and food preparation areas as indicated on the Drawings.

### 1.03 SUBMITTALS

A. Shop Drawings: Indicate location and dimension of joints and fastener attachments

B. Samples: Submit 8 inch by 10 inch sample of each type, color, and accessories to be installed.

C. Certificate of Compliance: Submit certificate from manufacturer the installed wall surfacing meets Specification requirements.

### 1.04 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. Class A Interior Finish Material as defined by the National Fire Protection Association Life Safety Code 101.

2. Underwriters Laboratories, Inc. listed, in accordance with ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

3. USDA/FSIS Requirements.

4. FMRC (Factory Material Research Center) approved.

### 1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s cartons properly labeled and identified.

B. Store materials flat in a clean, dry storage area where temperature shall be maintained above 50 degrees F. Do not store rolls on end.

1.06 PROJECT CONDITIONS

A. Installation environment shall be stable and controlled.

B. Room temperature shall be controlled to 75 degrees F plus or minus 5 degrees, during and after installation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wall and/or ceiling panels: Crane Composites, Fire-X Glasbord FM with Surfaseal, , Marlite FRP Panel P-100 Class A, Panolam Industries International Inc., or equal.

1. Wall Panels: Class 1 (A) Interior Finish. Thickness to be .09 inch, embossed, color as selected by Architect.

2. Class A Flame Spread: Less than 25, with Smoke Developed less than 450, per ASTM E84.

3. Barcol Hardness scratch resistance: 39 as per ASTM D2583, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

4. IZOD Impact per ASTM D256: 11.

B. Stainless steel trim with integral color profiles. Provide inside corner and outside corners, panel division and edge trim.

C. Adhesive and Sealants: VOC compliant, as recommended by manufacturer.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine backup surfaces to determine corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.

B. Do not begin installation until backup surfaces are in satisfactory condition.

3.02 APPLICATION

A. Perform cutting with carbide tipped saw blades or drill bits, or cut with snips.

B. Install panels with manufacturer’s recommended gap for panel field and corner joints.

C. Fastener holes in the panels shall be predrilled 1/8 inch oversize.

D. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

E. Utilizing products acceptable to manufacturer, install the system in accordance with panel manufacturer's printed instructions.

3.03 CLEANING

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

# SECTION 07 2100 - THERMAL INSULATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Thermal batt insulation for exterior walls and under roof decks.

2. Thermal batt insulation in furring at concrete or masonry walls.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 05 4100 - Structural Metal Stud Framing.

3. Section 09 2216 - Non-Structural Metal Framing.

4. Section 09 2423 – Cement Plaster and Metal Lath.

5. Section 09 8100 – Acoustical Insulation.

### 1.02 SUBMITTALS

A. Product Data:

1. Material List: Provide a list of materials for installation under this section.

2. Provide manufacturer's printed Product Data for each type insulation and accessory.

B. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

C. Certification: Provide certification that insulation materials conform to requirements of CBC Chapter 26.

D. Recycled Content: Provide certification that insulation materials contain a minimum 30 percent recycled materials.

### 1.03 QUALITY ASSURANCE

A. Surface Burning Characteristics: Flame spread rating shall not exceed 25 and smoke density shall not exceed 50 when tested in accordance with ASTM E84.

B. Combustion Characteristics: Rated as non-combustible when tested in accordance with ASTM E136.

C. Comply with following as a minimum requirement:

1. ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board.

2. ASTM C553: Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

3. ASTM C578: Specification for Rigid, Cellular Polystyrene Thermal Insulation.

4. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.

5. ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.

6. ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

8. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site and store in a safe, dry place, with labels intact and legible at time of installation.

B. Protect building insulation materials from damage.

1.05 PROJECT CONDITIONS

A. Avoid exposure to humidity and moisture. Protect from exposure to sunlight.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Owens Corning.

B. Johns Manville.

C. CertainTeed Corporation.

D. The DOW Chemical Company.

E. DiversiFoam Products.

F. Equal.

2.02 MATERIALS

A. General:

1. Provide Unfaced, friction-fit batt insulation where both sides of installation are enclosed.

2. Provide batt insulation with integral vapor barrier when one side of installation will be unenclosed.

3. Provide batt insulation with integral vapor barrier where at least one side of installation will be exposed to high humidity, such as showers.

4. Recycled content shall be a minimum of 30 percent.

B. Mineral Fiber Batt Insulation:

1. Unfaced Mineral Fiber Batt Insulation: Provide friction-fit, unfaced mineral fiber batts. Insulation shall consist of mineral fibers, glass or slag, and thermosetting resins complying with ASTM C665, Type I.

2. Faced Mineral Fiber Batt Insulation: Provide mineral fiber batts with vapor barrier consisting of mineral fibers, glass or slag, and thermosetting resins complying with ASTM C665, Type III, Class A, with vapor-retardant membrane facing.

3. Fasteners for Attaching Insulation to Wood Framing:

a. For faced batt insulation provide one of following types of staples: Stainless steel, monel, or copper-coated steel, size as required by manufacturer or applicable code.

b. For unfaced batt insulation provide 18 gage, minimum, galvanized steel wire where required to maintain proper insulation placement.

4. Fasteners for Attaching Insulation to Underside of Metal Roof Decks:

a. Spindle Anchors: Stic-Klip Mfg. Co., Type A or B as required, with Type S adhesive; Miracle Adhesives Corp. "Miracle StukUps" with Type HT994 adhesive; or Goodloe E. Moore Gemco or Tuff-Weld with G-P Improved or Tuff-Bond Quik-Set Type Adhesive as applicable; or equal. Provide adhesives of correct type for substrates and type of anchor.

b. String Wires: Minimum 18 gage galvanized steel wire.

C. Extruded-Polystyrene (XPS) Board Insulation: ASTM C578, Type X, thickness as indicated on drawings.

1. Manufacturers:

a. DiversiFoam Products, Certifoam.

b. Dow Chemical Company, Thermax.

c. Owens Corning, Foamular.

d. Equal.

2. Physical Properties:

a. Density, ASTM D1622: Not less than 1.35 pounds per cubic foot.

b. Surface Burning Characteristics, ASTM E84: Flame spread less than 25, smoke developed no greater than 50.

c. Compressive Strength, ASTM D1621: 25 psi minimum.

d. Thermal Resistance, ASTM C1363: R 5 minimum per inch of thickness.

e. Water Vapor Transmission, ASTM E96: Less than 0.03 perms.

f. Water Absorption by Volume, ASTM C209: Maximum 0.10 percent.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Examine Work to verify suitability to receive insulation. Do not proceed until unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

A. General:

1. Fit batt insulation, of R-value indicated on Drawings, snugly between framing members.

2. Maintain total insulation integrity over entire area to be insulated, including areas between closely spaced members.

3. Extend full thickness insulation over entire area to be insulated. Furnish manufacturer's recommended clips to tightly fit batts at joints.

4. Cut and fit batt insulation tightly around pipes, conduits and penetrations.

5. Do not compress batt insulation in excess of 10 percent (R-19 may be installed in 2 by 6 stud walls).

6. Prevent batt insulation from sagging during and after installation by installing adequate wire.

7. Metal door and window frames in acoustically insulated walls shall be filled with insulation, unless otherwise indicated.

8. Where vapor barrier is provided, install with vapor barrier facing room.

   a. Batts in Metal Framing: Provide friction-fit batts tightly fitted to stud webs and to metal furring.

   b. Batts under Metal Roof Decks where underside of insulation will be exposed install foil-faced flanged-type insulation batts and staple flanges together at maximum 4-inch centers and seal joints at abutting vertical surfaces with a pressure-sensitive plastic tape. Where underside of insulation will be inaccessible, install secure with spindle anchors. Provide 18 gage galvanized string wires under batts wherever necessary to prevent sagging. Stretch wire taut.

   c. Batts in Horizontal or Sloped Applications: Provide tightly stretched string wires along center of horizontal or sloping batts where support spacing exceed 16 inch on centers.

   d. Batts in Ceiling Framing: Install batts between joists, so top of insulation is level with top of framing members. Do not install insulation over recessed lighting fixtures, speakers, or other heat producing elements in ceilings. At junction boxes, access panels, and other items requiring access from above or below ceiling, cut insulation on each side to fit item and install loosely on top. Fit insulation snugly around ducts, conduits, pipes, and other items projecting through ceiling construction.

9. Install polystyrene board as required by Section 07 1326.

3.03 PROTECTION

A. Protect Work of this section until Substantial Completion.

3.04 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION

SECTION 07 8116 - CEMENTITIOUS FIREPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cementitious spray-applied fireproofing installed on structural steel and underside of metal decking, for fire rated protection.

B. Related Requirements:

1. Division 01 – General Requirements.
2. Section 03 3000 - Cast-In-Place Concrete.
3. Section 05 1200 - Structural Steel Framing.
4. Section 05 3000 - Metal Decking.

1.02 REFERENCES

A. Comply with the following as a minimum requirement:

1. ASTM E84 - Standard Test Methods for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E136 - Standard Test Methods for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
4. ASTM E605 - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials (SFRM) Applied to Structural Members.
5. ASTM E736 - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
6. ASTM E759 - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members.
7. ASTM E760 - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members.
8. ASTM E761 - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.
9. ASTM E859 - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members.
10. ASTM E937 - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

11. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

12. UL Fire Resistance Directory.

1.03 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings to indicate members and components to receive fireproofing. Indicate various ratings and thicknesses required.

B. Product Data:

1. Submit manufacturer's specifications for materials with copies of code and UL approvals.

2. Submit manufacturer's recommended application instructions.

C. Material Samples: Submit 4-inch by 4-inch sprayed Sample. Prepare Samples accurately; apply required thickness and density of fireproofing material.

D. Test Reports: Submit reports of tests performed by an authorized independent testing laboratory, indicating conformance with performance criteria specified below.

1.04 DELIVERY, STORAGE AND HANDLING

A. Material shall be delivered in original unopened packages, fully identified as to manufacturer, branch or other identifying data, and bearing proper Underwriters Laboratories, Inc. labels for fire-resistance classification.

B. Material shall be stored above grade, under cover and in a dry location until ready for installation. Bags exposed to water before installation shall be considered unsuitable for use and discarded. Stock of material is to be rotated and installed before its expiration date.

1.05 PROJECT CONDITIONS

A. A minimum temperature of 40 degrees F for air and substrate must be maintained for 24 hours before, during, and for 24 hours after installation of the sprayed fireproofing.

B. Provide ventilation to allow proper drying of fireproofing during and after its installation. In poorly ventilated areas lacking natural ventilation, provide forced air circulation as required.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. GCP Applied Technologies.

B. Isolatek International.

C. Carboline Company

D. Equal.

2.02 MATERIALS

A. Standard Durability/Density Sprayed fireproofing (Interior Locations, Concealed Conditions): GCP Applied Technologies Monokote Type MK-6's, Cafco 300 Series, or Carboline Company Southwest Type 5GP. The material shall be factory-blended, cementitious fireproofing.

1. Performance Criteria:

   a. Dry Density: Field density shall be measured in accordance with ASTM E605. Minimum average density shall be that listed in UL Fire Resistance Directory, Evaluation Report, or as required by authorities having jurisdiction.

   b. Deflection: Material shall not crack or de-laminate from surface to which it is installed when tested in accordance with ASTM E759.

   c. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or de-laminate from the surface to which it is installed.

   d. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have minimum average bond strength of 200 psf and minimum individual bond strength of 150 psf.

   e. Air Erosion: Maximum allowable weight loss of fireproofing material shall be 0.005 gm per square foot when tested in accordance with ASTM E859.

   f. Compressive Strength: Fireproofing shall not deform more than 10 percent when subjected to compressive forces of 1,000 psf. when tested in accordance with ASTM E761.

   g. Impact Penetration: Fireproofing material shall not show a loss of more than 2 ¼-inches when subjected to impact penetration tests in accordance with established test methods.

   h. Surface Burning Characteristics: Material shall exhibit following surface burning characteristics when tested in accordance with ASTM E84; flame spread-0 and smoke development-0.

   i. Fireproofing material shall not contribute to corrosion of steel members when tested in accordance to ASTM E937.

2. Sprayed fireproofing material shall have been tested and reported by Underwriters' Laboratories, Inc. in accordance with procedure of ASTM E119.

3. Sprayed fireproofing material and application shall meet requirements of OSHA regulation 29 CFR Section 1926.1101, which regulates use of asbestos in construction, and shall be free of mineral wool.

4. Fireproofing product shall be tested in accordance with ASTM G21, and shall show resistance to mold growth when inoculated with aspergillus niger, and mixed spore cultures (Tappi T487-M54 and ASTM G21). Mold inhibitor shall be provided by the manufacturer.

B. Medium Durability/Density Sprayed fireproofing (Interior Locations, Exposed Conditions to Abrasion): GCP Applied Technologies Monokote Type Z-106/HY, Cafco 400 Series or Carboline Company Southwest Type 7GP or or Southwest Type 7GP. The material shall be factory-blended, cementitious fireproofing.

1. Performance Criteria:

   a. Dry Density: Field density shall be measured in accordance with ASTM E605. Minimum average density shall be that listed in UL Fire Resistance Directory, Evaluation Report, or as required by authorities having jurisdiction.

   b. Deflection: Material shall not crack or de-laminate from surface to which it is installed when tested in accordance with ASTM E759.

   c. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or de-laminate from the surface to which it is installed.

   d. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have minimum average bond strength of 2,000 psf.

   e. Air Erosion: Maximum allowable weight loss of fireproofing material shall be 0.005 gm per square foot when tested in accordance with ASTM E859.

   f. Compressive Strength: Fireproofing shall not deform more than 10 percent when subjected to compressive forces of 100 lbf/sq.in. when tested in accordance with ASTM E761.

   g. Abrasion Resistance: No more than 6 inches shall be abraded or removed from fireproofed substrate when tested in accordance with established test methods.

   h. Impact Penetration: Fireproofing material shall not show a loss of more than 2 ¼-inches when subjected to impact penetration tests in accordance with established test methods.

   i. Surface Burning Characteristics: Material shall exhibit following surface burning characteristics when tested in accordance with ASTM E84; flame spread-0 and smoke development-0.

   j. Fireproofing material shall not contribute to corrosion of steel members when tested in accordance to ASTM E937.

2. Sprayed fireproofing material shall have been tested and reported by Underwriters' Laboratories, Inc. in accordance with procedure of ASTM E119.

3. Sprayed fireproofing material and application shall meet requirements of OSHA regulation 29 CFR Section 1926.1101, which regulates use of asbestos in construction, and shall be free of mineral wool.

4. Fireproofing product shall be tested in accordance with ASTM G21, and shall show resistance to mold growth when inoculated with aspergillus niger, and

mixed spore cultures (Tappi T487-M54 and ASTM G21). Mold inhibitor shall be provided by the manufacturer.

C. High Durability/Density Sprayed fireproofing (Interior or Exterior Locations, Exposed Conditions Subject to Impact): GCP Applied Technologies Monokote Type Z-146, Cafco Fendolite MII, or Carboline Company Southwest Type 7HD. The material shall be factory-blended, cementitious fireproofing.

1. Performance Criteria:

   a. Dry Density: Field density shall be measured in accordance with ASTM E605. Minimum average density shall be that listed in UL Fire Resistance Directory, Evaluation Report, or as required by authorities having jurisdiction.

   b. Deflection: Material shall not crack or de-laminate from surface to which it is installed when tested in accordance with ASTM E759.

   c. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or de-laminate from the surface to which it is installed.

   d. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have minimum average bond strength of 10,000 psf.

   e. Air Erosion: Maximum allowable weight loss of fireproofing material shall be 0.005 gm per square foot when tested in accordance with ASTM E859.

   f. Compressive Strength: Fireproofing shall not deform more than 10 percent when subjected to compressive forces of 500 lbf/sq.in. when tested in accordance with ASTM E761.

   g. Abrasion Resistance: No more than 6 inches shall be abraded or removed from fireproofed substrate when tested in accordance with established test methods.

   h. Impact Penetration: Fireproofing material shall not show a loss of more than 2 ¼-inches when subjected to impact penetration tests in accordance with established test methods.

   i. Surface Burning Characteristics: Material shall exhibit following surface burning characteristics when tested in accordance with ASTM E84; flame spread-0 and smoke development-0.

   j. Fireproofing material shall not contribute to corrosion of steel members when tested in accordance to ASTM E937.

2. Sprayed fireproofing material shall have been tested and reported by Underwriters' Laboratories, Inc. in accordance with procedure of ASTM E119.

3. Sprayed fireproofing material and application shall meet requirements of OSHA regulation 29 CFR Section 1926.1101, which regulates use of asbestos in construction, and shall be free of mineral wool.

4. Fireproofing product shall be tested in accordance with ASTM G21, and shall show resistance to mold growth when inoculated with aspergillus niger, and mixed spore cultures (Tappi T487-M54 and ASTM G21). Mold inhibitor shall be provided by the manufacturer.

D. Mixing water shall be clean, fresh and suitable for domestic consumption and free from such amounts of mineral or organic substances that would affect installation of fireproofing material.

E. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistive Directory" or in the listings of another qualified testing agency acceptable to the authorities having jurisdiction.

F. Dry mix sprayed fire resistive materials containing mineral fibers are not allowed.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Surfaces to receive sprayed fireproofing shall be free of oil, grease, paints/primers, loose dirt or other foreign substances which may impair proper adhesion of fireproofing to substrate. Where necessary, clean surfaces to receive fireproofing by a method recommended by fireproofing material manufacturer.

B. Installation of sprayed fireproofing shall not begin until surfaces to receive fireproofing have been inspected, to determine if surfaces are acceptable to receive fireproofing material.

C. The application of fireproofing to the underside of roof decks shall not commence until the roof is completely installed and tight, all penthouses are complete, all mechanical units have been placed, and construction roof traffic has ceased.

### 3.02 PREPARATION

A. Before installation of fireproofing, clips, hangers, support sleeves, and other attachments required to penetrate fireproofing shall be installed.

B. Ducts, piping, equipment or other suspended material or equipment, which would interfere with installation of fireproofing material, shall not be installed until fireproofing Work is complete.

### 3.03 APPLICATION

A. Provide equipment and application methods that conform to manufacturer's application instructions as reviewed.

B. Thickness of fireproofing shall conform to CBC Chapter 7 and Table 720.1(1) and Underwriters Laboratories, Inc. requirements, for types and locations of members to be protected.

### 3.04 FIELD QUALITY CONTROL

A. The Owner will select and pay an independent testing laboratory to sample and verify thickness and density of fireproofing in accordance with provisions of ASTM E605 and bond strength in accordance with ASTM E736.

B. The results of tests will be made available to all parties at the completion of installation.

3.05 PATCHING AND REPAIRING

A. Patch and repair fireproofing material after work of other trades to maintain fire-resistive ratings.

3.06 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.07 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Prefabricated Rated Sleeves and boxes for pipe/electric routing.

B. Related Sections:

1. Section 07 92 00 "Joint Sealants" for joints in or between fire-resistance-rated construction.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
b. Classification markings on penetration firestopping correspond to designations listed by the following:

1) UL in its "Fire Resistance Directory."

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 - PRODUCTS

2.1 FIRESTOPPING

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. 3M Fire Protection Products.
2. A/D Fire Protection Systems Inc.
3. Grace Construction Products; W.R. Grace & Co. -- Conn.
4. Hilti, Inc; CFS-DID.
5. Johns Manville; a Berkshire Hathaway company.
6. Nelson Firestop; a brand of Emerson Industrial Automation.
7. Tremco, Inc.
8. United States Gypsum Company.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Fire-resistance-rated walls include fire walls, smoke-barrier walls, and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Horizontal assemblies include floors.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates as recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

## 3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

## 3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

## 3.5 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

## 3.6 PENETRATION FIRESTOPPING SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. See attached Penetration Fire stopping assemblies at the end of this section.

END OF SECTION 07 84 13

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Mildew-resistant joint sealants.
4. Latex joint sealants.

B. Related Requirements:

1. Section 09 29 00 "Gypsum Wallboard" for acoustical sealant.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Compatibility of materials and sealants

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by an independent qualified testing agency procured by the Owner. Retesting costs due to sealant failure shall be by the GC.
   1. Submit Pre-construction testing reports for adhesion and compatibility of materials and sealants for all substrate used specifically on the project.

C. Sample Warranties: For special warranties.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing for Exterior Applications: Before installing sealants, field test their adhesion to Project joint substrates as follows:

   1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
   2. Conduct field tests for each kind of sealant and joint substrate.
      a. Use the 'Flap' procedure per ASTM C1521.
   3. Notify Architect seven days in advance of dates and times when test joints will be erected.
   4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

      a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

         1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

   5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
   6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).

2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

A. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:

1. Products:

a. Pecora Corporation; 898.
b. Tremco; Tremsil 600 White
c. Dow Corning 786

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: Interior NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

a. Use O Joint Substrates: Interior, wet locations such as restrooms.

B. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.

1. Type and Grade: S single component and NS nonsag.
2. Class: 50/100.
3. Use Related to Exposure: NT nontraffic.
4. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.
5. Products: (at buiding expansion joints).
   a. Dow Corning Corporation [NOTE: Precast shall be Dowsil 756)
   b. GE Silicones; SilPruf LM ; eq
   c. Pecora Corporation; eq

C. Single-Component Neutral-Curing Silicone Sealant.

1. Type and Grade: S single component and NS nonsag <Insert manufacturer's name; product name or designation.
2. Class: 50.
3. Use Related to Exposure: NT nontraffic.
4. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated, O.
   a. Use O Joint Substrates: Aluminum coated with a high-performance coating, galvanized steel, brick.
5. Products: (building construction and control joints).

   a. Dow Corning Corporation; [NOTE: Brick Veneer /Metal Cladding shall be Dowsil 756)
   b. GE Silicones; SilPruf ; eq
   c. GE Silicones; UltraPruf II ; eq
   d. Pecora Corporation; eq

D. Single-Component Pourable Neutral-Curing Silicone Sealant

1. Type and Grade: S single component and P (pourable).
2. Class 100/50
3. Use Related to Exposure: T (traffic).
4. Uses Related to Joint Substrates: M,A, and O as applicable to joint substrate indicated.
5. Products

    a. Dow Corning Corporation; 890-SL.
    b. Dow Corning Corporation; SL Parking Structure Sealant
    c. Pecora Corporation; 300 Pavement Sealant (Self Leveling).

2.3 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Use: All interior locations where silicone sealant is not used.
2. Products: Subject to compliance with requirements, provide one of the following:
    a. BASF Building Systems; Sonolac.
    b. Bostik, Inc.; Chem-Calk 600.
    c. Pecora Corporation; AC-20 +.
    d. Tremco Incorporated; Tremflex 834.

2.4 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or

harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, minimal grinding, or minimal mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants without altering, damaging the adjacent materials being sealed. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to

comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

## 3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 SEALANT CLASSIFICATIONS

Material Composition

- Type S - Single component
- Type M- Multi-component

Application Characteristic

- Grade P- Flowable & Self-leveling for horizontal expansion joints.
- Grade NS- Non-Sag or gun grade for use on vertical expansion joints.

Classification

- Class 25- passes 25% movement per ATSM C719.
- Class 12 1/2- passes 12 1/2% movement per ASTM C719.

Use

- Use T- traffic area.
- Use NT- Non-traffic area.
- Use M- passes ASTM C794 & C710 on mortar.
- Use G- passes ASTM C794 & C719 on glass.
- Use O- passes C794 & C719 on other substrates.

END OF SECTION 07 92 00

# SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
   1. Interior Hollow Metal Doors and Frames
   2. Exterior Hollow Metal Doors and Frames

B. Related Requirements:

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

   1. Include construction details, material descriptions, core descriptions, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:

   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

B. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-102-mm high wood blocking. Provide minimum 1/4-inch 6-mm space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amweld International, LLC.
2. Ceco Door; ASSA ABLOY.
3. Curries Company; ASSA ABLOY.
4. Security Metal Products Corporation.
5. Steelcraft; an Allegion brand.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches (44.5 mm).
c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (1.0 mm).
d. Edge Construction: Model 2, Seamless.
e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
b. Construction: Welded Frames

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm.)
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
    d. Edge Construction: Model 2, Seamless.
    e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

    a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
    b. Construction: Full Profile Welded.

4. Exposed Finish: Prime.

2.5 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.7 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).
3. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
4. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.

5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.

    b. Compression Type: Not less than two anchors in each frame.

6. Head Anchors: Two anchors per head for frames more than 42 inches (1067 mm) wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

8. Terminated Stops: Terminate stops 6 inches (152 mm) above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 2.10 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-(0.5-mm-)thick, cold-rolled steel sheet set into 0.032-inch-(0.8-mm-)thick steel frame.

1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
2. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.

f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that will be filled with grout containing anti-freezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
c. At Bottom of Door: [3/4 inch (19.1 mm)][5/8 inch (15.8 mm)] plus or minus 1/32 inch (0.8 mm).
d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 11 13

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Related documents, drawings and general provisions of contract, including General and Supplementary Conditions and Division 01 specification sections apply to this section.

1 . 2 S U M M A R Y

A. Section Includes: Work under this section comprises of furnishing solid core doors with wood veneer faces, light frames, factory fitting and machining and factory finishing for fire labeled and non-labeled flush wood doors.

B. Related Sections
1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Door Hardware”.
3. Division 08 Section “Glazing”.

1.3 REFERENCES

A. Standards
1. NFPA-80-1995 – Fire Doors and Windows.
2. NWWDA I.S. 1-A-97 – National Wood Window and Door Association.
3. WDMA – Wood Door Manufacturer’s Association.
4. UL10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

B. Codes
1. NFPA-101 – Life Safety Code.
2. CBC 2022 – California Building Code.
3. ANSI-A117.1 – Accessible and Usable Buildings and Facilities.
4. ADA – Americans with Disabilities Act.

1.4 SUBMITTALS

A. General Requirements: Submit copies of the flush wood doors shop drawings in accordance with Division 01, General Requirements.

B. Product Data: Submit shop drawings showing fabrication and installation of flush wood doors. Include details of door elevations, details of construction, location and installation requirements of door hardware.

C. Shop Drawings: Provide a schedule of doors and frames using same reference numbers for details and door openings as those on the contract documents. Shop drawings should include the following information:
   1. Door core material.
   2. Mortises and reinforcements.
   3. Glazed and louvered openings and material.
   4. Mounting locations of standard hardware.

D. Samples: Upon request submit the following samples:
   1. Corner sections of doors approximately 8-inch x 10-inch with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required.
   2. Finish sample for factory-finished doors.
   3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 QUALITY ASSURANCE

A. Substitutions: All substitution requests must be submitted within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his consultant.

B. Manufacturer Qualifications
   1. Obtain wood doors from a single manufacturer to ensure uniformity in quality of appearance and construction. All material supplied for this project to conform to NWWDA I.S. 1-A-97 for premium grade wood doors.

C. Fire Rated Doors
   1. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
      a. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.
   2. A physical label to be permanently affixed to the fire door at an authorized facility. Furthermore, all 45, 60, and 90 minute label fire doors are to have manufacturer’s standard laminated stiles for improved screw holding and split resistance capability.
      a. At stairwell enclosures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration.
   Comply with requirements of NWWDA pamphlet “How to Store, Handle, Finish, Install and Maintain Wood Doors,” as well as manufacturer's written instructions. Doors are to be shipped from manufacturer in individual polybags and shall be inspected immediately upon arrival at jobsite for any damage of defects.

B. Identify each door with individual opening numbers that correlate with designation system used on shop drawings and contract drawings for door, frames and hardware. Use only temporary, removable, or concealed markings.

C. Do not deliver or install doors until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy level in storage and installation areas.

1.7 WARRANTY

A. Warranties shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.

B. Submit written warranty on manufacturer's standard form signed by the manufacturer agreeing to replace or repair defective doors which have:
   1. Delamination in any degree.
   2. Warp or twist of 1/4 inch or more in any 3'-6" x 7'-0" plane of door face.
   3. Telegraphing of stile, rail or core through face to cause surface variation in excess of 1/100 inch in any 3-inch spans.

C. Contractor shall replace or refinish doors where contractor's work contributed to rejection or voiding of manufacturer's warranty.

D. Solid core interior doors shall be warranted for the life of their installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide flush wood doors by one of the manufacturers as listed.

B. Non-Rated Doors
   1. Supply engineered core complying with NWWDA I.S. 1-A, bonded to door faces, stiles and rails. Use minimum adhesive Type II for interior doors as outlined in NWWDA I.S. 1-A-7.
      a. Algoma: FGFW.
      b. Graham: GPD-EC.
      c. VT Industries: 5508.
      d. Marshfield: DCL-1/DCL-20.

C. Fire Rated Doors Over 20 Minutes
   1. Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required to provide fire rating indicated.
      a. Algoma: FD.
      b. Graham: GFM.
      c. Marshfield: DFM.

2.2 DOOR
   1. Performance Grade:
      a. ANSI/WDMA I.S. 1A Extra Heavy Duty

2. Grade:
    a. ANSI/WDMA I.S. 1A, Premium

3. Faces: Single-plywood veneer not less than 1/50 inch thick
    a. Finish: SELECT WHITE BIRCH
    b. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
    c. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Section 064216 "Flush Wood Paneling."
    d. Exposed Vertical Edges: Same species as faces – edge Type A.

    e. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
    f. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
    g. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
        1) Finish steel edges and astragals with baked enamel same color as doors.
        2) Finish steel edges and astragals to match door hardware locksets or exit devices.

4. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
        1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.
        2) Provide blocking to limit through bolting

5. Core for Non-Fire-Rated Doors: ANSI A208.1, Grade LD-1 particleboard.
    a. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
        1) 5-inch top-rail blocking, in doors indicated to have closers.
        2) 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
        3) 5-inch midrail blocking, in doors indicated to have exit devices.

6. Construction: Five plies, hot-pressed, bonded or unbonded.

## 2.3 FACTORY FINISHING

A. Prefinish all wood doors at the factory. Architect will select color from manufacturer’s standard range.

B. Prefinish all wood doors per NWWDA I.S. 1-A-97, Section G-17.

C. Finish doors using three (3) coats of water-clear 100% solids, modified acrylic urethane, cured immediately with ultra-violet light.

D. Factory seal doors on all six (6) sides using manufacturer's standard meeting these applications.

2.4 LIGHT FRAMES

A. Provide manufacturer's standard metal light frame formed of 18-gauge, cold-rolled steel sheet, factory primed and approved for use in doors of fire rating indicated.

B. Provide wood light frames from non-rated doors.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with

DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Pre-machine metal astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

1. Trim openings with moldings of material and profile indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. For hardware installation, see Division 8 Section "Door Hardware."

B. Install wood doors to comply with manufacturer's written instructions, referenced quality standard and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Align factory fitted doors in frames for uniform clearance at each edge. Gap at bottom of door not to exceed 3/4 inch.

3.3 ADJUSTING AND PROTECTING

A. Rehang or replace doors that do not swing or operate freely.

B. Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08 14 16

# SECTION 083113 - ACCESS DOORS AND FRAMES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. This Section includes the following:

1. Access doors and frames for walls and ceilings.

B. Related Sections include the following:

1. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
2. Division 09 Section "Acoustical Panel Ceilings" for suspended acoustical panel ceilings.

### 1.3 SUBMITTALS

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

D. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

### 1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain access door(s) and frame(s) through one source from a single manufacturer.

B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for vertical access doors and frames.
2. ASTM E 119 or UL 263 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

B. General Contractor shall include in the bid a minimum of (18) 2'x'2' ceiling access panels in addition to those as indicated on the drawings; Ceiling Access panels shall be required at hard gypsum board ceilings system location that are not feasible to provide/coordinate above acoustic panel ceiling systems. Review locations with the Architect prior to installation and routing systems requiring access.

C. General Contractor shall include in the bid a minimum of (12) 1'x'1' access wall panels in addition to those as indicated on the drawings; Review locations with the Architect prior to installation and routing systems requiring access.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

B. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

a. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.

2. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

C. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

D. Plaster Beads: Casing bead formed from 0.0299-inch zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. J. L. Industries, Inc.
   2. Larsen's Manufacturing Company.
   3. Milcor Inc.

B. TYPE 1 - Flush Access Doors and Frames with Exposed Trim: Fabricated from metallic-coated steel sheet.

   1. Locations: Ceiling surfaces. Minimum 12”x12” to access MEPT / FP /FA/Low voltage device items uno. Field locate with Architect coordination. Not all locations indicated in RCP. GC to include allowances for access locations required per MEPT drawings and coordinated with Architectural systems. Provide rated AP where required to maintain FRR as indicated ratings on the A0 series LSC Sheets.
   2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
   3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
   4. Hinges: Spring-loaded, concealed-pin type.
   5. Lock: Cylinder.

C. TYPE 2 - Flush Access Doors and Trimless Frames: Fabricated from metallic-coated steel sheet.

   1. Locations: Wall surfaces. Minimum 12”x12” to access MEPT / FP /FA/Low voltage device items uno. Field locate with Architect coordination. Not all locations indicated in Interior Elevations or plan notes. GC to include allowances for access locations required per MEPT drawings and coordinated with Architectural systems. Provide rated AP where required to maintain FRR as indicated ratings on the A0 series LSC Sheets.
   2. Door: Minimum 0.060-inch thick sheet metal, set flush with surrounding finish surfaces.
   3. Frame: Minimum 0.060-inch thick sheet metal with drywall bead flange.
   4. Hinges: Spring-loaded, concealed-pin type.
   5. Lock: Cylinder.

## 2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

   1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
   2. For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
   3. For trimless frames with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
   4. Provide mounting holes in frames for attachment of units to metal or wood framing.
   5. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 08 33 00 - ROLLING GRILLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Electric operated overhead rolling grilles.

B. Related Sections:
1. 08 31 13 Access Doors and Panels. Access doors.
2. 08 71 00 Hardware. Masterkeyed cylinders.
3. Division 26. Electrical wiring and conduit, fuses, disconnect switches, connection of operator to power supply, and installation of control station and wiring.

C. Products That May Be Supplied, But Are Not Installed Under This Section:
1. Control station.
2. Manual release pull handle.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Cycle Life:
a. Design grilles of standard construction for normal use of up to 5 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the grille.

1.3 SUBMITTALS

A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
1. Product Data.
2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
3. Quality Assurance/Control Submittals:
a. Provide proof of manufacturer ISO 9001:2015 registration.
b. Provide proof of manufacturer and installer qualifications - see 1.3 below.
c. Provide manufacturer's installation instructions.
d. Provide manufacturer’s Health Product Declaration (HPD) for each product
4. Closeout Submittals:
a. Operation and Maintenance Manual.
b. Certificate stating that installed materials comply with this specification.

1.4 DELIVERY STORAGE AND HANDLING

A. Reference Section 01 66 00 Product Storage and Handling Requirements.

B. Follow manufacturer's instructions.

1.5 WARRANTY

A. Standard Warranty: Two years from date of shipment against defects in material and workmanship.

B. Maintenance: Submit for owner’s consideration and acceptance of a maintenance service agreement for installed products.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Manufacturer:
1. Cornell - 24 Elmwood Ave. Mountain Top, PA 18707. Telephone: (800) 233-8366. Underwriters Laboratories, Inc. (UL), ISO 9001:2008 Registered.
2. Cookson
3. Clopay

B. Model: ESG10

C. Approved Equal: Cookson - 1901 South Litchfield Rd, Goodyear, AZ, 85338. Telephone: (800) 294-4358.

2.2 MATERIALS

A. Curtain:
1. ESG10 Straight Pattern
a. Horizontal Rods: Solid 5/16 inch diameter, 5056 H32 aluminum alloy.
1. Vertical Spacing: 2 inches on center.

b. Vertical Chains: Grommeted aluminum links, 3/4 inch wide, positioned by E-rings on 9 inch centers. Provide double E-rings on horizontal bars on both sides of end chains to retain curtain in guides.

2. Bottom Bar: 2 x 3-1/2 inch (50.8 x 88.9 mm) extruded aluminum tubular section reinforced with 3 x2 x 3/16 inch (76.2 x 50.8 x 4.76 mm) aluminum angle(s).

3. Finish:
a. Aluminum Curtain and Bottom Bar:
1. Curtain: Clear anodized.
2. Bottom Bar: Clear anodized.

B. Guides: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners and polypropylene pile runners on both sides of curtain.

1. Finish, Aluminum Guide Components:
   a. Clear anodized.

C. Counterbalance Shaft Assembly:
   1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
   2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of grille to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

D. Brackets: Fabricate from minimum 3/16 inch (4.76 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
   1. Finish:
      a. Zirconium treatment followed by a light gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.

E. Hood: Not required when located above a ceiling.

## 2.3 ACCESSORIES

A. Locking:
   1. Concealed Self Locking Mechanism: AutoLock manual lifting jamb lock assemblies that will prevent forced opening of a closed grille. Lock mechanism shall not interfere with normal electric operation.

## 2.4 OPERATION

A. Supply Model MG Electric Motor Operator, industrial duty - rated for a maximum of 20 cycles per hour, UL listed, Totally Enclosed Non Ventilated gear head operator(s) rated 1/3 hp as recommended by door manufacture for size and type of door, 120 Volts, 3 Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist and control station(s). Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator drive and door driven sprockets shall be provided with #50 roller chain. Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical door locking devices are provided. Operator drive and door driven sprockets shall be provided with minimum #50 roller chain. Operator shall be capable of driving the door at a speed of up to 9” per second or as recommended for door size. Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect

switch, all conduit and wiring per the overhead door wiring instructions. Location per Electrical drawings.

1. Flush mounted: "Open/Close" key switch with "Stop" push button and small format Best type 7-pin cylinder; NEMA 1B. Location per Electrical drawings.

B. Entrapment Protection: Provide the following primary entrapment protection device to enable momentary contact close operation.

1. SafetyGard UL325 Light Curtain with Dynamic Sequential Blanking: Provide monitored, non-contact light curtain consisting of a transmitter and a receiver to be mounted to the guide assembly of the door in the provided mounting channel, projecting a thru beam across the width of the door for the height of the light curtain (3ft or 6ft depending on opening size of the door). Interruption of beam before door fully closes shall cause door to immediately stop downward travel and reverse direction to the fully opened position.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

A. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Follow manufacturer's installation instructions.

3.3 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative.

B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

# SECTION 083513– Folding Doors

## Part 1 – General

1.01 Summary

A. Section includes:
   1. Bi-Folding Aluminum Doors

B. Related Sections:
   1. 08 4113 – Aluminum Framed Entrance and Storefront.

1.02 References

A. American Architectural Manufacturers Association (AAMA)

B. American Society for Testing and Materials (ASTM)

C. Aluminum Association (AA)

1.03 System Description

A. General: In addition to requirements shown or specified, comply with:
   1. Applicable provisions of AAMA Aluminum Storefront and Entrance Manual for design, materials, fabrication and installation of component parts.

B. Design Requirements: Arcadia 8000 Series Bi-Folding Aluminum Door is a single source package of door, doorframe and hardware that is engineered to allow doors in both directions to be folded to the side of an opening.

C. Performance Requirements: Each assembly shall be tested by a recognized testing laboratory or agency in accordance with specified test methods.
   1. Resistance to corner racking shall be tested by the dual moment corner joint strength test.
   2. Structural uniform load shall be tested in accordance with ASTM E 330.

1.04 Quality Assurance

A. Single Source Responsibility:
   1. Obtain entrances, storefronts, ribbon walls, window walls, curtain walls, window systems, and finish through one source from a single manufacturer.

B. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.03.

1.05 Warranty

A. System shall be warranted against failure and/or deterioration of metals due to manufacturing process for a period of two (2) years.

**Part 2 – Products**

2.01 Manufacturers

A. Acceptable Manufacturers:
   1. Arcadia, Inc., 2301 E Vernon, Vernon, CA. Telephone 323/269-7300, Fax 323/269-7390.
   2. Alternate manufacturer's as approved by Architect.

B. Acceptable Products:
   1. Arcadia, Inc., 8000 Series Bi-Folding Aluminum Door, 1-3/4".
      a. Vertical stile: 2, 3-1/2 or 5 inches.
      b. Top rail: 2-1/16 or 3-5/8 or 5-1/8 inches.
      c. Bottom rail: 3 or 6 or 10 inches.
      d. Glazing Insert: Snap-in type for 1/4" infill.
   2. Major portions of the door stiles shall be a nominal .125" and glass stops shall be .050" thick.

2.02 Materials and Accessories

A. Door members: Extruded 6063-T6 aluminum alloy (ASTM B221 – Alloy G.S. 10aT5).

B. Screws, fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM A-164 shall be aluminum or steel, providing the steel is properly isolated from aluminum.

2.02 Glazing Gasket (compression-type design).

2.03 Hardware

A. Hardware for 8000 Series Bi-Folding Aluminum Door shall be furnished and installed by the manufacturer and shall include the following standard hardware
   1. Weatherstripping: A hard-backed polypile weatherstrip shall be installed in frame and inter-lockers and meeting stiles of bi-parting doors. Sliding panel supplied with double sweep at sill.
   2. Sill track: Aluminum
   3. Stainless Steel Roller Guide Spindle
   4. Guide Channel: aluminum
   5. Top Guide Carrier/Hanger
   6. Keyed Interlock Twin Bolt Lever
   7. Required swing door hardware with keyed lever lockset.

2.01 Finish

A. Finish all exposed areas of aluminum and components as indicated.
   1. An Architectural Class II or I color anodic coating conforming to AA-M12C22A34/AA-M12C22A44.
      a. Anodized finish color shall be Colornodic, as selected by Architect from full range of samples.

2.05 Door Fabrication

A. Stiles and rails shall be tubular sections accurately joined, flush and hairline at corners with heavy concealed reinforcement brackets secured with machine bolts, with optional MIG weld. Exposed screws not permitted.

B. Prepare internal reinforcement for hardware.

C. Custom hardware templates and physical hardware must be submitted prior to any fabrication.

**Part 3 – Execution**

3.01 Examinations

A. Examine conditions and verify substrate conditions are acceptable for product installation.

3.02 Erection

A. The maximum deflection of the header with the live load shall not exceed the lesser of L/720 of the span and 1/16”. Structural support for lateral loads when the panels are stacked open must be provided.

3.03 Installation

A. Install in accordance with approved shop drawings and manufacturers installation instructions.

B. Installer to provide adequate anchorage devices and to securely fit frame in place, absolutely level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work.

C. Ensure doors are adjusted at the time of installation for proper operation.

D. Protect installed product from construction activities, particularly thresholds and floor channels.

3.04 Field Quality Control

A. Contractors responsibility to make all necessary final adjustments to attain normal operation of each door and its mechanical hardware

**END OF SECTION**

**SECTION 084113**

**ALUMINUM FRAMED ENTRANCES & STOREFRONT**

**Part 1 – General**

1.01 Summary

A. Section includes:

1. Aluminum-Framed Storefront

a. Interior: Arcadia, Inc., AR450 Series, 2" x 4½" Non-Thermal; center glazed, screw spline, shear block, compensating stick or punched opening fabrication for ¼" glass.

**b.** Exterior: Arcadia, Inc., AG451T Series, 2" x 4-1/2" Thermally broken; center glazed system, screw spline, shear block, compensating stick or punched opening fabrication for 1" glass.

B. Related Sections:

1. 08 3513 – Folding Doors

1.02 References

A. American Architectural Manufacturers Association (AAMA)

B. American Society for Testing and Materials (ASTM)

C. Aluminum Association (AA)

1.03 System Description

A. General: In addition to requirements shown or specified, comply with:

1. Applicable provisions of AAMA Aluminum Storefront and Entrance Manual for design, materials, fabrication and installation of component parts.

B. Design Requirements: Arcadia AR450 Series is a framing system suitable for outside or inside glazing.

1. Performance Requirements:

a. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. (.00003 $m^3/sm^2$) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E283.

b. Water Resistance: No water leakage when measured in accordance with ASTM E331 with a static test pressure of 10 PSF(480 Pa).

c. Dynamic Water Resistance: No water leakage, when measured in accordance with AAMA 501.1-94 with a dynamic test pressure of 10 PSF (480 Pa).

d. Limit mullion windload deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E 330.

e. System shall not deflect more than 1/8" at the center point, or 1/16" at the center point of a horizontal member, once deadload points have been established.

f. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.

g. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.

C. Design Requirements: Arcadia AG451T Series is a framing system that provides for flush glazing on all sides without projected stops, with glass in the center of the frame. Framing system suitable for outside or inside glazing.

1. Performance Requirements:
    a. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. (.00003 $m^3/sm^2$) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E283.
    b. Water Resistance: No water leakage when measured in accordance with ASTM E331 with a static test pressure of 8 PSF(383 Pa).
    c. Limit mullion windload deflection of L/175 with full recovery of glazing materials, when measured in accordance with ASTM E 330.
    d. System shall not deflect more than 1/8" at the center point, or 1/16" at the center point of a horizontal member, once deadload points have been established.
    e. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.
    f. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.
    g. Thermal Performance – When tested in accordance with AAMA 1503.1 the following results should be attained: U-Maximum .63/CRF – minimum of 59.
    h. National Fenestration Rating Council (NFRC) specific application evaluation.

1.04 Quality Assurance

A. Single Source Responsibility:
    1. Obtain entrances, storefronts, ribbon walls, window walls, curtain walls, window systems, and finish through one source from a single manufacturer.

B. Provide test reports from AAMA accredited laboratories certifying the performances as specified in 1.03.

1.05 Warranty

A. System shall be warranted against failure and/or deterioration of metals due to manufacturing process for a period of two (2) years.

**Part 2 – Products**

2.01 Manufacturers

A. Acceptable Manufacturers:
    1. Arcadia, Inc., 2301 E Vernon, Vernon, CA.
    Telephone 323/269-7300, Fax 323/269-7390.

B. Acceptable Products:
    1. Arcadia, Inc., AR450 Series.
    2. Arcadia, Inc., AG451T Series.

2.02 Framing Materials and Accessories

A. Framing members, transition members, mullions, adaptors, and mounting: Extruded 6063-T6 aluminum alloy (ASTM B221 – Alloy G.S. 10a T6).

B. Screws, fastening devices, and internal components: Aluminum, stainless steel, or zinc-plated steel in accordance with ASTM.A-164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from aluminum.

C. Glazing Gasket
   1. Compression-type design, replaceable, molded or extruded santoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM) for AG451T.
   2. Shall be of type that locks securely into the glazing reglet to prevent glazing gaskets from disengaging.

2.03 Finish
A. Finish all exposed areas of aluminum and components as indicated.
   1. An Architectural Class II or I color anodic coating conforming with AA-M12C22A34/AA-M12C22A44.
      a. Anodized finish color shall be Colornodic as selected by Architect from Manufacturer's full range of samples.

2.04 System Fabrication
A. Continuous sub-sill shall be provided under sill members to collect water infiltration and divert from the interior of the system.

A. Framing members shall be internally reinforced and secured at head and sill as necessary for structural performance requirements, for hardware attachment, and as indicated.

B. Fasteners shall be so located as to ensure concealment from view in the final assembly.

**Part 3 – Execution**

3.01 Examinations
A. Examine conditions and verify substrate conditions are acceptable for product installation.

3.02 Installation
A. Install in accordance with approved shop drawings and manufacturers installation instructions.

3.03 Field Quality Control
A. Test the storefront for water leaks in accordance with AAMA 501.2. Conduct test in the presence of the Architect. Correct deficiencies observed as a result of this test.

**END OF SECTION**

**SECTION 084229.23 – SLIDING AUTOMATIC ENTRANCES**

PART 1 - GENERAL

1.0 SUMMARY

A. This section includes the following types of automatic entrance doors:
   1.1 Exterior and interior sliding automatic entrances.

B. Related Sections:
   1.1 Division 7 Sections for caulking to the extent not specified in this section.
   1.2 Division 8 Section “Door Hardware” for hardware to the extent not specified in this Section.
   1.3 Division 26 and 28 Sections for electrical connections including conduit and wiring for automatic entrance door operators and access control devices.

1.1 REFERENCES

A. References: Refer to the version year adopted by the Authority Having Jurisdiction.
   1.1 ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   1.2 ICC/IBC - International Building Code.
   1.3 NFPA 70 - National Electrical Code.
   1.4 NFPA 101 - Life Safety Code.

B. American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA).
   1.1 ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors.
   1.2 ANSI Z97.1 Standards for Safety Glazing Material Used in Buildings.

C. Underwriters Laboratories (UL).
   1.1 UL 325 Standard for Safety for Door, Drapery, Gate, Louver and Window Operators and Systems.

D. American Association of Automatic Door Manufacturers (AAADM).

E. American Society for Testing and Materials (ASTM).
   1.1 ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
   1.2 ASTM B209 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
   1.3 ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

F. American Architectural Manufacturers Association (AAMA).
   1.1 AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.

G. National Association of Architectural Metal Manufacturers (NAAMM).

1.1 Metal Finishes Manual for Architectural Metal Products.

H. International Code Council (ICC).
1.1 IBC: International Building Code.

I. National Fenestration Rating Council (NFRC).
1.1 NFRC 100-2010: Procedure for Determining Fenestration Product U-Factors.
1.2 NFRC 200-2010: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
**1.3** NFRC 500-2010: Procedure for Determining Fenestration Product Condensation Resistance Values.

J. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
1.1 ASHRAE 90.1-2010/2013: Energy Standard for Buildings Except Low-Rise Residential Buildings.

## 1.2 DEFINITIONS

A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to activate the operation of the door.
1.1 Knowing act: Consciously initiating the opening of a power operated door using acceptable methods including wall mounted switches such as push plates and controlled access devices such as keypads, card readers and key switches.

B. Safety Device: A device that detects the presence of an object or person within a zone where contact could occur and provides a signal to stop the movement of the door.

## 1.3 PERFORMANCE REQUIREMENTS

A. Comply with the following:
1.1 ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors.
1.2 UL 325 listed.

B. Automatic door equipment accommodates medium to heavy pedestrian traffic.

C. Entrapment Force Requirements:
1.1 Power Operated Sliding Doors: Not more than 30 lbf (133 N) required to prevent stopped door from closing.
1.2 Sliding doors provided with a breakaway device shall require no more than 50 lbf (222N) applied 1 inch (25 mm) from the leading edge of the lock stile for the breakout panel to open.

D. Energy Code Requirements: Sliding automatic entrances that are required to meet construction energy code requirements in those districts that have adopted ASHRAE 90.1-2010/2013 shall have been evaluated based on methodology in accordance with the following National Fenestration Rating Council (NFRC) standards:
1.1 NFRC 100-2010: Procedure for Determining Fenestration Product U-Factors.
1.2 NFRC 200-2010: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

1.3 NFRC 500-2010: Procedure for Determining Fenestration Product Condensation Resistance Values.

1.4 ASTM 283e-2010: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

## 1.4 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, fabrication, operational descriptions and finishes.

B. Shop Drawings: Submit manufacturer’s shop drawings, including elevations, sections and details, indicating dimensions, materials, and fabrication of doors, frames, sidelites, operator, motion /presence sensor control device, anchors, hardware, finish, options and accessories.

C. Samples: Submit manufacturer’s samples of aluminum finish.

D. Manufacturers Field Reports: Submit manufacturer’s field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA A156.10 after completion of installation.

E. Energy Calculations: Submit computer simulation data that is based on methodology in accordance with the National Fenestration Rating Council (NFRC) standards: NFRC 100-2010, NFRC 200-2010, NFRC 500-2010, and ASTM 283e-2010.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door opening installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the entrance and their nearest service representatives. The final copies delivered after completion of the installation test to include spare parts list.

G. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

## 1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 10 years of documented experience in manufacturing of doors and equipment of similar to that indicated for this Project and that have a proven record of successful in-service performance. Manufacturer to have a company certificate issued by AAADM.

B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Certified Inspector Qualifications: Certified by AAADM.

D. Source Limitations for Automatic Entrances: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.

E. Power-Operated Pedestrian Door Standard: ANSI/BHMA A156.10 (current version).

F. Emergency Exit door requirements: Comply with requirements of authorities having jurisdiction for automatic entrance doors serving as a required means of egress.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings to receive automatic entrances by field measurements before fabrication and indicate on shop drawings.

1.7 COORDINATION

A. Coordinate sizes and locations of recesses in concrete floors for recessed tracks and thresholds if applicable. Concrete work is specified in Division 03.

B. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access control system as applicable.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Automatic Entrance Doors shall be free of defects in material and workmanship for a period of One (1) year from the date of substantial completion.

C. During the warranty period a factory-trained technician shall perform service and affect repairs. An inspection shall be performed after each adjustment or repair.

D. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal business hours.

E. Manufacturer shall have in place a dispatch procedure for emergency call back service that shall be available 24 hours a day, 7 days a week.

PART 2 - PRODUCTS

SCHEDULE 0 - MANUFACTURER

. Manufacturer: ASSA ABLOY Entrance Systems, 1900 Airport Road, Monroe, NC 28110. Toll Free (877) SPEC-123. Fax (704 ) 290- 5555 Website www.assaabloyentrance.com contact: specdesk.na.aaes@assaabloy.com

Project Local Contact

Don Schmidt
678-778-1538; don.schmidt@assaabloy.com

A. Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.

## 2.1 SLIDING AUTOMATIC ENTRANCES

A. Sliding automatic entrance system including the following:
   2.1 Sliding panels, sidelites and aluminum frame.
   2.2 Overhead concealed, electro-mechanical operator.
   2.3 Operator housing, guide system and carrier assemblies.
   2.4 Controls and accessories as required for a complete installation.

B. Besam SL500 EcoDoor U-Factor (Basis of Design) Automatic Sliding Entrance with Stile and Rail Panels.
   2.1 Single slide, full breakout, energy efficient door system.
      A. Configuration: Single slide, two equal panel unit with one operable leaf and one sidelite.
      B. Traffic Pattern: Two-way.
      C. Emergency Breakaway Capability: Sliding leaf and sidelite.
      D. Mounting: Overhead header installed between jambs.
   2.2 Bi-parting, full breakout, energy efficient door system.
      A. Configuration: Bi-parting, four equal panel unit with two operable leaves and two sidelites.
      B. Traffic Pattern: Two-way.
      C. Emergency Breakaway Capability: Sliding leaves and sidelites.
      D. Mounting: Overhead header installed between jambs.

## 2.2 ENTRANCE COMPONENTS

A. Stile and Rail Sliding Panels and Sidelites:
   2.1 Full breakout sliding entrances shall include two interlocks per moving panel securing the leading stile of the sidelite and the butt stile of the sliding door panel together.
   2.2 Vertical Stiles shall be narrow stile 2-1/8 inch (54 mm).
   2.3 Bottom Rails shall be 10 inch (254 mm).
   2.4 Intermediate Muntin shall be 4 inch (102 mm).
   2.5 Weather-stripping: Slide-in type, replaceable pile mohair seals retained by the aluminum extrusions. The following types of weather-stripping are required: complementing weather-stripping on the joining vertical stiles of the sidelite and sliding door panels, complementing weather-stripping on the lead edge of the lock stiles of bi-parting doors, single pile weather-stripping between the carrier and the header, single pile weather-stripping on the lead edge stile of single slide door panels, dual pile weather-stripping on the pivot stile of breakout sidelite panels, and dual pile weather-

stripping on the butt stile of fixed sidelite panels. Bottom rails shall be provided with an adjustable nylon sweep.

2.6 Besam EcoDoor Package:

**A.** Interior: EcoDoor Seals: High pile mohair weather stripping on the lock stile of the sliding doors, integrated mohair weather stripping with vinyl fin on the joining vertical stiles of the sidelite and sliding door panels, and expandable foam inserts in leading stile of sidelite panels at pockets for interlocks. Bottom rails shall be provided with a concealed adjustable nylon sweep.

2.7 Exterior U-Factor Door Package:

A. U-Factor door package shall have been evaluated in full compliance with the listed National Fenestration Rating Council (NFRC) and American Society for Testing and Materials (ASTM) standards: NFRC 100-2010, NFRC 200-2010, NFRC 500-2010, and ASTM 283e-2010.

B. U-Factor door package shall meet the following requirements:

1. U-Factor Rating 0.64 BTU/(h $^{o}$F ft$^{2}$).
2. Solar Heat Gain Coefficient 0.28
3. Visible Light Transmittance 0.45
4. Condensation Resistance 22
5. Air infiltration rating 0.93 cuft/min/sqft 0.28x3/Mx2/min.

2.8 Glass: Glazing shall comply with ANSI Z97.1, thickness as indicated.

A. Glazing Sliding Panels and Sidelite Panels: 1/4” (6 mm) tempered glass.

B. U-Factor Glazing Sliding Panels and Sidelite Panels: 1” (25 mm) overall thickness insulating glass unit consisting of an interior and exterior glass lite; both lites to be 1/4 inch (6 mm) clear tempered glass. Airspace to be 90% argon filled.

1. Glazing shall be PPG Solarban 60 Clear, coated on surface 2, and the airspace 90% argon filled and meet the following listed requirements specified for U-Factor and Solar Heat Gain Coefficient:
   a. U-Factor Summer (BTU/(h $^{o}$F ft$^{2}$) 0.22
   b. U-Factor Summer (W/(m$^{2}$K) 1.27
   c. U-Factor Winter (BTU/(h $^{o}$F ft$^{2}$) 0.25
   d. U-Factor Winter (W/(m$^{2}$K) 1.4
   e. Solar Heat Gain Coefficient 0.37

B. Door Carriers: Manufacturer’s standard carrier assembly that allows vertical adjustment.

2.1 Single Slide and Bi-Parting Panels:

A. Carriage Assembly: Carriage bar with two wheel assemblies. Each assembly shall have tandem roller wheels.

B. Roller Wheels: Two heavy duty Delrin roller wheels per wheel assembly, for a total of four (4) roller wheels, 1-7/16 inch (36.51 mm) diameter, per active door leaf for operation over a replaceable aluminum track. Single journal with sealed oil impregnated bearings.

**C.** Two (2) heavy duty self-aligning anti-risers per leaf.

C. Framing Members: Provide automatic entrances as complete assemblies. Manufacturer’s standard extruded aluminum framing reinforced as required to support loads.

2.1 Single Slide and Bi-Parting Entrance - Vertical Jambs: 1-3/4 inches (44.5 mm) by 4-1/2 inches (114.3 mm).

D. Header: Manufacturer's standard extruded aluminum header with a replaceable aluminum track extending full width of entrance unit. Header to conceal door operators, carrier assemblies, and roller track; complete with hinged access panel for service of door operator, and controls.

2.1 Single Slide and Bi-Parting Entrance:

A. Header Span: Maximum 16'-0" (4.9 m) without intermediate supports when entrance glazed with 1/4-inch glass.

B. Capacity: Capable of supporting active breakout leafs up to maximum of 300 lb (136 kg) per leaf when header is supported per manufacturer's recommendations.

C. Size: 4-1/2 inches (114.3 mm) wide by 7 inches (177.8 mm) high.

1. Header height including the sensor plate cap which spans the clear door opening width is 8 inches (204.3 mm) high.

2.2 Header Access: Interior location, Continuous hinge at top of header allows cover to swing and allow complete access to operator and internal electronic and mechanical assemblies.

2.3 Design: Closed header when doors in closed position.

## 2.3 HARDWARE

A. Hardware: Provide manufacturer's standard hardware as required for operation indicated.

2.1 Breakaway arms and bottom pivot assemblies shall be supplied by the manufacturer and shall be adjustable to comply with applicable codes.

2.2 Locking hardware shall be provided as indicated.

A. Electrified slide lock shall automatically lock the sliding function of all sliding door panels within the entrance when the door panels are in the closed position.

1. Fail secure operation: Slide lock shall lock the sliding function of the door panels upon loss of power.

B. Mortise type hookbolt latch. (Single slide sliding entrance).

1. Interior Side: Keyed cylinder. Lock indicators shall be provided if required by code.
2. Exterior Side: Keyed cylinder.

C. Two point locking system with throw rod into carrier arm and mortise hookbolt. (Bi-parting sliding entrance).

1. Interior Side: Keyed cylinder. Lock indicators shall be provided if required by code.
2. Exterior Side: Keyed cylinder.

D. Exit devices shall lock the breakout function while allowing emergency egress at all times. Exit devices in combination with the automatic slide locking hardware to be provided on secured doors. Automatic locking for the sliding door when the door control switch is in the closed position.

1. Flush mounted Adams-Rite 8600 Series, concealed vertical rod exit devices mounted to the leading sliding panels.

2.3 Keyed cylinders shall be provided as indicated.

A. Manufacturer's standard keyed cylinder.

B. Guide Track/Threshold: Manufacturer's threshold as indicated.

2.1 Full Breakout Entrance Guide Track: Recessed floor mounted aluminum guide track(s) adjacent to the sidelite portion of the sliding automatic door assembly.

## 2.4 DOOR OPERATORS AND CONTROLS

A. Door Operator and Controller:
   2.1 Electro-mechanical controlled unit utilizing a high-efficiency, energy efficient, DC motor requiring a maximum of 3 amp current draw, allowing 5 operators on one 20 amp circuit. The supplied system shall have the capability to operate at full performance well beyond a brown out and high line voltage conditions (85V – 265V) sensing changes and adjusting automatically. The operator shall allow an adjustable hold open time delay of 0 to 60 seconds and have internal software to incorporate a self-diagnostic system.
   2.2 Operating Temperature Range: -31□ F to 130□ F (-35□ C to 54.44□ C).

B. Microprocessor Control Box:
   2.1 Modular control unit to allow for changing technology. Factory-adjusted configuration with opening and closing speeds set to comply with ANSI/BHMA A156.10 requirements and electronic dampening to reduce wear on drive train. Should the drive train operations deviate from design criteria ranges, Watchdog Control Circuit Monitoring will assume command of the system and shut down the automatic function allowing a secondary supervisory circuit to perform as a backup. Control unit shall allow the following functions:
      A. Diagnostics with the ability to produce application data.
   2.2 Mode Selector Control:
      A. Multi-position keyed cylinder mode selector control shall allow selection of the indicated functions to be engaged when switch is turned to the appropriate setting. Contractor to provide 15 keys.
      B. Mode Selector Control Mounting: Control shall be mounted as indicated:
         1. Jamb mounted, 48” above floor level to the top of the device.
      C. Mode selector control to allow the following functions:
         1. “Off”
         2. “Exit Only” one way traffic with automatic operation from the interior.
         3. “Two Way Traffic” allowing automatic operation from exterior and interior.
         4. “Partial Opening” energy saving door position allows door to automatically adjust opening width based on amount of usage, that is, full open during high use and partial open during low use. The control for this setting is programmable allowing adjustment to both the usage setting and the opening width.
         5. “Hold Open” doors activated and held in the full open position.

## 2.5 ACTIVATION AND SAFETY CONTROL DEVICES

A. General: Provide the types of activation and safety devices specified in accordance with ANSI/BHMA standards, for the condition of exposure and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.

B. Combination Activation Motion Sensor/Safety Presence Sensor:
   2.1 Shall be a sliding door sensor utilizing K-band microwave technology to detect motion and focused active infrared technology to detect presence, combined in a single housing surface mounted on each side of the header.

A. Presence sensor shall remain active at all times.
B. The sensor shall communicate with the automatic door operator through a self-monitoring connection that allows the door to go into a fail-safe mode preventing the door from closing in the event of a sensor failure.

2.2 Motion/presence detecting sensors to be field installed and adjusted.

C. Card Reader Activation:

2.1 Card reader to provide signal for activation of automatic entrance when entrance is locked.

2.2 Access control systems, including card readers, shall be provided by others.

2.6 ELECTRICAL

A. High-Efficiency DC Motor: Maximum of 3 amp current draw, allowing 5 operators to run on one 20 Amp circuit.

B. Power: Self-detecting line voltage capable control. 120 VAC through 240 VAC, 50/60 Hz, 3 amp minimum incoming power with solid earth ground connection for each door system.

C. Key Impulse Input: Input for card readers or remote activation with independent adjustable hold open delay.

D. Wiring: Separate internal channel raceway free from moving parts.

E. Brown out / high voltage capability: System has capability to operate at full performance well beyond brown out and high voltage line conditions (85 V – 265 V) sensing changes and adjusting automatically.

2.7 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Anodized Finish:

2.1 AAMA 611, Clear, AA- M12C22A41, Class I, 0.018 mm.

PART 3 - EXECUTION

3.0 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical source power to verify actual locations of wiring connections.

C. Proceed only after such discrepancies or conflicts have been resolved.

## 3.1 INSTALLATION

A. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.

B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
   3.1 Install surface mounted hardware using concealed fasteners to greatest extent possible.
   3.2 Set headers, carrier assemblies, tracks, operating brackets and guides level and true to location with anchorage for permanent support.

C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections.

D. Glazing: Glaze sliding automatic entrance door panels in accordance with the Glass Association of North America (GANA) Glazing Manual, published recommendations of glass product manufacturer, and published instructions of automatic entrance system manufacturer.

E. Sealants: Comply with requirements specified in division 7 Section “Joint Sealants” to provide a weather tight installation.
   3.1 Set thresholds, bottom guide and track systems and framing members in full bed of sealant.
   3.2 Seal perimeter of framing members with sealant.

F. Signage: Apply signage on both sides of each door and sidelite as required by ANSI/BHMA A156.10 and manufacturers installation instructions.

## 3.2 ADJUSTING

A. Adjust door operators, controls and hardware for smooth and safe operation and for weather tight closure. Adjust doors in compliance with ANSI/BHMA A156.10.

B. Verify installation and alignment of all entrance weather-stripping as required for compliance with specified air infiltration requirements.

## 3.3 FIELD QUALITY CONTROL

A. Before placing doors into operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA A156.10. Certified technician shall be approved by the manufacturer.

## 3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door installation.

B. Clean glass and metal surfaces promptly after installation. Remove excess sealants, compounds, dirt and other substances. Repair damages to match original finish.

## 3.5 DEMONSTRATION

A. Engage a factory-authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of the door.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Hollow Metal Doors and Frames”.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.
c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

B. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

C. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

D. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

E. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

F. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

## 1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Ten years for manual overhead door closer bodies.
4. Twenty five years for manual overhead door closer bodies.
5. Five years for motorized electric latch retraction exit devices.
6. Two years for electromechanical door hardware, unless noted otherwise.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

   a. Hager Companies (HA).
   b. McKinney (MK).
   c. Stanley Hardware (ST).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

    a. Hager Companies (HA).
    b. Pemko (PE).
    c. Stanley Hardware (ST).

C. Continuous Double-acting Hinges. ANSI/BHMA A156.26 Grade 1-600 Certified continuous hinges. Hinges shall be non-handed and allow the door to swing up to 100 degrees in either direction. Where required provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions as specified. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR) - DSH Series.
    b. Pemko (PE) - DSH Series.

D. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should comply with ANSI/BHMA A156.14.

1. Sliding Bi-Passing Pocket Door Hardware: Provide complete sets consisting of track, hangers, stops, bumpers, floor channel, guides, and accessories indicated.

2. Pocket Sliding Door Hardware: Rated for doors weighing up to 200 lb.

3. Manufacturers:

    a. Hafele Manufacturing (HF).
    b. Johnson Hardware (JO).
    c. Pemko (PE).

## 2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Hager Companies (HA) - ETW-QC (# wires) Option.
    b. McKinney (MK) - QC (# wires) Option.
    c. Stanley Hardware (ST) - C Option.

B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified

functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

    a. Architectural Builders Hardware (AH) - PT1000-EZ Series.
    b. Pemko (PE) - EL-CEPT Series.
    c. Securitron (SU) - EL-CEPT Series.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

    a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
    b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

    a. Hager Companies (HA) - Quick Connect.
    b. McKinney (MK) - QC-C Series.

## 2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood (RO).
    c. Trimco (TC).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood (RO).
    c. Trimco (TC).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood (RO).
    c. Trimco (TC).

## 2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU).
    b. Sargent Manufacturing (SA).
    c. Yale Commercial (YA).

C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types: Full size, Removable cores.

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Manufacturer’s Standard.

D. Removable Cores: Provide removable cores as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

E. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.

2. Manufacturers:

a. Corbin Russwin (RU) - Access 3 AP.
b. Sargent (SA) - Degree DG1.
c. Yale Commercial (YA) - Keymark X4.

F. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

G. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Fifteen (15) for each keyway.
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

H. Construction Keying: Provide construction master keyed cylinders.

I. Construction Keying: Provide temporary keyed construction cores.

J. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.6 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

    a. Lund Equipment (LU).
    b. MMF Industries (MM).
    c. Telkee (TK).

P. Electronic Key Management System: Provide an electronic key control system with Stand-alone Plug and Play features including advanced RFID technology. Touchscreen interface with PIN access for keys individually locked in place. Minimum 1,000 system users and 21 iFobs for locking receptors. System shall have a minimum 250,000 audit events screen displayed or ability to be exported via USB port.

1. Manufacturers:

    a. Medeco (MC).
    b. Traka (TA).

2.7 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Where specified, provide status indicators with highly reflective color and wording for “locked/unlocked” or “vacant/occupied” with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1” x 0.6” with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.

2. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ML2000 Series.
    b. Sargent Manufacturing (SA) - 8200 Series.
    c. Yale Commercial(YA) - 8800FL Series.

B. Narrow Stile Interconnected Locksets:

1. Interconnected locksets designed with a mortise case which contains both a latchbolt and deadbolt and allows simultaneous retraction of both the latchbolt and deadbolt with a single motion turning of the lever handle.

2. Locksets to be non-handed and available with a 1 1/8” or 1 1/2” standard backset.

3. Latchbolt and deadbolt shall be fabricated of wrought brass and bronze with a minimum 3/4" latchbolt throw and 1” deadbolt throw.

4. Manufacturers:

    a. Adams Rite (AD) - 2190/2290 Series.

2.8 ELECTROMECHANICAL LOCKING DEVICES

A. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below and in the hardware sets.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
2. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ML20900 Series.
    b. Sargent Manufacturing (SA) - 8200 Series.
    c. Yale Commercial(YA) - 8800FL Series.

B. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty, High Security Monitoring): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.

2. High Security Monitoring: Provide lock bodies which have built-in request to exit monitoring and are provided with accompanying door position switches. Provide a resistor configuration which is compatible with the access control system.

3. Manufacturers:

    a. Corbin Russwin Hardware (RU) - ML20600 NAC Series.
    b. Sargent Manufacturing (SA) - NAC 8200 Series.

C. Electromechanical Mortise Locksets, Grade 1 (Commercial Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
2. Manufacturers:

D. Electromechanical Narrow Stile Interconnected Locksets: Interconnected locksets designed with a mortise case which contains both a latchbolt and deadbolt and allows simultaneous retraction of both the latchbolt and deadbolt with a single motion turning of the lever handle. Locksets to be non-handed and available with a 1 1/8” or 1 1/2” standard backset. Latchbolt and deadbolt shall be fabricated of wrought brass and bronze with a minimum 3/4" latchbolt throw and 1” deadbolt throw. Electromechanical options include solenoid activated outside trim.

1. Manufacturers:

a. Adams Rite (AD) - 2190/2290 Series.
b. No Substitution.

## 2.9 STAND ALONE ACCESS CONTROL LOCKING DEVICES

A. Stand Alone Electronic Keypad Locksets: Internal, battery-powered, self-contained ANSI Grade 1 mortise or cylindrical lock consisting of electronically motor driven locking mechanism and integrated keypad without requirements for separate electronic programming devices. Locks to accept standard, interchangeable (removable) core, security and high security override cylinders. Provide keypad locks with a minimum 100 user codes furnished standard with 6 "AA" batteries and non-volatile memory.

1. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2. Manufacturers:

a. Sargent Manufacturing (SA) - KP Series.

## 2.10 AUXILIARY LOCKS

A. Mortise Deadlocks, Large Case: ANSI/BHMA A156.13 Grade 1 Certified Products Directory (CPD) listed large case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. One piece stainless steel bolts with a 1" throw. Deadlocks to be products of the same source manufacturer and keyway as other locksets.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ML2000 Series.
b. Sargent Manufacturing (SA) - 8200 Series.
c. Yale Commercial(YA) - 8800 Series.

B. Behavioral Health, Mortise: ANSI/BHMA A156.13, Series 1000, Operational and Security Grade 1 Certified Products Directory (CPD) listed mortise type manufactured to Office of Mental Health (OMH) requirements with behavioral health lever and escutcheon trim. Locksets to be manufactured with a corrosion resistant, formed steel case. Levers and escutcheons are manufactured from stainless steel material. Provide optional lead-lining (lock body), Torx® fasteners, and Antimicrobial coating as specified in Hardware Sets.

1. Manufacturers:

a. Corbin Russwin (RU) - ML2000 BHSS Series.
b. Sargent Manufacturing (SA) - 8200 BHW Series.
c. No Substitution.

2.11 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.12 ELECTROMAGNETIC LOCKING DEVICES

A. Surface Electromagnetic Locks (Heavy Duty): Electromagnetic locks to be surface mounted type tested to ANSI A156.23, Grade 2 with minimum holding force strength of 1,200 pounds. Locks to be capable of accepting between 12 to 24 volts direct current and be UL listed for use on fire rated door assemblies. Electromagnetic coils are to consume no more than 1.5W during normal operation. Locks are to have an integrated door position switch, tamper switch, and lock bond sensor. Locks are to have integrated motion sensor and/or security camera as indicated in the hardware sets. Locks to be capable of detecting door prop conditions and entering low power mode. Provide mounting accessories as needed to suit opening conditions. Power supply to be by the same manufacturer as the lock with combined products having a lifetime replacement warranty.

1. Manufacturers:

a. Securitron (SU) - M680E Series.

2.13 ELECTRIC STRIKES

A. Standard Electric Strikes: Electric strikes tested to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified.

Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:

    a. Folger Adam (FO) - 700 Series.
    b. HES (HS) - 1006 Series.

B. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

## 2.14 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

10. Rail Sizing: Provide exit device rails factory sized for proper door width application.

11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
b. Sargent Manufacturing (SA) - 80 Series.
c. Yale (YA) - 7000 Series.

## 2.15 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.

2. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

3. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED5000 Series.
b. Sargent Manufacturing (SA) - 80 Series.
c. Yale (YA) - 7000 Series.

## 2.16 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers

are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC6000 Series.
   b. Norton Rixson (NO) - 7500 Series.
   c. Sargent Manufacturing (SA) - 351 Series.

C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:

   a. Corbin Russwin Hardware (RU) - Unitrol Series.
   b. Norton Rixson (NO) - Unitrol Series.

D. Door Closers, Overhead Concealed (Heavy Duty): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed heavy duty door closers with closers with spring power adjustment. Closers to have fully concealed body in the frame head and track assembly in the door, rack and pinion type construction, either offset or center hung applications, with separate and independent valves for closing speed, latch speed, and backcheck adjustments. Overhead concealed closers require a minimum 4-inch frame head for mounting.

1. Manufacturers:

   a. Norton Rixson (NO) - 7900 Series.
   b. Sargent Manufacturing (SA) - 268/269/278 Series.

## 2.17 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:

   a. LCN Door Closers (LC) - SEM7800 Series.
   b. Norton Rixson (RF) - 980/990 Series.
   c. Sargent Manufacturing (SA) - 1560 Series.

## 2.18 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

   a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6. Manufacturers:

   a. Burns Manufacturing (BU).
   b. Rockwood (RO).
   c. Trimco (TC).

## 2.19 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of

door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Burns Manufacturing (BU).
    b. Rockwood (RO).
    c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

    a. Norton Rixson (RF).
    b. Rockwood (RO).
    c. Sargent Manufacturing (SA).

## 2.20 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).
2. Reese Enterprises, Inc. (RE).
3. Zero (ZE).

2.21 ELECTRONIC ACCESSORIES

A. Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1 1/4" or 1 1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options. Provide fifteen (15) keys for each key switch.

1. Manufacturers:

a. Alarm Controls (AK) - MCK Series.
b. Securitron (SU) - MK Series.

B. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.

1. Manufacturers:

a. Alarm Controls (AK) - TS Series.
b. Securitron (SU) - PB Series.

C. Touchless Switches: FCC certified microwave sensing switch used for REX or activation of various access control devices in place of a traditional wired switch. Unit to have an adjustable sensing zone from 4” to 24”. At exterior locations furnish foam gaskets and weather covers. Provide single gang or double gang unit as specified in the hardware sets.

1. Manufacturers:

a. Norton Rixson (NO) - 700 Series.
b. Securitron (SU) - WSS Series.

D. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.

1. Manufacturers:

a. Alarm Controls (AK) - SREX Series.
b. Securitron (SU) - XMS Series.

E. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a

1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

    a. Sargent Manufacturing (SA) - 3280 Series.
    b. Security Door Controls (SD) - DPS Series.
    c. Securitron (SU) - DPS Series.

F. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.

1. Manufacturers:

    a. Corbin Russwin Hardware (RU) - WT2 Wiegand Test Unit.
    b. Sargent Manufacturing (SA) - WT2 Wiegand Test Unit.
    c. Yale Commercial(YA) - WT2 Wiegand Test Unit.

G. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.

1. Manufacturers:

    a. Securitron (SU) - AQD Series.
    b. Altronix (AS) - Maximal 3.

## 2.22 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.23 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

## 3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

## 3.5 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

## 3.6 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

## 3.7 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer’s Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. SU - Securitron
4. RO - Rockwood
5. SA - SARGENT
6. AD - Adams Rite
7. HS - HES
8. RF - Rixson
9. NO - Norton
10. OT - Other
11. MC - Medeco
12. LU - Lund Equipment Co

**Hardware Sets**

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Storefront Framing
2. Door Glazing
3. Interior Fixed Windows

B. Related Sections:
1. Section 08 81 13 "Decorative Glass Glazing."

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

D. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

E. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.4 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300,
   according to the following requirements:
   a. Specified Design Wind Loads: Not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures": Section 6.0 "Wind Loads." See Structural Drawing Design Notes.
   b. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
      1) For monolithic-glass lites heat treated to resist wind loads.
      2) For insulating glass.
      3) For laminated-glass lites.
   c. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
   d. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
2. For insulating-glass units, properties are based on units with lites 6.0 mm thick and a nominal 1/2-inch-wide interspace.
3. Front-Glass Values: Based on using LBL-44789 WINDOW 7.0 computer program for the following methodologies:
   a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
   b. Solar Heat Gain Coefficient: NFRC 200.
   c. Solar Optical Properties: NFRC 300.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

D. Product Test Reports: For each of the following types of glazing products:
   1. Coated float glass.
   2. Fire-resistive glazing products.
   3. Laminated Ceramic Glazing
   4. Insulating glass
   5. Glazing sealants
   6. Glazing gaskets
   7. Preconstruction “adhesion and compatibility report” indicating the required systems and adhesion types used for each system.

1.6 INFORMATIONAL SUBMITTALS

A. Warranties: Sample of special warranties.

B. Glass Samples: For each type of the following products; 12 inches square.
   1. Coated float glass.
   2. Fire-resistive glazing products.
   3. Laminated Ceramic Glazing
   4. Insulating glass

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Glass: Obtain clear float glass, tinted float glass, coated float glass, and insulating glass from single source from single manufacturer for each glass type.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

   1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."

E. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified testing agency based on testing glass products.

1. Glass Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

F. Elastomeric Glazing Sealant Product Testing: Obtain sealant test results for product test reports in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period.

1. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated, as documented according to ASTM E 548.

2. Test elastomeric glazing sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.

G. Safety Glazing Products and Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies. Comply with testing requirements in 16 CFR 1201.

H. Fire-Protection-Rated Glazing Products and Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F , and the fire-resistance rating in minutes.

1. Where glazing units, including Kind FT glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.

I. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.

J. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

K. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F .

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.

2.2 GLASS PRODUCTS

A. **GLASS TYPES AS NOTED IN PROJECT:**
   1. **GL-1: Exterior, Safety Glazing, 1" Insulated**
   2. **GL-2: ¼", FULLY TEMPERED FLOAT GLASS**
   3. **GL-3: 5/16" CERAMIC GLAZING – FIRE RATED**

B. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

C. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

   2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.

   3. For uncoated glass, comply with requirements for Condition A.

   4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).

   5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

D. Uncoated Float Glass: Class 2, complying with other requirements specified.

   1. Products: Subject to compliance with requirements:
      a. Guardian Industries Corp. ; SunGuard Advanced Architectural Glass
      b. Viracon

E. Fire-Protection Rated Glazing
   1. Fire-Protection-Rated Glazing (FPG), General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.
   2. Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials.
      a. Products: Subject to compliance with requirements, provide one of the following:
      1. Nippon Electric Glass Co., Ltd. (dist. by Technical Glass Products); FireLite Plus.
      2. Schott North America, Inc.; Laminated Pyran Crystal.
      3. Vetrotech Saint-Gobain; SGG Keralite FR-L.

F. Insulated Glass: All exterior facing glass shall be 1” nominal thickness insulating glass as follows:
(a) Outside pane to be 1/4” nominal thickness laminated glass consisting of:
(1) Outer lite of laminated glass assembly: 2.7 mm clear annealed glass
(b) Interlayer of laminated glass assembly: (1) 0.030 PVB interlayer.
(c) (1) Inner lite of laminated glass assembly: 2.7 with Cardinal 366 Low E on the #4 surface of the laminated glass assembly, (the #2 surface of the insulated glass assembly).
(d) Argon filled Gap 0.5 minimum
(e) Inner pane to be 3 mm clear (annealed/tempered) glass. Laminator shall be approved by the manufacturer.

## 2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
1. Neoprene.
2. EPDM.
3. Silicone.

## 2.4 MISCELLANEOUS GLAZING AND FILM MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
1. Appropriate setting blocks, face gaskets, wedges and edge spacers must meet the current requirements of ASTM Specifications D-395 and C-864 for hardness, deformation, compression set and polymer content.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

H. Protective Impact Resistant Applied Window Film. Behavioral Health Locations: Applied Interior window film. NOTE: Behavioral Health Room Locations: See floor plan designations: shall have interior applied Impact Resistant Clear Film by 3M or equal upon shop drawing review. Rooms 1912, 3509, 3512, 3518, 3554, 3567

a. 3M Ultra Prestige; 8mil Micro-layered, PR S70

I. Dual Seals required: Polyisobutylene primary seal and secondary silicone seal typical.

## 2.5 FABRICATION OF GLAZING UNITS

A. Flat Glass:

1. Shall comply with ASTM C1036 Standard Specification for Flat Glass, Type 1, Class 1 (clear) or Class 2 (tinted, heat-absorbing and light reducing) and Quality q3
2. ASTM C 1048 Heat Treated Flat Glass, Kind HS or FT (remove ASTM Standard C 1048 if annealed glass), Condition A (uncoated), B (spandrel glass, one surface coated), or C (other coated glass)

a. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
b. Maximum peak to valley rollerwave 0.003” (0.08mm) in the central area and 0.008” (0.20mm) within 10.5” (267mm) of the leading and trailing edge.
c. For Clear or low-iron glass ¼” to 3/8” thick without ceramic frit or ink, maximum + or – 100 mD (millidiopter) over 95% of the glass surface.
d. Maximum bow and warp 1/32” per lineal foot (0.79mm).
e. All tempered architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201

B. DECORATIVE-GLASS FABRICATION

1. Edge Finishing: Fabricate finished edges to produce smooth, polished edges without chips, scratches, or warps.
2. Finished Edge: Rounded polished where exposed.

## 2.6 MONOLITHIC-GLASS TYPES

A. Glass Type: AS INDICATED ON DRAWINGS

2.7 LAMINATED-GLASS TYPES

A. Glass Type: AS INDICATED ON DRAWINGS

2.8 INSULATING-GLASS UNITS

A. GLASS TYPE: AS INDICATED ON DRAWINGS

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches .

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

## 3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

## 3.5 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 08 80 00

SECTION 08 8716

ANTI-GRAFFITI CONTROL FILM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Anti-graffiti control film applied to existing glazing.

B. Related Requirements:

1. Division 01 – General Requirements.

2. Section 08 8000: Glazing.

1.02 RELATED REQUIREMENTS

A. ASTM D882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

B. ASTM D1044 – Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion.

C. ASTM D4830 -- Standard Test Methods for Characterizing Thermoplastic Fabrics Used in Roofing and Waterproofing.

D. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E903 - Effect of Coating Variables on Total Solar Reflectance and Emissivity of Polymer Coated Metal Panels.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, catalog cuts, and other data to demonstrate compliance with the specified requirements.

B. Material Samples: Submit Samples of film installed on glass; minimum Sample size 8 by 11.

C. Quality Control Submittals:

1. Certificates: Manufacturer’s certification that the installer has been trained for the installation of the specified films.

2. Installers Qualifications: Submit list of installations completed within the past three years; provide owners contact information.

3. Manufacturer’s installation instructions.

D. Closeout Submittals: Maintenance, cleaning and replacement instructions.

1.04 QUALITY ASSURANCE

A. Mockups: Install anti-graffiti film to window glazing as directed by LACPW for installation evaluation. Obtain mockup approval prior to continuing with the remainder of the work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site with manufacturer's labels intact and legible.

B. Protect film from damage.

1.06 SITE CONDITIONS

A. Maintain temperature, humidity and ventilation within limits recommended by film manufacturer.

1.07 WARRANTY

A. Manufacturer shall provide a one year material warranty for products installed outdoors, and a 15 year warranty for products installed indoors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Provide products manufactured by one of the following:

1. 3M.

2. CPFilms Inc., LLumar Films.

3. Huper Optik USA.

4. Equal.

2.02 PHYSICAL AND MECHANICAL PROPERTIES

A. Film Thickness:

1. .

2. 6 mils.

B. Scratch Resistance: Film shall have 5 percent maximum haze increase when tested to ASTM D1044.

C. Surface Burning Characteristics: When tested in accordance with ASTM E84 shall not exceed the following values:

1. Flame spread index: 25 maximum.

2. Smoke Development Index: 450 maximum.

D. Puncture Strength when tested per ASTM D4830:.Minimum of 79 pounds for the 4 mil film and 110 for the 6 mils.

E. Physical Properties when film is applied on a 1/8 inch clear glass and tested in accordance to ASTM E903:

1. Shading Coefficient: 0.97 for the 4 mils films and 0.95 for 6 mils.

2. Visible Light Transmission: 86 to 89 percent.

3. Solar Transmission: 81 percent for 4 mils and 79 percent for 6 mils.

4. Solar Absorption: 10 percent for 4 mils and 13 percent for 6 mils.

5. Solar Reflection: 9 percent for 4 mils and 8 percent for 6 mils.

6. UV Transmission: Less than 5 percent.

F. Tensile properties when tested in accordance to ASTM D882:

1. Minimum Tensile Strength of Film: 30,000 pounds per square inch.

2. Minimum Elongation at Break: 100 percent.

3. Minimum Break Strength: 130 pounds per inch.

2.03 ACCESSORIES

A. Provide accessories, such as adhesive, sealants and cleaners, primers and sealers as recommended by film manufacturer and compatible for application indicated and surfaces in contact.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine glass surfaces to receive film and verify that they are free from defects and imperfections, which will affect installation. Correct such deficiencies before starting film installation.

3.02 PREPARATION

A. Window frames shall be checked for dirt, dust, and other debris. Frames shall be cleaned and vacuumed. Window surfaces shall be cleaned with a commercial cleaner recommended by manufacturer.

B. Window surfaces to receive anti-graffiti control film shall be bladed with one sided razor blade with blade holder for the purpose of removing particulate matter on glass surface.

C. Protect window frame from damage generated by film application.

3.03 INSTALLATION

A. Film shall be installed in strict accordance with manufacturer's written instructions.

B. After final squeegee technique, film shall be flat with no visible concentrations of moisture.

C. Film edges shall be cut neatly and square at a uniform distance of 1/8 inch maximum of the window sealing device.

D. Installed film shall be free of any creases or tears once installed to designated interior window surfaces.

E. Treated interior film surface shall be clean and free of soap residue and squeegee marks.

F. If film has a dimpled appearance from residual moisture, moisture shall dry flat with no moisture dimples within a 30 day period after the date of Substantial Completion.

3.04 CLEANING

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

# SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

### 2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
3. Size and Gauge: As indicated on Drawings.

B. Studs and Runners: ASTM C 645. As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide the following:

1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch-(13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch-(1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645. As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch-(13-mm-) deep, steel sheet members designed to reduce sound transmission. Configuration: hat shaped.

## 2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-(1.59-mm-) diameter wire, or double strand of 0.048-inch-(1.21-mm-) diameter wire.

B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

C. Flat Hangers: Steel sheet, in size indicated on Drawings.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch (13-mm-) wide flanges. Depth as indicated on the Drawings.

E. Furring Channels (Furring Members): Steel Studs and Runners: ASTM C 645. Size as indicated on Drawings.

F. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

## 2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) on center.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754 and ASTM C 840.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) on center unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) on center unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm) on center unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. Install two studs at each jamb unless otherwise indicated.

3. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

## 3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure in a manner that will not cause hangers to deteriorate or otherwise fail.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

# SECTION 09 22 26 – METAL SUSPENSION SYSTEM

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

1. Section Includes: Provide metal suspension system for acoustical panel ceilings including but not limited to:

    1. Exposed metal suspension systems for acoustical panel ceilings.

2. Related Sections:

    1. Section 09 22 26, Suspension Systems.
    2. Section 09 51 13, Acoustical Panel Ceilings.
    3. Section 26 51 10, Interior Lighting

### 1.3 REFERENCES

1. Abbreviations and Acronyms:

    1. ASCE: The American Society of Civil Engineers; www.asce.org.
    2. CISCA: Ceilings & Interior Systems Construction Association; www.cisca.org.
    3. LEED: Leadership in Energy and Environmental Design; www.usgbc.org.

2. Reference Standards:

| | | |
|---|---|---|
| 1. | ASCE 7-10 | - Minimum design loads for buildings and other structures |
| 2. | ASTM A653/A653M | - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| 3. | ASTM C635/C635M | - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings |
| 4. | ASTM C636/C636M | - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels |
| 5. | ASTM C754 | - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products |
| 6. | ASTM C841 | - Standard Specification for Installation of Interior Lathing and Furring |
| 7. | ICC ES AC 156 | - Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components |

1.4 SUBMITTALS

1. Product Data: Submit sheets listing dimensions, load carrying capacity and standard compliance.

2. Samples: Submit samples of main tee and cross tee with couplings.

1.5 MAINTENANCE MATERIAL SUBMITTALS

1. Supply additional material equal to 2% of ceiling area. Additional material should match products installed and have the appropriate labels and identification.

2. Supply extra materials that match Products installed and are packaged with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

1. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

1. Protect system components from excessive moisture in shipment, storage, and handling. Deliver in unopened bundles and store in a dry place with adequate air circulation. Do not deliver material to building until wet conditions such as concrete, plaster, paint, and adhesives have been completed and cured to a condition of equilibrium.

1.8 WARRANTY

1. Manufacturer Warranty: Submit a written warranty executed by manufacturer for a period of 40 years from date of Substantial Completion, agreeing to repair or replace suspension system components that fail or are compromised within the specified warranty period. Failed or compromised parts can include, but are not limited to:

    1. Rusting or defects directly made by the manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Chicago Metallic [Intermediate] [Heavy] Duty Non-Fire Rated Double Web Suspension System manufactured by ROCKFON, 4849 South Austin Avenue, Chicago, IL 60638. 1-800-323-7164; www.rockfon.com.

2.2 MATERIALS

1. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE 7 and ICC ES AC 156.

2. Basic Steel Material and Finish: Commercial quality, CS Type A to ASTM A653/A653M, hot-dip galvanized to not less than G30 zinc coating designation.

3. Main Tees and Cross Tees: All suspension main tee and cross tee components are manufactured from commercial quality steel with factory punched cross tee slots, hanger holes and integral bayonet-style end couplings. The main tees are capped with steel capping affixed to a flange and is coated with factory applied baked-on enamel paint.

    1. Structural Classification Standard: ASTM C635/C635M Heavy Duty.
    2. Color: Standard white unless otherwise noted.
    3. Specified Product: “Chicago Metallic 1200 (15/16) Exposed” by ROCKFON.

4. Perimeter Treatment Components:

    1. Angle Moldings: Manufactured from 0.020” thick steel and finished identical to main tees and cross tees.
    2. Channel Moldings: Manufactured from 0.018” thick steel with factory applied standard white baked-on enamel paint finish.
    3. Shadow Line Moldings: Manufactured from 0.020” thick steel with 3/4” and 3/8” hemmed edge and finished with factory applied standard baked-on enamel paint.

PART 3 - EXECUTION

3.1 EXAMINATION

1. Examine substrates, areas and conditions, including structural framing to which metal acoustical ceiling suspension assemblies attach or abut, with installer present, for compliance with requirements specified in this and other Sections affecting ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of metal acoustical ceiling suspension assemblies.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

1. Install metal acoustical ceiling suspension assemblies to comply with ASTM C636/C636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

2. Main Tees: Installed 48” on center, by direct suspension from existing structure in accordance with ASTM C754 and ASTM C841 with not less than 12 ga steel hanger wires, wrapped tightly 3 full turns, spaced 48” on center along component length.

3. Cross Tees:

    1. Installed perpendicular to main tees 24” on center to form 2’ by 4’ modules.
    2. Installed adjacent to each unsupported side of recessed fixtures.

4. Angle Moldings: Installed on vertical surfaces, intersecting suspension components by appropriate method in accordance with industry accepted practice.

5. Additional Hanger Wires: Wrapped tightly 3 full turns to structure and components at locations where imposed loads could cause deflection exceeding 1/360 span.

3.3 REPAIR

1. Remove damaged or compromised components; replace with undamaged components.

3.4 CLEANING

1. Clean exposed grid with non-solvent based non-abrasive commercial cleaning solution. Comply with manufacturer's instructions for cleaning grid components. Remove any components that cannot be effectively cleaned or repaired.

END OF SECTION

# SECTION 09 24 23 - CEMENT PLASTER AND METAL LATH

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Lath and Portland cement plaster and stucco.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 05 4100 - Structural Metal Stud Framing.
3. Section 06 1000 - Rough Carpentry.
4. Section 06 1643 – Gypsum Sheathing.
5. Section 07 2100 – Thermal Insulation.
6. Section 09 2216 - Non-Structural Metal Framing.
7. Section 09 3013 - Ceramic Tiling.

### 1.02 SYSTEM DESCRIPTION

A. Three coat 7/8” cement plaster on metal lath with a fiberglass reinforcing mesh embedded into a polymer-modified base coat over the cured brown coat, over rigid foam insulation, over two layers of a water-resistive barrier over sheathing over metal studs. Continuous Insulation on Z Channels Under Cement Plaster: Three coat 7/8” cement plaster on metal lath with a fiberglass reinforcing mesh embedded into a polymer-modified base coat over the cured brown coat over rigid foam insulation friction-fitted between steel Z channels with thermal break tape over two layers of water resistive barrier over sheathing over metal studs.

B. Three coat 7/8” cement plaster with a fiberglass reinforcing mesh embedded into a polymer-modified base coat over the cured brown coat on metal lath over water resistive barrier over plastic sheet air barrier over sheathing over metal studs.

C. Two coat 1/2” to 5/8” cement plaster on metal lath over CMU or concrete with a fiberglass reinforcing mesh embedded into a polymer-modified base coat over the cured brown coat.

D. Two coat 1/2” to 5/8” cement plaster over CMU or concrete with a fiberglass reinforcing mesh embedded into a polymer-modified base coat over the cured brown coat.

### 1.03 REFERENCES

A. ASTM International (ASTM):

1. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

2. ASTM A510 - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel.

3. ASTM A641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

4. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

5. ASTM C150 – Standard Specification for Portland Cement.

6. ASTM C206 – Standard Specification for Finishing Hydrated Lime.

7. ASTM C847 - Standard Specification for Metal Lath.

8. ASTM C897 – Standard Specification for Aggregate for Job Mixed Portland Cement-Based Plasters.

9. ASTM C926 – Standard Specification for Application of Portland Cement-Based Plaster.

10. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.

11. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.

12. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete.

13. ASTM E1190 – Standard Test Methods for Power-Actuated Fasteners Installed in Structural members.

B. Federal Specifications (FS):

1. FS FF-N-105: Nails, Brads, Staples and Spikes: Wire, Cut and Wrought.

2. UU-B-790A: Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent, and Fire Resistant).

C. International Code Council (ICC):

1. ICC-ES AC11: Acceptance Criteria for Cementitious Exterior Wall Coatings.

2. ICC-ES AC 191: Acceptance Criteria for Metal Plaster Bases (Lath).

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each material and component proposed for installation.

B. Plaster Samples: Submit minimum 24-inch by 24-inch samples of each stucco and Portland cement plaster texture for review. Samples shall be representative of texture, color, and

proposed fabrication and finish quality. Maintain reviewed Samples on Project site for reference.

C. Accessories Samples: Submit 12 inch long samples of metal lath accessories: control joints, expansion joints, corner reinforcements, reveals and screeds.

D. Certificates: Submit test reports or ICC Evaluation Reports indicating that materials are in compliance with CBC requirements. Cementitious materials shall meet the acceptance requirements of ICC AC11, and metal lath the acceptance requirements of ICC AC191.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store weather sensitive materials under cover, off the ground, and kept in a dry condition until ready for use.

B. Deliver materials to the Project site in manufacturer's sealed and labeled packages.

PART 2 - PRODUCTS

2.01 METAL LATH AND WEATHER RESISTIVE BACKING

A. Metal Lath:

1. Walls and Ceilings: Diamond mesh expanded metal lath, in conformance to ASTM C847, without paper backing. 3.4 pounds per square yard, hot-dip galvanized coating G60 in accordance with ASTM A653. Alabama Metal Industries Corporation (AMICO), California Expanded Metal Products Company (CEMCO), ClarkDietrich, Marino-Ware, or equal.

a. 3.4 Expanded Metal Lath V-grooved self-furring type for installation over sheathing. Lath shall be furred out a minimum of 1/4 inch when installed over a solid surface in accordance to DSAIR 25-4.

b. Flat type for installation over open stud framing.

2. Walls: Self-furring Welded Wire Lath: Weight 1.95 pounds per square yard, with Class 1 galvanized coating in conformance to ASTM A641. Structa Mega Lath per ICC ESR-2017, as manufactured by Structa Wire Corp, or equal.

3. Walls & Ceilings: Self-furring Welded Wire Lath: Weight 2.2 pounds per square yard, with Class 1 galvanized coating in conformance to ASTM A641 with heavy perforated Kraft paper. V-Truss per ICC ESR-2017, as manufactured by Structa Wire Corp, or equal.

B. Water Resistive Barrier Backing for Metal Lath:

1. One layer of asphalt saturated, water resistant Kraft paper backing conforming to Fed Spec UU-B-790A and ASTM E2556 Type II, manufactured by Fortifiber, Davis Wire, GMC Paper Products, or equal. Furnish for exterior plastering (except on soffits and ceilings), and for mortar-set ceramic wall tile.

C. Self-Adhered Flashing:

1. Compatible with the Plastic Sheet Air Barrier, minimum 25 mils thick, self-sealing and waterproof.

2. Adhesives, primers and sealers for self-adhered flashings and water repellant backing shall be as recommended by manufacturer for installation with specified products and substrates and shall be approved by the OWNER's Office of Environmental Health and Safety (OEHS).

2.02 METAL LATH ACCESSORIES

A. Materials: Minimum 0.0172 inch galvanized steel or 0.0207 zinc alloy with expanded wings. PVC is not permitted. Furnish casing beads, expansion and control joints, weep and vent screeds.

B. Manufacturers: Alabama Metal Industries Corporation (AMICO), California Expanded Metal Products Company (CEMCO), ClarkDietrich, Stockton Products, Marino-Ware, equal.

C. Products:

1. Exterior Stress Relief Joints: Sizes and profiles, indicated or required. Control joints shall have expanded wings when attachment flange is installed above the primary water-resistant barrier.

2. Expansion Joints: Two piece sections designed to accommodate expansion, contraction and shear forces. Industry generic name: M-Slide Expansion Joint 2 piece joint.

3. Control Joints: One-piece sections, with flange designed to engage plaster. Grounds shall provide full 7/8 inch thickness of cement plaster. Industry generic name: XJ-15.

4. Soffit Drip Screed: Similar to Stockton Products No. 5, with key holes.

5. Casing Beads: Expanded or standard flange type with 7/8 inch grounds to establish plaster thickness. Industry generic names: J-Mold or # 66.

6. Welded Wire Corner Reinforcement: 2-5/8 inch wire wings square or bullnose. Industry generic name: CornerAid.

7. Inner Corner Reinforcement: Shaped reinforcing expanded metal with 3 inch legs, for angle reinforcement. Industry generic name: Cornerite.

8. Lath Reinforcement: Flat expanded metal lath reinforcing units. Industry generic name: Striplath.

9. Outside Corner Reinforcing: 2 1/2" legs Class 1 Galvanized Coating complying with ASTM A641. VTruss Straight Corner per ICC ESR-2017, as manufactured by Structa Wire Corp, or equal.

10. Ventilating Screeds: Soffit, attic, fascia, edge, channel and expansion channel vent screeds, perforated web type, with integral plaster grounds, of sizes indicated on drawings.

11. Foundation Weep Screeds: Integral plaster ground and weep screed; 3-1/2" minimum attachment flange. Industry generic name: #7 Weep Screed.

12. Foundation Casing at Walls with Continuous Insulation: Custom shaped galvanized steel "J" mold with weep holes. Width shall be sized to accommodate insulation thickness plus 7/8 inch plaster.

2.03 LATH FASTENERS

A. Fasteners through Continuous Insulation: Fastener spacing as indicated on drawings.

1. Wood Studs: Fasteners shall be corrosion resistant screws in conformance to CBC Chapter 26.

2. Metal Studs: Corrosion resistant coated wafer head steel #10 screws with length that penetrates framing steel thickness plus three threads minimum.

B. Fasteners at Locations with no Continuous Insulation:

1. Wood Studs: Fasteners shall be corrosion resistant.

a. Nails: In accordance to FS FF-N-105, 0.113 with a 3/8 inch diameter head with length that penetrates wood framing (exclusive of sheathing) 3/4 inch minimum.

b. Screws: Type A, in accordance to ASTM C1002, length that penetrates wood framing (exclusive of sheathing) 3/4 inch minimum.

c. Staples: In accordance to FS FF-N-105. Minimum 3/4 inch crown, 0.053 inch steel. Staples shall have sufficient length to penetrate studs at least 3/4 inch.

2. Metal Studs: Wafer head type S or S-12, corrosion resistant, with length to penetrate framing steel thickness plus three threads minimum.

a. Screws for fastening to steel members from 0.033 inch to 0.112 inch in thickness shall be in accordance to ASTM C954.

b. Screws for fastening to steel members 0.033 inch in thickness and less shall be in accordance to ASTM C1002.

C. Fasteners for Concrete and CMU Substrates: Power Actuated Fasteners: For attachment of lath to concrete and concrete masonry, recommended by manufacturer for the specific use intended. Minimum 3/4 inch long hardened drive style pin with a 1/2 inch diameter style washer. Fasteners shall be Fasteners shall be corrosion resistant and provide minimum withdrawal resistance of 50 pounds minimum.

D. Wire: Wire for fastening lath to supports, tying ends and edges of lath sheets, and securing accessories to lath, 0.0475 inch diameter (# 18 wire). Galvanized soft-annealed steel wire in conformance to ASTM A641.

2.05 PLASTER MATERIALS

A. Factory Blended Portland Cement Plaster Basecoats and Finish: Products as fabricated by California Stucco, La Habra, Parex, Shamrock Stucco, Merlex, Omega Stucco, Inc., , Spec Mix, Quikrete, CTS, Sika, or other manufacturer member of the Stucco Manufacturer's Association (SMA).

1. Material Standards: Shall conform to ASTM C926.

2. Three Coat Systems:

a. Scratch and Brown Coats: Factory blended fiber reinforced plaster and sand mix conforming to ASTM C926, and requiring only the addition of water. Total thickness of coats: 3/4 inch.

b. Finish Coat: Factory blended cementitious stucco color coat, integrally colored with fade-resistant pigments. Coat thickness 1/8 inch.

1) Finish: To Match Existing

2) Color: As selected by ARCHITECT.

3. Two Coat Systems:

a. Brown Coat: Factory blended fiber reinforced plaster and pre-mixed with sand conforming to ASTM C926 and requiring only the addition of water. Coat thickness 3/8 to ½ inch.

b. Finish Coat: Factory blended cementitious stucco color coat, integrally colored with fade-resistant pigments. Coat thickness 1/8 inch.

1) Finish: To Match Existing

2) Color: As selected by ARCHITECT.

4. Crack Isolation System:

a. Fiberglass Reinforcing Mesh (Lamina): 4.5 oz. Mesh, alkali resistant, compatible with plaster finish.

b. Base Coat: Polymer-modified cement base/skim coat, compatible and approved by plaster finish coat manufacturer.

B. Water: Clean, potable and from domestic source.

C. Plaster Bonding Agent: In conformance to ASTM C932 and formulated for exterior use. "Weld-Crete", manufactured by Larsen Products Co., or equal.

D. Bonding Agent: 100% acrylic emulsion additive, Parex USA Adacryl Admix & Bonder or equal.

E. Flashing: Single ply self-adhesive waterproofing membrane as manufactured by W.R. Grace Company, Jiffy-Seal by Protecto Wrap, W.R. Meadows, Inc., or equal. Furnish for installation

behind stress relief joints and backing on horizontal and vertical surfaces exposed to weather; under metal copings and flashings; and window jambs and sills.

F. Continuous Insulation: Refer to Section 07 2100, Thermal Insulation.

G. Miscellaneous Materials: Provide additional components and materials required for a complete installation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that installation of plastic sheet air barrier and flashings, per Section 07 2719, and continuous insulation per Section 07 2100 are complete before starting Work of this Section.

3.04 INSTALLATION OF LATH AND LATH ACCESSORIES

A. Exterior Lathing, General: Install in conformance to ASTM C1063 and CBC Chapter 25.

B. Install longest length of metal lath as possible. Do not use pieces shorter than six feet in length. Attach lath to framing supports not more than seven (7) inches apart along framing supports only.

C. Apply metal lath with long dimension at right angles to framing or furring supports and lap lath a minimum 1/2 inch at sides and minimum 1 inch on ends. Lap wire lath minimum one mesh on sides and ends. Stagger vertical laps at least 16 inches. Lath shall lap flanges of solid flanged trim accessories by a minimum of 50%.

D. Ends of lath on open framing (unsheathed) shall occur over supports. Where necessary, install additional studs to provide support for lath ends and support for separate flanges of stress relief joints.

E. Install trim accessories plumb, level and straight, attachments should not exceed 24 inches on center.

F. Lath shall not be continuous through control joints. Two-piece Expansion Joints shall have the lath cut, be attached to framing and lath lap the flanges. Place control joints as indicated on elevations. Water resistant barrier shall be continuous behind all control joints and vertical reveals.

G. Install a weep screed at or below foundation plate line on exterior stud walls in conformance to CBC section 2512. Screed shall be of a type permitting water to drain to exterior of building. Weather-resistant barrier and exterior lath shall cover and terminate on attachment flange of screed.

H. Powder Actuated Fasteners shall be used on concrete/masonry substrates when lath is applied. Fasteners shall be driven home and avoid spalling of concrete. Pattern shall simulate that of framed walls.

I. Interior Lathing, General: Install in conformance to ASTM C841 and CBC Chapter 25.

J. Metal lath shall be fastened to metal supports with specified fastener spaced not more than 6 inches apart or with other recognized fasteners.

3.05 PLASTER APPLICATION - GENERAL

A. Verify that installation of lath is complete prior to start plastering. Notify the Technical Service Information Bureau upon completion of lath and prior to start of plaster to schedule a lathing installation compliance meeting. TSIB will submit a written field observation report delineating any deficiencies. Site meeting shall be coordinated with LACPW.

B. Proportion, mix, apply, and cure plaster in conformance with ASTM C926 and CBC Chapter 25.

C. Install each plaster coat to an entire wall or ceiling panel without interruption to avoid cold joints and abrupt changes in uniform appearance of succeeding coats. Wet plaster shall abut existing plaster at naturally occurring interruptions in plane of plaster (such as corner angles, openings and control joints) wherever possible. Cut joining, where necessary, square and straight and at least 6 inches away from a joining in preceding coat.

D. Provide sufficient moisture or curing methods to permit continuous and complete hydration of cementitious materials, considering climatic and Project site conditions. If water cured, each basecoat shall be continuously damp for at least 48 hours, including weekends and holidays. Other curing methods, spray applied curing compounds.

E. Provide sufficient time between coats to permit each coat to cure or develop enough rigidity to resist cracking or other damage when next coat is installed.

3.06 EXTERIOR PLASTERING

A. Concrete surfaces, except where noted as "Exposed Concrete" or "Painted Concrete," shall be finished with stucco light sand finish coats, as specified.

B. Preparation of Concrete and Masonry Surfaces:

1. Exterior concrete and masonry surfaces to be plastered shall be free of oily or waxy substances, and loose or foreign material. Uniformly spray with nozzle-type water spray at least 12 hours before installation of plaster or as required to control suction.

2. Concrete and masonry surfaces to receive two coat application of 5/8 inch thick Portland cement plaster shall be treated with bonding agent. This surface preparation shall not be installed instead of a brown coat of plaster.

3. Concrete surfaces to receive stucco dash finish shall be lightly sandblasted to provide a roughened surface.

4. Verify that lath has been installed securely and that grounds, screeds, casing beads and other accessories are straight, in correct position, and securely fastened in place.

C. Mixing: Provide plaster mix: cementitious materials and aggregate in proportions specified, furnishing only sufficient water to obtain proper consistency before installation. Do not mix any more material at any time than can be installed within 1/2 hour after mixing. Do not re-temper. Add only enough water to allow proper application of cement plaster.

D. Application:

1. Sand Bond Coat: on concrete or masonry surfaces, leave undisturbed, and maintain damp for at least 24 hours following installation. Dash bond coat may be omitted when liquid bonding agent is used.

2. Scratch Coat: Install with sufficient material to completely cover laths and scratch across supports.

3. Brown Coat: Rod to a straight, true, even within 1/4 inch tolerance in 5 feet of surface and consolidate surface with a wood or neoprene float. Surface shall be left open and course, suitable to receive finish coat.

4. Stucco Finish Coat: Install in two coats to a total thickness of 1/8 inch, each coat covering surface uniformly. First coat shall completely cover basecoat with uniform color. Second color shall provide a uniform texture.

   a. First finish coat shall be installed adequately to cover surface and fill minor imperfection in the brown coat.

   b. The second coat shall be installed by doubling back same day, when first coat is sufficiently dry.

   c. Over concrete surfaces, second coat shall be installed 24 hours after installation of first coat. In warm weather, first coat shall be cured by light water spray after material has set.

   d. Protection: Protect those surfaces, which are not to receive dash finish coats. Such surfaces shall be shielded and shall have any sand left from dashing operation removed.

   e. Provide smoothed plaster finish to comply with ADA requirements behind handrails.

E. Curing Exterior Plaster: Adhere to current edition of CBC for curing requirements.

3.08 QUALITY CONTROL

A. Finish interior and exterior plaster to a uniform texture, free of imperfections and flat within 1/4 inch in 5 feet. Form a suitable foundation for paint and other finishing materials. Avoid joining marks in finish coats.

3.09 REPAIR OF DAMAGED PLASTER

A. Plaster Detached from Framing:

1. Remove loose and broken plaster.

2. Repair or replace damaged water-resistant backing and lath in compliance with specified standards.

3. Remove stucco finish from surrounding area in the same plane by sandblasting.

4. Install a scratch coat and a brown coat mixed with liquid bonding agent instead of water to the areas devoid of plaster.

5. Install a coat of liquid bonding agent to entire wall plane.

6. Install a 1/8 inch thick stucco finish coat to entire wall plane and match existing texture and color.

B. Cracked Plaster 1/8 inch to 1/2 inch:

1. Remove loose material from crack with a wire brush.

2. Fill crack with slurry of stucco and liquid bonding agent.

3. Install a coat of liquid bonding agent to entire wall plane.

4. Install 1/8 inch thick stucco finish to entire wall plane and match existing texture and color.

C. Cracks Larger than ½ inch - Painted:

1. Remove loose material from crack with a wire brush.

2. Fill crack with slurry of one part Portland cement to three parts masonry or stucco sand and liquid bonding agent to match existing texture of adjacent surface.

3. Paint entire wall plane, color to match existing.

4. Where patching of plaster over existing lath is feasible, fasten loose lath and install new lath with nails at 6 inch centers. Where metal is furnished, lap new lath over existing 6 inches and tie at 6 inch centers. Install paper backings as required, shingled into existing.

5. Patching of Holes, Cracks, and Gouges: Holes, cracks, gouges, missing sections, and other defects in existing improvements shall be patched. For holes over 1 inch in size, cut small sections of lath and place in opening attached to existing material. Install 3 coats of plaster. For holes one inch and smaller, install bonding agent to existing surfaces and neatly fill hole with plaster, installing necessary coats to match adjacent surfaces, eliminate cracks and match existing surface texture. Cracks, gouges, and other defects shall be filled with plaster or spackle as required and neatly finished to match adjacent existing improvements.

3.10 CLEANING

A. Remove rubbish, debris, and waste material and legally dispose of off the Project site.

3.11 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

# SECTION 09 29 00 - GYPSUM BOARD

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Texture finishes.

B. Related Requirements:

1. Section 09 2216 - "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

### 1.4 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.

3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch.
2. Long Edges: Tapered.

E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

F. Foil-Backed Gypsum Board: ASTM C 1396/C 1396M.

1. Core: As indicated on Drawings.
2. Long Edges: Tapered.

G. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 2.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10.

H. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: As indicated, Type X.
2. Long Edges: Tapered.

3. Mold Resistance: ASTM D 3273, score of 10.

I. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. National Gypsum Company; Sound Break.
b. Quiet Solution, Quiet Rock.

2. Core: As indicated.
3. Long Edges: Tapered.

J. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Gypsum.
b. CertainTeed Corp.
c. Georgia-Pacific Gypsum LLC.
d. Lafarge North America Inc.
e. PABCO Gypsum.
f. Temple-Inland.
g. USG Corporation.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized steel sheet.
2. Shapes:

a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.
g. Curved-Edge Cornerbead: With notched or flexible flanges.
h. Drywall Control Joint (DRM-50-50 2-PC), paint to match adjacent drywall ceiling.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Fry Reglet Corp.
b. Gordon, Inc.
c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 , Alloy 6063-T5.

3. Shapes:

Refer to Interior Finish Legend.

## 2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Exterior Applications:

1. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound.

2. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
b. Grabber Construction Products; Acoustical Sealant GSC.
c. Pecora Corporation; AC-20 FTR, AIS-919.
d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

1. Where long, continuous runs of this wall system are employed, control joints must be provided every 30' or less.
2. Where structural movement may impose direct loads on these systems, isolation details are required.
3. Partitions should not be used where frequently exposed to excessive moisture unless all surfaces are waterproofed.
4. To prevent weakening due to calcining, gypsum board should not be exposed to temperatures over 125°F (52°C) for extended periods of time.
5. Gypsum board joints on single layer, or the face layer on two layer applications, shall not occur within 12" of the corners of door frames unless control joints are installed at the corners.
6. When gypsum board abuts concrete floors, cut board to allow for 1/8" to 1/4" clearance between board and floor to prevent potential wicking.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

1. Control joints are required in ceilings to limit areas to 2,500 square feet. Additionally, control joints should be installed in ceilings to limit dimensions in either direction to 50

feet. Control joints should be installed where ceiling framing or furring changes direction.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces above ceilings, etc., except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

## 3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly.
3. Flexible Type: Apply in double layer at curved assemblies.

4. Ceiling Type: Ceiling surfaces.
5. Foil-Backed Type: As indicated on Drawings.
6. Abuse-Resistant Type: As indicated on Drawings.
7. Moisture- and Mold-Resistant Type: As indicated on Drawings.
8. Type C: Where required for specific fire-resistance-rated assembly indicated.
9. Glass-Mat Interior Type: As indicated on Drawings.
10. Acoustically Enhanced Type: As indicated on Drawings.
11. Skim-Coated Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels [vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically parallel to framing with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically parallel to framing and face layer either vertically (parallel to framing) or horizontally perpendicular to framing with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches on center. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches on center.

## 3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at exposed panel edges.
3. L-Bead: Use where indicated.
4. U-Bead: Use at exposed panel edges.
5. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated on Drawings.

## 3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 2: Panels that are substrate for tile, Panels that are substrate for acoustical tile, Where indicated on Drawings.
3. Level 3: Where indicated on Drawings.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

5. Level 5: Where indicated on Drawings.
    a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

## 3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

# SECTION 095123 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

B. Related Requirements:
1. Section 095113 "Acoustical Panel Ceilings" for ceilings consisting of acoustical panels and exposed suspension systems for interior ceilings.

## 1.2 SUMMARY

A. Section Includes: Provide suspended ceiling acoustical ceiling panels including but not limited to:
1. Acoustical Ceiling Panel.

B. Related Sections:
1. Section 09 29 00, Gypsum Board.
2. Section 09 22 26, Metal Suspension System.
3. Section 09 78 11, Wood Interior Wall and Ceiling Panels.
4. Section 09 84 33, Wood Fiber Acoustical Units.
5. Section 23 05 29, Hangers and Supports for HVAC Piping & Equipment.
6. Section 23 37 13, Diffusers, Registers and Grilles.
7. Section 26 51 10, Interior Lighting.

## 1.3 REFERENCE

A. Abbreviations and Acronyms:

1. ASCE: The American Society of Civil Engineers
2. ASTM: American Society for Testing and Materials
3. CISCA: Ceilings & Interior Systems Construction Association; www.cisca.org.
4. IBC: International Building Code
5. International WELL Building Standard
6. LEED: Leadership in Energy and Environmental Design (set of rating systems for the design, construction, operation, and maintenance of green buildings)
7. LBC: Living Building Challenge

B. Reference Standards:

1. ASTM C635 — Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

2. ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
3. ASTM C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
4. ASTM D1308 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems
5. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
6. ASTM D4828 Standard Test Methods for Practical Washability of Organic Coatings
7. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers
8. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials
10. ASTM E580/E580M Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions
11. ASTM E795 Practice for Mounting Specimens During Sound Absorption Tests
12. ASTM E1111 Standard Test Method for Measuring the Interzone Attenuation of Open Office Components
13. ASTM E1264 Standard Classification for Acoustical Ceiling Products
14. ASTM E1414/E1414M Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
15. ASTM E1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
16. ICC-ES / ESR 2631 International Code Council-Evaluation Services -ESR 2631 Rockfon Chicago Metallic Corporation Suspended Ceiling Framing Systems and Suspension Ceiling Systems
17. ICC ES AC 156 Acceptance Criteria for Seismic Certification by Shake-Table Testing of Non-structural Components
18. UL 2818 GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings
19. UL 2821 GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions From Building Materials, Finishes and Furnishings
20. UL 2824 GREENGUARD Certification Program Method For Measuring Microbial Resistance From Various Sources using Static Environmental Chambers
21. Health Product Declaration Standard V2.0
22. California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.2 2017

## 1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Conference: Conduct conference at [Project site] . Agenda includes Project conditions, coordination with work of other trades, and layout of items which penetrate ceilings.

## 1.5 SUBMITTALS

A. Product Data: Submit manufacturer's Product Data, including maintenance data.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating pre-consumer recycled content and cost
   2. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.
   3. Sourcing of Raw Materials: Corporate sustainability report for each manufacturer.
   4. Third-Party Verified Environmental Product Declaration (3PV EPD) Certifications: For each product.
   5. Health Product Declaration (HPD) Certification: For each product.
   6. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials UL GREENGUARD GOLD in both school and office scenarios.
   7. Mold and mildew resistance per ASTM D3273 [Level 10 – No Mold Growth] and ASTM C1338 [Pass – No Fungal Growth].
   8. Declare Label: The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Approved (less than 1 percent proprietary ingredients).
   9. Samples: For each exposed product and for each color and texture specified, [6 by 6 inches (150 by 150 mm)] in size.

C. Samples for Initial Selection: For components with factory-applied finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

   1. Acoustical Panels: Set of [full-size] [6 by 6 inches (150 by 150 mm)] Inches Samples of each type, color, pattern, and texture.
   2. Exposed Suspension-System Members, Moldings, and Trim: Set of [6-inch- (150-mm-)] long Samples of each type, finish, and color.
   3. Clips: Full-size [hold-down] [impact] [and] [seismic] clips.

E. Delegated Design Submittals: For seismic restraints for suspended ceiling systems.

   1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

## 1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Ceiling suspension-system members.
   2. Structural members to which suspension systems will be attached.
   3. Method of attaching hangers to building structure.
   4. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

5. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
6. Size and location of initial access modules for acoustical panels.
7. Items penetrating finished ceiling and ceiling-mounted items including the following:
    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers.
    e. Sprinklers.
    f. Access panels.
    g. Perimeter moldings.
    h. Other items as required
8. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
9. Minimum Drawing Scale: [1/4 inch = 1 foot (1:48)] [1/8 inch = 1 foot (1:96)] [1:50] [1:100] .

B. Qualification Data: For testing agency.
C. Product Test Reports: For each acoustical panel ceiling, for tests performed by [manufacturer and witnessed by a qualified testing agency] [a qualified testing agency].
D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
E. Field quality-control reports.

**1.7 CLOSEOUT SUBMITTALS**

A. Operational and Maintenance Data: Submit maintenance instructions to Owner for recommended cleaning materials and methods for panels and trim. Include precautions for use of and composition of cleaning materials detrimental to acoustic panels and trim.

**1.8 MAINTENANCE MATERIAL SUBMITTALS**

A. Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Panels: Full-size panels equal to percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to percent of quantity installed.
3. Hold-Down Clips: Equal to percent of quantity installed.
4. Impact Clips: Equal to percent of quantity installed.

**1.9 QUALITY ASSURANCE**

A. Single-source responsibility: Provide acoustical panel units and grid components by a single manufacturer.

**1.10 DELIVERY, STORAGE, AND HANDLING**

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

## 1.11 WARRANTY

A. **Warranty Period:**
Acoustical Panels Manufacturer Warranty: Submit a written warranty executed by manufacturer for a period of 30 years from date of Substantial Completion, agreeing to repair or replace acoustical tile that fails or is compromised within the specified warranty period. The warranty does not cover any damage or change to the Products resulting from improper material handling or storage, water, moisture, fire, chemical fumes, bacteria, mold, fungi, wind, accident, disaster, non-intended use, improper installation, abuse, or failure of other system components or modification.

# PART 2 - PRODUCTS

## 2.1 SOURCE LIMITATIONS

A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

A. Acoustical panels to comply with the requirements of UL GREENGUARD GOLD Certification for both school and office scenarios and the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for suspended ceiling systems.
C. Seismic Performance: Suspended ceiling systems to withstand the effects of earthquake motions determined in accordance with [ASTM E580/E580M-22] .
D. Surface-Burning Characteristics: Comply with UL 723 ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: [Zero 0] Class A in accordance with ASTM E84.
2. Smoke-Developed Index: [no higher than 5] Class A in accordance with ASTM E84.

E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

F. Humidity Resistance: Ensure that acoustical panels are dimensionally stable at up to 100 percent relative humidity at temperatures ranging from 32 to 104 deg. F (0 to 40 deg. C) without having to acclimatize panels and tested to ASTM C367.

## 2.3 ACOUSTICAL PANELS

A. Manufacturer**:** Rockfon 4849 South Austin Avenue, Chicago, IL 60638. 1-800-323-7164; www.rockfon.com.

B. Basis-of-Design Product: Subject to compliance with requirements, provide **Rockfon® Education Standard™** Stone Wool ceiling tiles.

1.1 Material: Stone Wool

1.2 ASTM E1264 Classification: ASTM E1264 (2022) : Type IV, Form 3, Pattern G
ASTM E1264 (2023): Type A, Form A2.3, Pattern G

1.3 Panel Size: 24 by 24 inches [As indicated on Drawings] [As indicated in a schedule]

1.4 Thickness: 5/8 inch

1.5 Edge/Joint Detail:Square Lay In SQ

1.6 Noise Reduction Coefficient (NRC): Not less than 0.70

1.7 Color: White

1.8 Light Reflectance (LR): Not less than 0.84 for White.

1.9 Fire Class: Class A in accordance with UL 723 ASTM E84:
Flame Spread Index: [0]
Smoke Developed Index: [no higher than 5]

1.10 GWP (A1-A3): 0.238 kg $CO_2$-eq/$ft^2$ / 2.57 kg $CO_2$-eq/$m^2$

1.11 Recycled Content: 49%

1.12 Sustainability Design Certification: Meeting UL GREENGUARD GOLD for classroom and office scenarios for VOC emissions, HDPs, EPDs, and Declare Labels for related products.

1.13 Provide acoustical panels without any added antimicrobial treatments; that are inherently resistant to fungus, mold, mildew, and gram-positive and gram-negative bacteria with a rating of 10; and that show no mold, mildew, or bacterial growth after 28-days of exposure when tested in accordance with ASTM D3273 [Level 10 – No Mold Growth] and ASTM C1338 [Pass – No Fungal Growth].

1.14 Sag and warp resistant in 100% relative humidity and tested to ASTM C367.

1.15 Thermal Resistance: R 2.17 $hr.ft^2.°F/Btu$ (I-P), R 0.38 $m^2.K/W$ (SI)

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.
B. Layout openings for penetrations centered on the penetrating items.

**3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS**

A. Install acoustical panel ceilings in accordance with ASTM C636/C636M [seismic design requirements manufacturer's written instructions and CISCA's "Ceiling System Handbook"

**3.4 CLEANING**

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touch up of minor finish damage.
B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Carpet tile and installation accessories.

B. Related Sections:

1. Section 09 65 13 ‘Resilient Base’.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Where cutouts are required in carpet tiles.
2. Carpet tile installation type, pattern, pile direction.
3. Locations of borders and transitions. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size.
2. Transition Stripping: 12” long.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1.5 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: VOC Individual equal or less than ½ CA chronic REL. VOC Formaldehyde equal to or less than 16.5 ug/m3 equal to or less than 13.5 ppb per test methodology outline in 2013 D.C. Green Construction Code.

1.6 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE (CPT)

A. Basis of Design Product: Subject to compliance with requirements. Provide product by manufacturer as indicated on the Finish Schedule.

B. Applied Soil-Resistance Treatment: Manufacturer's standard material.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated per 40 CFR 59, Subpart D (EPA Method 24).

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

2.3 WALK OFF (WO)

A. Basis of Design Product: Subject to compliance with requirements. Provide product by manufacturer as indicated on the Finish Schedule.

B. Applied Soil-Resistance Treatment: Manufacturer's standard material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

3.4 CLEANING AND PROTECTION

A. Clean: As per manufacturers recommendations.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

END OF SECTION 09 68 13

# SECTION 09 72 00 - WALLCOVERINGS

## PART 1 GENERAL

### 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. ASTM INTERNATIONAL (ASTM)

B. ASTM E84 (2023) Standard Test Method for Surface Burning Characteristics of Building Materials

C. CALIFORNIA DEPARTMENT OF PUBLIC HEALTH (CDPH)

D. CDPH SECTION 01350 (2017; Version 1.2) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers

E. GREEN SEAL (GS) GS-36 (2013) Adhesives for Commercial Use

F. GYPSUM ASSOCIATION (GA) GA 214 (2010) Recommended Levels of Gypsum Board Finish

G. INTERNATIONAL CODE COUNCIL (ICC)

H. ICC IBC (2021) International Building Code

I. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

J. NFPA 265 (2023; ERTA 1 2023) Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls

K. NFPA 286 (2019) Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth

L. SCIENTIFIC CERTIFICATION SYSTEMS (SCS) SCS SCS Global Services (SCS) Indoor Advantage

M. SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

N. SCAQMD Rule 1168 (2017) Adhesive and Sealant Applications

O. UNDERWRITERS LABORATORIES (UL)

P. UL 723 (2020) UL Standard for Safety Test for Surface Burning Characteristics of Building Materials

Q. UL 2818 (2022) GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings

### 1.2 SUBMITTALS

A. Architect's review is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. All products used must be

manufactured in the United States per the Build America, Buy America Act. Submit the following in accordance with Section 01 30 00 ADMINISTRATIVE REQUIREMENTS and Section 01 60 00 PRODUCT REQUIREMENTS:

B. SD-03 Product Data

Wallcoverings and Accessories; G

Primer and Adhesive

Recycled Content for vinyl wallcovering; S

Recycled Content for textile wallcovering; S

Recycled Content for acoustical wallcovering; S

C. SD-04 Samples

Wallcoverings and Accessories; G

D. SD-07 Certificates

Build America, Buy America Act certification of compliance; G

Indoor Air Quality; S

E. SD-08 Manufacturer's Instructions

Wallcoverings and Accessories

F. SD-10 Operation and Maintenance Data Wallcoverings and Accessories; G

## 1.3 CERTIFICATIONS

### 1.3.1 Indoor Air Quality Certifications

A. Submit required indoor air quality certifications and validations in one submittal package.

#### 1.3.1.1 Fabrics and Wallcoverings

A. Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party program that products meet the requirements of this Section. Provide current product certification documentation from certification body.

#### 1.3.1.2 Primers and Adhesives

A. Provide products certified to meet indoor air quality requirements by UL 2818 (Greenguard) Gold, SCS Global Services Indoor Advantage Gold or provide certification or validation by other third-party programs that products meet the requirements of this Section. Provide current product certification documentation from certification body. When product does not have certification, provide validation that product meets the indoor air quality product requirements cited herein.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver the material to the site in manufacturer's original wrappings and packages and clearly label with the manufacturer's name, brand name, pattern and color name and number, dye lot number, size, and other related information. Store in a safe, dry, clean, and well-ventilated area at temperatures not less than 50 degrees F and within a relative humidity range of 30 to 60 percent. Store wallcovering material in a flat position and protected from damage, soiling, and moisture. Do not open containers until needed for installation, unless verification inspection is required.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Comply with wallcovering manufacturer's printed installation instructions for minimum temperature of area to receive requirements for conditioning adhesive and wallcovering. Provide a minimum 50 degrees F area temperature, 72 hours prior to installation, during installation, and until the adhesive dries. Observe ventilation and safety procedures.

1.6 WARRANTY

A. Provide manufacturer's standard performance guarantees or warranties that extend beyond a one-year period.

1.7 EXTRA MATERIALS

A. Provide one linear foot of full-width wallcovering of each pattern and color for each 50 linear feet of wallcovering installed, excluding presentation dry erase wallcovering. Provide the same manufacturer, type, pattern, color, and lot number of extra stock as the installed wallcovering. Provide full rolls, packed for storage and marked with content, manufacturer's name, pattern and color name and number and dye lot number. Leave extra stock at the site at a location as directed by the Contracting Officer.

PART 2 PRODUCTS

2.1 TEXTILE TYPE II WALLCOVERING (WC 5.1)

A. Provide colorfast, stain, and soil resistant textile wallcovering fabricated of woven fabric with paper or acrylic backing. Meet the requirements of Class A when tested in accordance with ASTM E84 or UL 723. Comply with or exceed the following for textile wallcovering:

B. Basis-of-Design Product: Provide Castine Clair PVC Free GOH 33389842 Cream as manufactured by Wolf-Gordon Inc.

C. Provide Textile Wallcovering containing a minimum of 20% percent recycled content. Provide data identifying percentage of recycled content for textile wallcovering. Provide product free of PFC/PFOA/PFOS, PVC and phthalates (BBP, DPB, DEHP, DIDp, DINP, DnHP, DnOP, solvents.

D. Provide certification of indoor air quality for textile wallcovering.

2.2 TEXTILE WALLCOVERING (WC 5.2)

A. Provide colorfast, stain, and soil resistant textile wallcovering fabricated of woven fabric with paper or acrylic backing. Meet the requirements of Class A when tested in accordance with ASTM E84 or UL 723. Comply with or exceed the following for textile wallcovering:

B. Basis-of-Design Product: Provide Purr Clair PVC Free GOH 33423964 Emerald as manufactured by Wolf-Gordon Inc.

C. Provide Textile Wallcovering containing a minimum of 20% percent recycled content. Provide data identifying percentage of recycled content for textile wallcovering. Provide product free of PFC/PFOA/PFOS, PVC and phthalates (BBP, DPB, DEHP, DIDp, DINP, DnHP, DnOP, solvents.

D. Provide certification of indoor air quality for textile wallcovering.

2.3 VINYL WALLCOVERING (VWC 5.3)

A. Provide colorfast, stain, and soil resistant textile wallcovering fabricated of woven fabric with paper or acrylic backing. Meet the requirements of Class A when tested in accordance with ASTM E84 or UL 723. Comply with or exceed the following for textile wallcovering:

B. Basis-of-Design Product: Provide Canopy, GOH 33483059 Forest as manufactured by Wolf-Gordon Inc.

C. Provide Textile Wallcovering containing a minimum of 20% percent recycled content. Provide data identifying percentage of recycled content for textile wallcovering. Provide product free of PFC/PFOA/PFOS, and phthalates (BBP, DPB, DEHP, DIDp, DINP, DnHP, DnOP, solvents.

D. Provide certification of indoor air quality for textile wallcovering.

2.4 TEXTILE WALLCOVERING (WC 5.4)

A. Provide colorfast, stain, and soil resistant textile wallcovering fabricated of woven fabric with paper or acrylic backing. Meet the requirements of Class A when tested in accordance with ASTM E84 or UL 723. Comply with or exceed the following for textile wallcovering:

B. Basis-of-Design Product: Provide Berlin, Clair PVC Free GOH 32819418 Artic as manufactured by Wolf-Gordon Inc.

C. Provide Textile Wallcovering containing a minimum of 20% percent recycled content. Provide data identifying percentage of recycled content for textile wallcovering. Provide product free of PFC/PFOA/PFOS, PVC and phthalates (BBP, DPB, DEHP, DIDp, DINP, DnHP, DnOP, solvents.

2.5 WALL LINER (SWC 9.1)

Provide a rigid vinyl sheet wall liner having a minimum weight of 3.7 ounces/square yard and a total minimum thickness of 0.030 (0.8 mm) inch. Test wall liner in accordance with NFPA 286 or have a Class A flame spread rating of 0-25 and smoke development rating of 0-450 when tested in accordance with ASTM E84 or UL 723.

Provide certification of indoor air quality for wall liner.

A. Basis-of-Design Product: Palladium Rigid Sheet as manufactured by IPC Door and Wall Protection Systems, Inpro Corporation.

B. Description:

1. Panel Size: 4' x 8' (1.22m x 2.44m)
2. Thickness: .030 inch (.8 mm)
3. Trim Accessories: Provide stainless steel

2.6 FIBERGLASS REINFORCED PLASTIC PANELS (FRP 9.2)

Provide homogeneous panels of fiberglass, calcium carbonate and resin.

A. Basis-of-Design Product: Standard FRP Panels as manufactured Marlite

B. Description:

1. Fire Rating: Class A
2. Size: 4' x 8'
3. Panel Thickness: 3/32"
4. Color: See Interior Materials s & Finish Legend in the drawings.
5. Finish: Smooth

2.7 PRIMER AND ADHESIVE

A. Provide a type primer and adhesive recommended by the wallcovering manufacturer, containing a non-mercury based mildewcide, and complying with local indoor air quality standards. Primer must permit removal of the wallcovering and protect the wall surface during removal. Do not damage gypsum wallboard facing paper during removal of wallcovering. Provide a strippable type adhesive. When substrate color variations show through vinyl wallcovering, provide a white pigmented primer as recommended by the wallcovering manufacturer used to conceal the variations. Provide a recommended type adhesive to install corner guards and wainscot cap by the manufacturer of the corner guards and wainscot cap.

B. Provide primers and non-aerosol adhesive products used on the interior of the building (defined as inside of the weatherproofing system) that meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of SCAQMD Rule 1168. Provide aerosol adhesives used on the interior of the building that meet either emissions requirements of CDPH SECTION 01350 (limit requirements for either office or classroom spaces regardless of space type) or VOC content requirements of GS-36. Provide certification or validation of indoor air quality for primer; also, provide certification or validation of indoor air quality for adhesives.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect all areas and conditions under which wallcoverings are to be installed. Notify the Contracting Officer, in writing, of any conditions detrimental to the proper and timely completion of the installation. Work will proceed only when conditions have been corrected and accepted by the installer.

3.2 SURFACE PREPARATION

A. Do not apply wallcovering to surfaces that are rough, that contain stains which will bleed through the wallcovering, or that are otherwise unsuitable for proper installation. Fill cracks and holes; sand rough spots smooth. Finish walls to receive presentation dry erase wallcovering to a Level 4 gypsum wallboard finish in accordance with GA 214 unless Level 5 is recommended by the wallcovering manufacturer. Thoroughly dry surfaces at least 30 days prior to installation of vinyl wallcovering. Provide interior surfaces of new and existing gypsum wallboard with a wallcovering primer in accordance with the manufacturer's printed instructions. As required, use white primer when substrate color variations are visible through thin or light color wallcovering. Seal interior surfaces of exterior masonry walls to prevent moisture penetration, then prime with a wallcovering primer in accordance with the manufacturer's printed instructions. Provide masonry walls with flush joints. Test moisture content of plaster, concrete, and masonry with an electric moisture meter of a maximum five percent reading. Apply a thin coat of joint compound or cement plaster, as recommended by the wallcovering manufacturer, to the concrete and masonry walls as a substrate preparation. To promote adequate adhesion of wall lining over masonry walls, prime the

walls as recommended by the wall lining manufacturer. Prime the surfaces of walls as required by the manufacturer's printed instructions to permit ultimate removal of wallcovering from the wall surfaces. Allow primer to completely dry before adhesive application.

## 3.3 INSTALLATION

A. Do not install building construction materials that show visual evidence of biological growth.

### 3.3.1 Wallcovering

A. Install wallcovering in accordance with the manufacturer's printed installation instructions. Remove glue and adhesive spillage from wallcovering face and seams with a remover recommended by the manufacturer.

#### 3.3.1.1 Textile Wallcovering

A. When textile wallcoverings are specified to comply with NFPA 265, NFPA 286, or ICC IBC (Section 803.5 Textile wall coverings) testing, install the wallcovering in accordance with the manufacturer's printed installation instructions for compliance with the testing using the same product mounting system, including adhesive. After the installation is complete, vacuum the fabric with a ceiling to floor motion.

#### 3.3.1.2 Acoustical Wallcovering

A. When acoustical wallcoverings are specified to comply with NFPA 265, NFPA 286, or ICC IBC (Section 803.5 Textile wall coverings) testing, install the wallcovering in accordance with the manufacturer's printed installation instructions for compliance with the testing using the same product mounting system, including adhesive. After the installation is complete, vacuum the fabric with a ceiling to floor motion.

## 3.4 CLEAN-UP

A. Upon completion of the work, clean wallcovering free of dirt, soiling, stain, or residual film. Remove and clean surplus materials, rubbish, and debris resulting from the wallcovering installation.

-- End of Section --

# SECTION 09 79 11 - WOOD INTERIOR WALL AND CEILING PANELS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Wood veneer laminate panels and attachment system for walls and ceilings.

1. Perforated for acoustical performance

B. Accessories

### 1.02 RELATED REQUIREMENTS

A. Section 05 40 00 – Metal Stud Framing:

B. Section 06 10 00 – Rough Carpentry: Wall framing and sheathing

C. Section 09 29 00 – Gypsum Board.

### 1.03 REFERENCE STANDARDS

A. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a

B. ASTM D6007 - Formaldehyde emission testing.

C. Certified Clean Air Gold – Conforms to California department of public health standard method v1.2 School classroom

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Convene conference 1 week before starting work to establish procedures to maintain optimum working conditions and to coordinate work with related and adjacent work.

### 1.05 SUBMITTALS

A. See Section 01 33 00 – Submittals for submittal procedures.

B. Product Data: Submit manufacturer's product data, including sub-framing system and accessories.

C. Shop Drawings: Show panel attachment system, spacing and member type, panel or slat layout, fastener spacing, corner and transition details.

D. Samples: Submit two samples of each finish/color of wall and/or ceiling panels.

E. Installation Instructions: Refer to the Parklex Walls & Ceilings technical guide for instructions including surface preparation, installation procedures and cleaning and care.

### 1.06 MOCK-UP

A. See Section 01 45 00 – Quality Control for additional requirements.

B. Construct system mock-up panel sized 2 feet long by 6 feet high; include fasten panels; include outside corner inside corner opening, transition to adjacent materials.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

## 1.07 DELIVERY, STORAGE, CONDITIONING, AND HANDLING

A. Transportation:
   1. Transport panels horizontally and strapped down to avoid sliding across one another.
   2. Protect edges and corners.
   3. Maintain in original protective packaging until use.

B. Storage:

1. Refer to manufacturer technical guide for the most updated information.
2. Panels must be stored in a clean, dry and well-ventilated place, sheltered from the weather and extremes of temperature. Under no circumstances should this be an external environment.
3. Panels must be placed in a horizontal position and always in the original packaging.
4. The storage temperature must be between 50-77$^{O}$F with the Relative Humidity of the air between 30-70%.
5. If any panel needs repackaging, this must be in the original packaging material.
6. All material must be placed (still in its original packaging) in the center of the room or area in which it is to be installed. This must be done for a minimum of 72 h. It should remain in its original packaging until immediately prior to installation.
7. Do not lean or store any packaging in direct contact with walls, leaving a minimum space of 24” around all sides.
8. Stack packaging horizontally (on a minimum of 4 equidistant battens) to ensure air flow around the boxes. The packaging must rest on a flat surface, to prevent deflection/deformation of the panels.
9. The room environment before and during the installation must be maintained between 59-80ºF, with the relative humidity between 40% and 65%.
10. To avoid deformations, fissures or other permanent damage to the material, the environment after installation must be maintained between 59-80ºF, with the relative humidity between 40% and 65%.
11. If necessary, use auxiliary humidification/dehumidification devices to ensure these values are achieved.
12. If the above requirements are not strictly followed, irreversible damage to the material may occur.

C. Handling:

1. Refer to manufacturer technical guide for the most updated handling information.

## 1.08 WARRANTY

A. See Section 01 78 76 – Closeout Submittals for additional warranty requirements.

B. Provide manufacturer's standard 10-year warranty.

## PART 2 PRODUCTS

## 2.01 MANUFACTURERS

A. Parklex USA, Inc.; 200 River Park North Drive, Woodstock, GA 30188; telephone: 678-401-7403; website: http://www.parklex.com

B. Substitutions: Submit for review by Architect.

## 2.02 APPLICATIONS

A. Fastening systems:

| INSTALLATION SYSTEMS | REMOVABLE | APPLICATION | LENGTH | WIDTH | PRODUCT |
|---|---|---|---|---|---|
| **Interior hanging hook** | YES (there is a non removable option) | Walls | ≤ 8' | ≤ 4' | WET INTERNAL<br>DRY INTERNAL |
| **Hidden fastener with plugs** | NO | Walls&Ceilings | ≤ 8' | ≤ 4' | WET INTERNAL<br>DRY INTERNAL |
| **Removable Clip system** | YES | Walls&Ceilings | ≤ 8' | ≤ 2' | WET INTERNAL<br>DRY INTERNAL |
| **Velcro fastener system** | YES | Walls | ≤ 8' | ≤ 4' | WET INTERNAL<br>DRY INTERNAL |
| **Adhesive installation method** | NO | Walls | ≤ 8' | ≤ 4' | WET INTERNAL<br>DRY INTERNAL |
| **Tongue and groove installation method** | NO | Walls&Ceilings | ≤ 8' | ≤ 15 3/8" | DRY INTERNAL |

1. Description: Interior Hanging Hook System, Hidden Fastener with Plugs Adhesive Installation Method See Drawings for wall assembly and panel detailing
2. Panel Type Parklex DRY Internal S (standard).

B. Curves

1. Install curved panels using concealed furring or framing system with adhesive.
2. Adjust distance between vertical profiles and fixing points per manufacturer's instructions, or as shown on shop drawings.
3. Install hidden adhesive furring securely, plumb and level to sub-framing and as recommended by manufacturer.
4. Maximum Adhesive Furring Spacing:
5. 1. Panel Thickness: Max. Horizontal Spacing:
6. 6 to 8 mm 15-3/4 inches (400 mm)
7. 10 and 12 mm 23-5/8 inches (600 mm)

8. Install manufacturer's recommended setting clamps at 8 to12 inches (200 to 305 mm) on center and for no less than minimum required time.

## 2.03 MATERIALS

A. Dry Internal Panels: High pressure laminate with natural timber veneer adhered to a birch plywood core with high pressure laminate balancer (backer).
   1. Size: 48 by 96 inches (1220 by 2440 mm).
   2. Thickness: 8 mm
   3. Edge: Square
   4. Type: S – Standard
   5. Color/Species Country Oak
   6. Texture: Prodema Woodskin Matt
   7. Fire Classification: ASTM E84, [S: Class C t ≥ 8 mm] [F: Class B t ≥ 14 mm]
   8. Density: 46.8 lbs/ft$^3$ (≥ 0.75 g/cm$^3$)
   9. See Parklex Walls and Ceilings Technical Guide for structural and physical properties.
   10. Special Coating: ISO 22196; Antibacterial
   11. Formaldehyde emission testing: ASTM D6007 / CARB 2: COMPLIANT

## 2.04 ACCESSORIES

A. Interior hanging Hook System:
   1. Panel screw
   2. Interior hook
   3. Interior hanging rail (10')

B. Hidden fasteners with Plug system:
   1. Parklex Plug 14.25 diameter
   2. Fixed point Drilling Bit
   3. Floating point Drilling Bit
   4. Panel screw for Wood (By Others)
   5. Panel screw for Metal (By Others)
   6. Silicone Sealant

C. Removable Clip system:
   1. Panel Screw
   2. Removable Clip
   3. Non-removable Clip
   4. Single rails- Black 10'
   5. Joint rail- Black 10'
   6. Stopper (for vertical layouts only)

7. Marker

C. Adhesive installation method:

1. Adhesive- As recommended or provided by adhesive manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine substrate and framing members for alignment

B. Notify Architect of conditions that would adversely affect installation.

C. Do not begin surface preparation or installation until unacceptable conditions are corrected.

### 3.02 PREPARATION

A. Securely install wall framing or furring system plumb and square, and correctly spaced to accommodate panel system.

### 3.03 INSTALLATION

#### A. INTERIOR HIDDEN HANGER HOOK SYSTEM

**1)** Install panels in strict compliance with most updated Walls & Ceilings technical guide https://parklex.com/download/25005
**2)** Use recommended cutting tools, equipment, and procedures.

#### B. HIDDEN FASTENER WITH PLUGS

**3)** Install panels in strict compliance with most updated Walls&Ceilings technical guide https://parklex.com/download/25005
**4)** Use recommended cutting tools, equipment, and procedures.

#### C. REMOVABLE CLIP SYSTEM

**5)** Install panels in strict compliance with most updated Walls&Ceilings technical guide https://parklex.com/download/25005
**6)** Use recommended cutting tools, equipment, and procedures.

#### D. ADHESIVE INSTALLATION METHOD

**7)** Install panels in strict compliance with most updated Walls&Ceilings technical guide https://parklex.com/download/25005
**8)** Use recommended cutting tools, equipment, and procedures.

## 3.11 CLEANING

A. Clean stains and excess adhesive from boards following manufacturer's instructions.
   1. Refer to Walls&Ceilings technical guide for specific instructions.
   2. Do NOT use abrasive cleaning cloths or sponges, or harsh solvents such as trichloroethylene-perc, ammonia or any other carpet cleaning products, acidic products or paint and grease solvents on any surface to clean boards.

## 3.12 PROTECTION

A. Protect panels from damage by placing thick cardboard corners at building corners, and lining passageways and walls adjacent to material handling routes with protective pads or sheet goods.

B. If a panels are damaged during construction or correction period, contact Parklex for instructions to send portion of damaged material to Parklex for replacement closely matching existing.

**END OF SECTION**

SECTION 09 8433 WOOD FIBER ACOUSTICAL UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Acoustic fiber units.

a. Wall Panels.

b. Ceiling Panels.

c. Acoustical Ceiling System.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 09 2216 - Non-Structural Metal Framing.

3. Sections 09 2900 - Gypsum Board.

4. Section 09 5113 - Acoustical Panel Ceilings.

5. Division 23 - HVAC.

6. Division 26 - Electrical

1.02 SYSTEM DESCRIPTION

A. Product Requirements: The acoustical fiber units shall be provided in uniform thickness with tolerances of not to exceed plus or minus 1/8 inch. Permitted span distances shall not exceed manufacturer’s recommendations.

B. Single Source Responsibility: Provide acoustical fiber units from a single manufacturer.

C. Regulatory Requirements:

1. The acoustical fiber units shall provide a flame spread rating of 25 or less when tested in accordance with ASTM E84 for the exposed interior surface.

2. The acoustical fiber units shall be manufactured, fabricated, and installed to provide a Noise Reduction Coefficient (NRC) rating as indicated on the Drawings.

1.03 SUBMITTALS

A. Product Data:

1. Submit a complete list of proposed materials.

2. Submit manufacturer's installation instructions.

3. Submit manufacturer's recommended procedures for normal cleaning and removal of stains including precautions in furnishing of cleaning materials that may be detrimental to surfaces.

B. Material Samples: Submit Samples of color and texture, minimum 6-inch by 6-inch.

1.04 QUALITY ASSURANCE

A. Design Criteria:

1. Deflection of finished surface limited to 1/360 of span or less.

2. 1/8 inch maximum permissible variation from true plane measured from 10 foot straightedge placed on surface of finished acoustical fiber units.

C. Requirements of Regulatory Agencies:

1. Conform to CBC requirements and UL - Tunnel Test for Fire Hazard Classification of Building Materials.

2. CISCA Code of Practices.

3. Acoustical Materials:

a. Acoustical and Insulating Materials Association Bulletin - Performance Data for Architectural Acoustic Materials.

b. FS SS-S-118A, Sound Control Blocks and Board (Acoustical Tiles and Panels, Prefabricated).

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in original sealed packages.

B. Storage: Store materials in building area where they will be installed, in original package. Maintain and protect from damage due to water or deteriorating elements.

C. Handle in a manner to prevent damage during storage and installation.

1.06 PROJECT CONDITIONS

A. Environmental Requirements: Maintain temperature in space at 55 degrees F or above for 24 hours before, during and after installation.

B. Scheduling:

1. Before concealing Work of other sections, verify required inspections have been completed.

2. Coordinate with related Work of other sections. Coordinate location and symmetrical placement of air distribution devices, electrical devices, and penetrations with related Work section.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Tectum Inc.: Cementitious Wood Fiber Acoustical Products, or equal.

B. Wall and/or Ceiling Panels

1. Tectum Standard Interior Wall Panels, or equal.

a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.

b. Thickness 1 inch.

c. Edge: square ends.

d. Width: 23 ¾-inch.

e. Length: 6’.

f. Color: To be selected by Architect.

g. Mounting Style: "A" Provide all fasteners, Furring strips and OCF 703 fiberglass insulation for a complete installation.

2. Acoustical Ceiling System

1. Tectum Full Span Panels, or equal.

a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.

b. Thickness: 1 inch.

c. Color: Factory painted white.

d. Size: As indicated on Drawing.

2. Tectum Lay-IN Grid Panels, or equal.

a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.

b. Thickness and Back Rabbet: 1 inch thick.

c. Color: Factory painted white.

2.03 ACCESSORY MATERIALS

A. Provide accessories as follows:

1. Clips: 0.043 inch galvanized steel.

2. Painted Head Drywall Screws:

a. Material: Steel.

b. Length: 1 5/8 -inch. Verify in field as needed.

c. Color: White.

3. Moulding:

a. Material: Plastic.

b. Designation: CHC.

4. Touch-Up Paint: Color to match board.

PART 3 - EXECUTION

3.01 PREPARATION

A. MANUFACTURER'S INSTRUCTIONS

1. Comply with the instructions and recommendations of the acoustical wall panel system manufacturer.

2. Install materials in accordance with governing regulations, fire resistance rating requirements and applicable industry standards.

a. Comply with CISCA Code of Practices.

B. EXAMINATION

1. Site Verification of Conditions:

a. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and installation.

b. Do not proceed with installation of wall panel system until unacceptable conditions are corrected.

3.02 INSTALLATION

A. Screw head to be flush with panel surface.

B. Securely fasten wall panels by means of splines attached vertically to smooth wall or furring strips. Engage vertical kerfs on the edges of the wall panels with splines. Install adhesive.

C Cover field cut edges by means of trim or other moldings.

3.03 CLEANING

A. Clean exposed surfaces of acoustical panel, trim, moldings and suspension members to comply with manufacturer's instructions for cleaning.

B. Touch up any minor finish damage.

C. Remove and replace damaged Work as required.

3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.05 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

END OF SECTION

# SECTION 099113 - EXTERIOR PAINTING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Steel.
3. Galvanized metal.
4. Exterior gypsum sheathing.

B. Related Requirements:

1. Section 05 1200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.
2. Section 09 9123 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

### 1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Basis-of-Design: Sherwin Williams. Subject to compliance with requirements, provide comparable product by one of the following manufacturers:

1. Benjamin Moore.
2. PPG.

### 2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: As selected by Architect from manufacturer's full range.

### 2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Portland Cement Plaster: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

.

B. Tint undercoats same color as topcoat but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Pipe hangers and supports.
d. Metal conduit.
e. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: PrepRite Block Filler.
b. Intermediate Coat: Latex, Loxon Block Surfacer.
c. Topcoat: Latex, Duration Exterior Latex Satin Coating 2 coats

B. Concrete Substrates, Traffic Surfaces, Traffic Stripping:

1. Waterborne paint meeting Federal Specifications TT-P-1952E, Type I, Type II, Type III. Federal Standard No. 595 Colors:

a. White 37925
b. Red 31136
c. Yellow 33538
d. Black 37038

C. Steel Substrates:

1. Water-Based Coating System:
a. Prime Coat: All Surface Enamel Oil Primer.
b. Topcoat: A-100 Exterior Latex Gloss, 2 coats.

D. Galvanized-Metal Substrates:

1. Water-Based Coating System:

a. Prime Coat: All Surface Enamel Latex Primer.
b. Topcoat: A-100 Exterior Latex Gloss. 2 coats.

E. Gypsum Wallboard Substrates:

1. Latex System:
a. 1st Coat: S-W Exterior Latex Wood Primer, B42W8041(4.0 mils wet, 1.4 mils dry)

b. 2nd Coat: S-W Solo Acrylic Semi-Gloss, A76 Series
c. 3rd Coat: S-W Solo Acrylic Semi-Gloss, A76 Series (4.0 mils wet, 1.5 mils dry per coat).

END OF SECTION 099113

# SECTION 099123 - INTERIOR PAINTING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Steel.
3. Wood.
4. Gypsum board.
5. Plaster.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this section.
2. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
3. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.
4. Section 099600 "High-Performance Coatings" for tile-like coatings.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Label each coat of each Sample.
3. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Indicate VOC content.

1.4 CLOSEOUT SUBMITTALS

1. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer’s label with the following information:

1. Product name and type (description).
2. Batch date.
3. Color number.
4. VOC content.
5. Environmental handling requirements.

6. Surface preparation requirements.
7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Lead Paint: It is not expected that lead paint will be encountered in the Work.

1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company (The); products indicated or comparable product from one of the following:

1. Benjamin-Moore
2. PPG

B. Comparable Products: Comparable products of approved manufacturers will be considered in accordance with Section 016000 "Product Requirements," and the following:

1. Products are approved by manufacturer in writing for application specified.
2. Products meet performance and physical characteristics of basis of design product including published ratio of solids by volume, plus or minus two percent.

C. Source Limitations: Obtain paint materials from single source from single listed manufacturer.

1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall provide materials that comply with VOC limits of authorities having jurisdiction and for interior paints and coatings applied at Project site, the following VOC limits exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Floor Coatings: 100 g/L.
6. Shellacs, Clear: 730 g/L.
7. Shellacs, Pigmented: 550 g/L.

C. Colors: As indicated in the Finish Schedule.

## 2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.

1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

    a. Concrete: 12 percent.
    b. Masonry (Clay and CMU): 12 percent.
    c. Wood: 15 percent.
    d. Gypsum Board: 12 percent.

2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

1. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer[.] [ but not less than the following:]

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

## 3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Do not paint exposed equipment or piping.

2. Paint the following work where exposed in occupied spaces:

a. Painting of exposed equipment will be field-determined.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: Primer, latex, interior.

1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils (0.203 mm) wet, 3.2 mils (0.081 mm) dry.

b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat: Latex, interior, semi-gloss.

1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat .

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer sealer, latex, interior:

1) S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils (0.203 mm) wet, 3.2 mils (0.081 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

B. CMU Substrates:

1. Latex System:

a. Block Filler: Block filler, latex, interior/exterior:

1) S-W PrepRite Block Filler, B25W25, at 75-125 sq. ft. per gal. (1.84 to 3.07 sq. m per liter).

b. Intermediate Coat: Latex, interior, matching topcoat.
c. Topcoat: Latex, interior, flat:

d. Topcoat: Latex, interior, semi-gloss:

1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.

2. Water-Based Light Industrial Coating System:

a. Block Filler: Block filler, latex, interior/exterior:

1) S-W PrepRite Block Filler, B25W25, at 75-125 sq. ft. per gal. (1.84 to 3.07 sq. m per liter).

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

C. Metal Substrates (Aluminum, Steel, Galvanized Steel):

1. Latex System:

a. Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.

b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.
c. Topcoat: Water-based acrylic, semi-gloss:

1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils (0.064 to 0.102 mm) dry, per coat.

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer, rust-inhibitive, water based:

1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.

c. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

D. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.

1. Latex System:

a. Prime Coat: Primer sealer, latex, interior:

1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.

b. Intermediate Coat: Latex, interior, matching topcoat.
c. Topcoat: Latex, interior, eggshell:

1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry, per coat.

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer sealer, latex, interior:

1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, eggshell:

1) S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

E. Gypsum Board and Plaster Substrates:

1. Latex System:

a. Prime Coat: Primer, latex, interior:

1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils (0.102 mm) wet, 1.0 mils (0.025 mm) dry.

b. Intermediate Coat: Latex, interior, matching topcoat.

c. Topcoat finish is indicated on drawings and may be one of the following:

d. Topcoat: Latex, interior, flat:

1) S-W ProMar 200 Zero VOC Latex Flat, B30-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.

e. Topcoat: Latex, interior, low sheen:

1) S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.

f. Topcoat: Latex, interior, eggshell:

1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry, per coat.

g. Topcoat: Latex, interior, semi-gloss:

1) S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils (0.102 mm) wet, 1.6 mils (0.041 mm) dry, per coat.

h. Topcoat: Latex, interior, gloss:

1) S-W ProMar 200 Zero VOC Gloss, B21-12650 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer sealer, latex, interior:

1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils (0.102 mm) wet, 1.0 mils (0.025 mm) dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, eggshell:

d. Topcoat: Light industrial coating, interior, water based, semi-gloss:

1) S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-151 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

END OF SECTION 099123

SECTION 09 3013

CERAMIC TILING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ceramic tile, waterproof membrane for tile, stone thresholds, thin set mortar, and mortar setting beds for floor and wall tile.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 03 3000 - Cast-In-Place Concrete.

3. Section 06 8316 - Fiberglass Reinforced Panels.

4. Section 07 9200 - Joint Sealants.

5. Section 08 1113 – Hollow Metal Doors Frames.

6. Section 08 3116 – Access Panels and Frames.

7. Section 09 2423 - Cement Plaster and Metal Lath.

8. Section 09 2900 - Gypsum Board.

1.02 SUBMITTALS

A. Product Data: Manufacturer's product data, standard specifications, Safety Data Sheets, and other technical information for each product specified.

B. Material Samples: Manufacturer’s standard palette, indicating full range of tile colors, textures, and grout colors.

C. Manufacturer’s Instructions:

1. Manufacturer's preparation and installation instructions.

2. Maintenance instructions.

D. Product Certificates: Signed by manufacturer certifying that products furnished comply with requirements of this Specification.

1.03 REFERENCES

A. American National Standards Institute (ANSI)

1. A108, Specifications for the Installation of Ceramic Tile.

2. ANSI A118, Ceramic Tile Installation Materials.

3. ANSI A137.1, Standard Specifications for Ceramic Tile.

B. ASTM International:

1. ASTM A1064 - Standard Specification for Carbon Steel and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

2. ANSI A326.3 - Test Method for Dynamic Coefficient of Friction of Hard Surface Flooring Materials.

1. ASTM C185 - Standard Test Method for Air Content of Hydraulic Cement Mortar.

2. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

3. ASTM C150 - Standard Specification for Portland Cement.

4. ASTM C206 - Standard Specification for Finishing Hydrated Lime.

5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

6. ASTM C241 - Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic.

7. ASTM C503 - Standard Specification for Marble Dimension Stone.

8. ASTM C920 - Standard Specification for Elastomeric Joint Sealants

9. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

C. Tile Council of North America (TCNA) – Current edition of "Handbook for Ceramic, Glass and Stone Tile installation".

1.04 QUALITY ASSURANCE

A. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.

B. Consistent Quality: Products shall be consistent in appearance and physical properties.

C. Comply with requirements of California Building Code and ADAAG.

D. Environmental Requirements: Adhesives, primers, caulk, sealants and liquid applied products shall meet the technical requirements specified in this Section.

1.05 PRE-CONSTRUCTION MEETINGS:

A. Prior to start of Work of this section and after approval of submittals, schedule an on-site meeting between CONTRACTOR, LACPW, Architect, and representatives of the material manufacturer and tile installer to review construction conditions and Drawings for conformance with the requirements of this Section for each substrate.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver tile and other materials in sealed containers, with manufacturer's labels intact.

B. Store materials in clean, dry and secure areas.

1.07 MAINTENANCE

A. Extra Materials: Provide the following in labeled manufacturers' cartons:

1. Five percent of each type and color of tile installed.

2. Ten linear feet of coved base and bullnose tile for each color installed.

3. Six units of each type and color of corner pieces.

1.08 WARRANTY

A. Manufacturer shall provide a five year material warranty. Installer shall provide a five year installation warranty.

B. For waterproofing, manufacturer shall provide a 10 year material warranty for waterproofing installation, tile setting, and grouting materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Tile: Standard Grade Products from the following manufacturers conforming to ANSI A137.1:

1. Dal-Tile Corporation.

2. American Olean Company.

3. Florida Tile, Inc.

4. Equal.

B. Installation Materials: Products and methods of the following manufacturers conforming to ANSI A137.1:

1. Laticrete International, Inc.

2. Custom Building Products.

3. MAPEI.

4. Siena Tile and Stone Installation Products.

5. Equal.

2.02 MATERIALS

A. Colors, Textures, and Patterns: Tile shall be from manufacturer's standard product line. 90 percent shall be from "price group 2", and "10 percent from price group 3", unless indicated otherwise. Tile trim and accessories shall match adjoining tile. Grout color shall match tile unless otherwise indicated.

B. Tile sizes: Tile sizes specified are modular dimensions unless otherwise indicated.

C. Portland cement mortar bed for floor, walls and shower areas:

1. Laticrete International, Inc., 3701 Fortified Mortar.

2. Custom Building Products, Quickrete Floor Mud.

3. MAPEI, Modified Mortar Bed.

4. Mix per ANSI A108.1A.

D. Latex Portland cement bond mortar thin-set for tiles under 15" in one dimension on floor installations:

1. Laticrete International, Inc., 254 Platinum.

2. Custom Building Products, Porcelain Tile Professional Thin Set Mortar.

3. Mix per ANSI 118.4.

E. Latex Portland cement bond mortar thin-set for tiles over 15" in one dimension on floors. For all tile on wall installations:

1. Laticrete International, Inc., Tri-Lite.

2. Custom Building Products, ProLite Premium LFT Mortar.

3. MAPEI, UltraLite Mortar.

4. Mix per ANSI 118.15.

F. Waterproof Membrane: Cold-applied, single component liquid with embedded reinforcing fabric where recommended by manufacturer: Laticrete International, Inc. Hydro Ban Waterproof Membrane, Custom Building Products Red Guard Waterproof Membrane, or MAPEI Mapelastic Aqua Defense.

G. Reinforcing Wire Fabric: 2-inch by 2-inch, 16 by 16 gage, galvanized electrically welded wire reinforcing, per ASTM A1064.

H. Latex Portland Cement Grout: Laticrete International, Inc. Sanded Grout (1500 Series), Custom Polyblend Sanded Grout, Laticrete International, Inc. Unsanded Grout 1600 Series (for joints smaller than 1/8”), Custom Polyblend Unsanded Grout, or MAPEI Ultracolor Plus FA.

I. Cleavage Membrane and Wall Backing Paper: Cleavage membrane shall be 15-pound asphalt-saturated felt manufactured according to ASTM D226 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

J. Separation Material (for all sealed joints including perimeters): Quality Foam, QF 200 white, 3/8 inch wide by 5-inch high.

K. Backer Rod for sealants (for ceramic mosaic fields): Polyethylene foam, closed-cell, flexible and compressible, 3/16 inch diameter.

L. Cleaner and Sealer:

1. Cleaner and sealer shall be from one manufacturer, acceptable to tile and grout manufacturers. To establish quality, the Specification is based on Aqua Mix Inc. Equivalent products from Miracle Sealants Co., Watco Tile and Brick, MAPEI, or equal may be provided.

2. Cleaner: Aqua Mix Concentrated Tile Cleaner, neutral phosphate-free cleaner, Custom Building Products Tile Lab Concentrated Tile and Stone Cleaner, or Mapei Ultracare cleaner.

3. Sealer: Aqua Mix Penetrating Sealer, fungus- and bacteria-resistant, stain-resistant, and slip-resistant as specified for tile, Custom Building Products Tile Lab Surface Gard, Mapei Ultracare, or equal.

M. Sealants:

1. Sealant and primer shall be from one manufacturer, acceptable to tile and grout manufacturers. See Section 07 9200 - Joint Sealants.

2. Ceramic Mosaic Tile: One-Part, Mildew-Resistant Silicone Sealant: ASTM C920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for

sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.03 TILE

A. Unglazed Ceramic Mosaic Floor Tile:

1. Size: 1 inch by 1 inch or as indicated.

2. Colors and patterns as selected by Architect from price groups specified.

3. Slip Resistance: Resistant to slipping appropriate to the installed conditions of use, as required by the California Building Code, ADAAG, ANSI 137.1 and TCNA.

B. Glazed Wall Tile:

1. Size: 4-1/4 inch by 4-1/4 inch face dimensions by 5/16 inch thick (ceramic mosaic tile may also be used on walls).

2. Colors and patterns as selected by Architect from price groups specified.

C. Unglazed Paver Tile:

1. Porcelain, flat tile.

2. Size: 12 inch by 12 inch, or as shown.

3. Colors and patterns as selected by Architect from price groups specified.

4. Slip Resistance: Resistant to slipping appropriate to the installed conditions of use, as required by the California Building Code, ADAAG, ANSI 137.1 and TCNA.

D. Trim:

1. Integral bullnose at external corners.

2. Provide bullnose where tile projects from jamb.

3. Tile base with wall tile above

4. Bullnose at wainscot.

E. Stone Thresholds:

1. White honed marble complying with Marble Institute of America Group “A,” unless other color indicated and ASTM C503.

2. Size and profile shaped to provide transition between tile surfaces and adjoining finished floor surfaces, or as indicated. Width not less than 4 inches. Edges beveled on a slope of no greater than 1:2. Cut to fit door frame profile.

## PART 3 - EXECUTION

### 3.01 EXAMINATION AND PREPARATION

A. Examine substrates and conditions for compliance with installation requirements. Verify that all penetrations through substrate have been installed. Proceed with Work only after all conditions are in compliance.

B. Substrates shall be firm; dry; clean and within flatness tolerances required by relevant ANSI A108 tile installation standards. Prepare surfaces as follows:

1. Concrete Floors: Allow concrete floors to cure for 28 days minimum before beginning tile and grout installation. Remove laitance, sand, dust, and loose particles.

C. Substrates to receive wall tile and base shall be:

1. Scratch coat of cement plaster, as specified in Section 09 2423 - Cement Plaster and Metal Lath at existing concrete or plaster walls.

2. Cementitious backing panels, as specified in Section 09 2900 - Gypsum Board.

D. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical items of Work, and similar items located in or behind tile has been completed before installing tile.

E. Verify that joints and cracks in tile substrates are coordinated with caulked-joint locations; if not coordinated, adjust as required by the ARCHITECT.

F. Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are maintained in compliance with referenced standards and manufacturer's written instructions.

G. Protect adjacent surfaces during progress of Work of this section.

### 3.02 TILE INSTALLATION, GENERAL

A. Install tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Center the tile fields in both directions for each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

B. For tile mounted in sheets: Joints between tile sheets shall be the same width as joints within tile sheets.

C. Extend Work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without damaging tile. Carefully grind the cut edges of tile abutting trim, finish, or built-in items. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Locate joints, directly above joints in concrete substrates, at horizontal and vertical changes in plane, or where indicated during installation of mortar beds. Provide 3/8-inch wide foam at joints. Do not saw-cut joints after installing tiles.

F. Prepare and clean joints to be sealed. Apply sealants to comply ASTM C920 with requirements of Section 07 9200 - Joint Sealants.

G. Conform to manufacturers printed instructions, and applicable requirements of ANSI and TCNA Standards.

3.03 TILE INSTALLATION, FLOOR

A. Install reinforcing and latex Portland-cement mortar setting bed over cured concrete slab. Lap reinforcing at least one full mesh, and support or lift so that it is approximately in the middle of mortar bed. Do not abut against vertical surfaces. Install foam separation material at perimeters and expansion joint locations for caulked joints.

B. Mix setting mortar in accordance with ANSI recommendations and ASTM C185.

C. Once begun, mortar installation shall continue until room is completed. Discard any batch not floated and finished within ½ hour of mixing. Firmly compact before screeding. Screed to true plane and pitch as indicated. Slope mortar bed sufficiently that water flows to drain and no puddling will occur. Slope mortar down to floor drains for proper installation of waterproof membrane. After screeding, firmly rub down with steel or wood float.

D. Cure mortar bed with a light fog spray of water and cover with 6-mil Visqueen for 72 hours.

E. Waterproof Membrane:

1. Install waterproof membrane where indicated and in restrooms areas according to TCNA Standards. Extend membrane up wall mortar or backing board as follows:

a. 3 inches above top of curb wall.

b. 6 inches minimum above floor.

2. Ensure that layers of membrane are fully inserted into clamping ring of floor drain. After membrane installation and before tile setting, install pea gravel around sub drain to prevent blockage of weep holes and place mortar to proper level for setting tile.

3. For tile installations other than slab on grade, before setting tile and after seven days curing, water test membrane by damming drains and doors, filling floor with water to 4-inch minimum depth and leaving for 24 hours. Correct any leaks and re-test before proceeding. After testing, protect membrane from traffic until tile Work begins.

F. Install tile on floors with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 to 1/8 inch.

2. Paver Tile: 3/16 to 3/8 inch.

3.04 TILE INSTALLATION, WALLS

A. Install wall mortar beds before floor mortar beds.

B. On plaster walls, clean scratch coat surface of loose or foreign materials, fog spray with water, and install brown coat mortar bed over scratch coat to a thickness not less than 3/8 inch and not greater than 3/4 inch. Once started, wall mortar installation shall continue until wall is completely floated. Discard any batch not floated and finished within a half an hour of mixing. As soon as wall mortar is dried to sufficient hardness, but still plastic, firmly rub with wood float.

C. Cover cure with 40-weight Kraft paper for 72 hours minimum.

D. Install waterproof membrane where indicated per article 3.03E WATERPROOF MEMBRANE requirements.

E. Install tile over properly cured setting bed, waterproof membrane, or cementitious backing panels utilizing "thin-set" method with latex portland cement bond mortar, in accordance with manufacturer's printed instructions and ANSI A108.5. Confirm substrate is completely clean and free of dust. Ensure that bond coats do not intrude into joints to be caulked.

F. Minimum coverage of bond mortar shall be 80 percent. Set and test as specified for floors.

G. Lay out Work so tiles will be centered on each wall or section of wall in order to minimize tile cuts. Lay out tile wainscots to next full tile beyond dimensions indicated. Spot setting bed with mortared tile, set plumb and true, accurately indicate plane of finished tile surfaces.

H. Install tile on walls with following joint widths:

1. Glazed Wall Tile: 1/16 inch.

2. Ceramic Mosaic Tile: 1/16 to 1/8 inch.

3. Special Large Tile: 3/16 to 3/8 inch.

I. Horizontal joints shall be level, vertical joints plumb with surfaces true and plumb, edges of tiles flushed.

J. Rub exposed cuts smooth with a fine stone; no cut edge shall be set against a fixture or adjoining surface without a 1/16 inch joint to be caulked.

K. Install access doors where required, furnished under another section, in correct location, plumb or level, flush with adjacent construction, and securely fastened to framing.

3.05 THIN SET METHOD

A. Confirm substrate is completely clean and free of dust. Cut foam at floor perimeters flush with top of mortar bed. Ensure that bond coats do not intrude into joints to be sealed. Install tile over properly cured setting bed or waterproof membrane utilizing "thin-set" method with latex portland cement bond mortar, in accordance with manufacturer's printed instructions and ANSI A108.5.

B. Minimum coverage of bond mortar shall be 80 percent except 95 percent in shower areas and exterior installations. Place tile into fresh mortar press tile to ensure full contact. Before setting proceeds, set and remove three tiles or sheets of tiles to confirm specified coverage of bond mortar. If coverage is insufficient, utilize a larger toothed trowel or back butter tiles until proper coverage is provided.

3.06 GROUTING

A. Prior to starting, ensure that all tile surfaces are clean and excessive bond mortar is scraped and vacuumed from joints (approximately 2/3 depth of tile should be open for grouting). Follow manufacturer’s instructions for mixing grout. Once grout Work commences, proceed until complete wall or floor area is finished utilizing one batch of grout.

B. Latex portland cement grouting: Dampen tile surface and joints with water using sponge but leaving no puddles in joints. Force grout into joints using sufficient pressure on rubber float so as to fill joints completely and scrape excess grout off tile surface with rubber float. Smooth or tool grout to uniform joint finish. Do not over water.

C. Curing latex Portland cement grout: Remove final grout haze with clean soft cloth, and cover with 40-weight Kraft paper to cure. Leave paper in place for protection. Cover wall surfaces with 40-weight Kraft paper for 72 hours.

3.07 CLEANING AND SEALING

A. If grout scum is not visible on tile surface after curing, clean tile surface with clear water. Remove and replace cracked, broken or defective Work with proper material.

B. If, when curing membrane is removed, grout scum is visible on tile surface, use the following cleaning method:

1. Immediately recover floor with paper or felt and allow to continue curing for a minimum of 14 days; uncover floor and maintain entire tile surface saturated with clean cool water for not less than two hours.

2. Utilize a neutral cleaner acceptable to manufacturers of tile and grout and follow manufacturer's instruction. Do not provide generic acid cleaners.

3. Wet tile floors and apply cleaning solution to floor surface, then scrub with a brush. Rinse area several times with clean water to flush solution off floor surface.

C. Apply penetrating sealer in accordance with manufacturer's instructions utilizing a dense sponge applicator, paint pad, sprayer or brush. Avoid overlapping, puddling, and rundown. Completely wipe surface dry within 3 to 5 minutes using cotton or paper towels; do not allow sealer to dry on tile. After two hours, test surface by applying water droplets to surface. If water is absorbed, apply a second coat. Avoid surface traffic for 24 hours.

3.08 SEALANTS

A. Ensure joints to be sealed are free of setting and grouting materials and construction debris. Do not permit any foot traffic on installed sealants for a minimum of 48 hours or protect with hardboard strips.

B. Install in accordance with Section 07 9200 - Joint Sealants.

3.09 PROTECTION

A. Admit no traffic where tile is installed until mortar and grout has set for a minimum of 72 hours.

B. Protect Work of this section until Substantial Completion.

3.10 CLEAN UP

A. Remove rubbish, debris, and waste material and legally dispose of off the Project site.

END OF SECTION

SECTION 09 6513 RUBBER BASE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Topset coved rubber base for installation with surface flooring.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 09 6519 - Resilient Tile Flooring.

3. Section 09 6813 – Tile Carpeting.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's published technical data describing materials, construction and recommended installation instructions. Submit technical data and installation instructions for each adhesive material.

B. Maintenance Instructions: Submit manufacturer's recommendations for maintenance, care and cleaning of base.

C. Samples: Submit Samples of topset base in each available color. Following color selections, submit Samples, not less than 12 inches long of each selected color and type. Submit pint cans of each type adhesive.

D. Maintenance Materials: Before Substantial Completion, deliver at least 50 lineal feet and five outside corner units of each color of rubber base installed. Deliver the materials in unopened factory containers or in sealed cartons with labels identifying the contents, matching installed materials. Include unopened cans of adhesives adequate to install the maintenance materials.

1.03 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

2. ASTM F1861: Standard Specification for Resilient Wall Base.

3. Comply with current CHPS requirements, www.chps.net.

4. Each selected color and configuration shall be from same dye lot and color.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in original unopened manufacturer's packaging clearly labeled with manufacturer's name. Store materials at room temperature, but not less than 70 degrees F, for a minimum of 48 hours before installation, unless otherwise indicated in manufacturer's printed instructions.

1.05 PROJECT CONDITIONS

A. Ventilation and Temperature: Verify areas that are to receive rubber base are ventilated to remove fumes from installation materials, and areas are within temperature range recommended by the various material manufactures for site installation conditions.

1.06 WARRANTY

A. Manufacturer shall provide a five year material warranty.

B. Installer shall provide a two year fabrication and installation warranty.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Burke/Mercer Wall Base.

B. Roppe, Pinnacle Rubber Base.

C. Flexco Company, Wallflower Premium Rubber Wall Base.

D. Johnsonite.

E. Equal.

2.02 MATERIALS

A. Rubber base: Conform to ASTM F 861; Group 2, solid (homogeneous); Type 1, TS, (thermoset) vulcanized rubber, Style B (coved), 4-inch high unless otherwise indicated, integral colors as selected, non-shrinking, 1/8 inch thick, with matching molded outside corners.

B. Base Adhesive: Water based, low odor type, as recommended by manufacturer of rubber base.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate the Work of this section with other sections to provide a level, smooth and clean finish surfaces to receive rubber base.

3.02 EXAMINATION

A. Field verify dimensions and other conditions affecting the Work of this section before commencing the Work of this section.

B. Before Work is started, examine surfaces that are to receive rubber base. Deficiencies shall be corrected before starting the Work of this section.

3.03 PREPARATION

A. Do not start preparation until adjacent concrete floor slabs are at least 90 days old and finish flooring is installed.

B. Install rubber base when ambient temperature is 70 degrees F. or higher.

3.04 INSTALLATION

A. Install topset base at:

1. Hard floors, including resilient flooring, concrete and carpet tile and other soft floors.

2. Along cabinetry base as indicated on drawings and where flooring extends into open cabinets.

B. Securely fasten cement base to backing in long lengths in accordance with manufacturer's recommendations. Lay out lengths so that not less than 18 inches long filler pieces are provided. Assure that top and toe continuously contact the wall and floor, and that all joints are tight. Install matching factory formed external corners at all offsets. Inside corners shall be coped; wrapped corners are not acceptable.

C. Use of adhesive gun is prohibited. Apply adhesive directly to substrate using the appropriate notched trowel or spreader according to manufacturer's instructions. Maintain 1/8 inch gap from top of base to prevent adhesive oozing onto adjacent surfaces.

D. Base and outside corners shall be rolled with a seam roller before adhesive sets.

3.05 CLEANING

A. Maintain surfaces of base clean as installation progresses. Clean rubber base when sufficiently seated and remove foreign substances.

B. Clean adjacent surfaces of adhesive or other defacement. Replace damaged and/or defective Work to the specified condition.

3.06 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.07 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

# SECTION 09 8100 - ACOUSTICAL INSULATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Acoustical insulation and sealants.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 07 2100 - Thermal Insulation.

3. Section 09 2216 - Non-Structural Metal Framing.

1.02 SUBMITTALS

A. Product Data:

1. Provide manufacturer's printed Product Data for each product.

2. Provide manufacturer's printed installation instructions.

1.03 QUALITY ASSURANCE

A. Fire Ratings: Comply with fire-resistance and flammability ratings specified.

B. Acoustic Performance: Acoustic Insulation shall be tested in accordance to ASTM C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, with Type A (#4) mounting.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect insulation from physical damage and from becoming wet or soiled.

B. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL INSULATION

A. Unfaced Mineral/Glass Fiber Blanket/Batt Acoustical Insulation: Acoustical insulation produced by combining mineral/glass fibers with thermosetting resins to comply with ASTM C665, Type I.

1. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50 when tested in accordance with ASTM E84.

2. Manufacturers: Johns Manville "Sound Control Batts", Owens Corning "Sound Attenuation Batts", or equal.

3. Thickness: 3-inch unless otherwise indicated.

2.02 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant for Concealed Joints: Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound:

1. Pecora Corp. "BA-98".

2. Tremco Inc. "Tremco Acoustical Sealant".

3. Hilti, Inc. “CP 506”.

4. Equal.

B. Acoustical Sealant for Exposed Joints: Non-oxidizing, skinnable, paintable, gunnable sealant recommended for sealing interior exposed joints to reduce transmission of airborne sound.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions for installation conditions.

B. Do not install insulation until building is sufficiently enclosed or protected against absorption of moisture by the insulation, and do not install insulation unless supporting framing and construction is in a thoroughly dry condition.

C. Install snugly between framing members with ends snugly fitted between units and against adjacent construction.

D. Carefully cut and fit insulation around pipes, conduit, and other obstructions and penetrations.

E. Where door and window frames occur in framing; cut additional strips of insulation and hand-pack as required to fill voids in and around such frames.

F. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C919 for use of joint sealants in acoustical applications as applicable to materials, applications and conditions indicated. Install sealants in accordance with manufacturer's instructions.

3.02 CLEANUP

A. Remove rubbish, debris and waste materials and legally dispose off of Project site.

3.03 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 09 8434 – ACOUSTICAL WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Acoustical wall panels.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 09 2900 - Gypsum Board.

1.02 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings for panel units. Indicate anchors, accessories, and installation details.

B. Product Data: Submit manufacturer's specifications and installation instructions for each material and component part. Include methods of installation for each type of substrate to receive units.

C. Material Samples: Submit 12-inch by 12-inch Samples, of each color fabric required. Review of Samples will be for color, pattern, and texture only. Submit 12-inch by 12-inch Samples of substrate material including edge condition with fabric.

D. Test Reports: Submit certified copies of test reports from an independent acoustical testing laboratory indicating compliance with the standards and requirements listed in this section.

1.03 QUALITY ASSURANCE

A. Acoustical measurements shall be performed in accordance with ASTM C423 and shall be performed in Type A mounting in accordance with ASTM E795. An independent acoustical testing laboratory accredited under the National Voluntary Laboratory Accredited Program (NVLAP) shall perform the test.

B. Each component of the panel shall have a Class A rating supported by test from Underwriter's Laboratory in accordance with ASTM E84-15a.

C. Sound Absorption Coefficient Requirements for Panels:

1. The sound absorption coefficients of the ½" material shall not be less than Class D, NRC 0.45 – with 1" air gap: Class C, NRC 0.70.

1.04 PRODUCT HANDLING

A. Crate and pack units as required preventing damage during transit, storage, or handling at the Project site.

B. Store material to provide easy access for inspection and identification.

1.05 JOB CONDITIONS

A. Space Enclosure: Do not install until ambient conditions of temperature and humidity are continuously maintained at values indicated at time of Substantial Completion.

PART 2 - PRODUCTS

2.01 PANELS

A. Fabric Requirements: The fabric shall be equivalent to the following:

1. Autex Acoustics Cube Acoustic Panel:

a. Pattern Non Woven no pattern repeat.

b. Contents: 100 percent polyester fiber

e. Flammability (ASTM E84-15a): Class A

1) Flame Spread: 0 to 25.

2) Smoke Developed: 45.

g. Color Fastness to Light standard ISO 105-B02-2014 Rating 6.

B. Acoustical Core Materials: Semi-rigid inorganic glass fiber material equal to Owens Corning Industrial Insulation, Johns Manville, Knauf, or equal.

2.02 PANEL CONSTRUCTION

A. Panel construction shall consist of a one-piece layer of rigid insulation board with a rigid dimensionally stable panel. The construction shall be guaranteed against twisting and warping. Edges shall be straight and parallel for butt joint application or reveal wall mounting. Panels to be customizable with print, Mold and Press. Precision cut groove and peel and stick. Requiring no edging or capping.

B. Provide cutouts in panels for flush plates, receptacles, outlets, switches, thermostats, clocks, lights, and similar items.

2.03 MOUNTING HARDWARE

A. Installation hardware shall be concealed types and provided by the panel manufacturer. Panels shall be provided with appropriate hardware to securely fasten edges and corners to the wall and to prevent the center portions of the panel from deflecting more than 1/2 inch in any 10-foot plane. Panels shall be individually removable unless otherwise specified.

B. Install panels as indicated with specified air space, filler panels, and fiberglass fill backing as indicated. Provide furring strips, blocking, leveling angles, etcetera as required to provide a complete and finished system.

C. Where panel ends are exposed, panel shall be constructed to conceal mounting hardware.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Install panels in locations as shown on the Drawings and in accordance with the manufacturer’s written instructions.

B. Install units plumb and level in accordance with the manufacturer’s printed instructions and reviewed Shop Drawings. No exposed fastening devices are permitted.

C. Required cutouts or changes in panel dimensions may be factory performed or field cut in accordance with manufacturer’s written directions.

D. Finish corners even and true to line on face and sides with no wrinkles. Corners shall be finished to prevent unraveling, tearing or other visible defects.

E. Provide minimum amount of adhesive to fasten fabric to the acoustic core. The adhesive shall not reduce the acoustical panel sound absorption.

### 3.02 TOLERANCES

A. The fabric will be selected by the Architect from the panel manufacturer's standard finishes. The finish shall be of the same type as that furnished for the sound absorption test.

B. Finished appearance shall be flat with finish tight and free from sags and wrinkles. Finish may be returned onto the backside of the panel. Panel edge construction shall not be visible though finish.

### 3.03 CLEANUP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

### 3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 101100

VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Visual display board assemblies.
2. Floor-to-ceiling visual display assemblies.
3. Rail support system for visual display board assemblies.
4. Modular support system for visual display board assemblies.
5. Sliding visual display units.
6. Monitor wall mount bracket, in wall anchorage.

B. Related Requirements:
1. Section 101200 "Display Cases" for individually framed and enclosed, wall-mounted bulletin boards and for tackboards within display cases.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Visual display board assemblies.
2. Floor-to-ceiling visual display assemblies.
3. Rail support system for visual display board assemblies.
4. Modular support system for visual display board assemblies.
5. Sliding visual display units.
6. Monitor bracket, adjustable arm.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
2. Include electrical characteristics for motorized units.

C. Shop Drawings: For visual display units.

1. Include plans, elevations, sections, details, and attachment to other work.
2. Show locations of panel joints.

D. Samples for Initial Selection: For each type of visual display unit indicated, for units with factory-applied color finishes, and as follows:

## 1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each visual display unit, for tests performed by a qualified testing agency.

B. Sample Warranties: For manufacturer's special warranties.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

## 1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

## 1.7 WARRANTY

A. Special Warranty for Ceramic Steel Surface: Manufacturer agrees to repair or replace porcelain-enamel surfaces that fail in materials or workmanship within the life of the building.

1. Failures include, but are not limited to, the following:

    a. Surfaces lose original writing and erasing qualities.
    b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period:

    a. 10 years from date of Substantial Completion for Panel Construction.
    b. Life of the building for writing surfaces.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84-16; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency. Fire Resistive Class A, 15/15.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

## 2.2 VISUAL DISPLAY BOARD LARGE FORMAT FULL HEIGHT WRITING PANEL SYSTEM

A. Visual Display Board Assembly: factory fabricated.

1. Assembly: markerboard
2. Corners: Square.
3. Width: 47 inches.
4. Height: 95 inches.
5. Mounting Method: Direct to wall**.**

B. Markerboard Panel: Ceramic Steel Porcelain-enamel-faced markerboard panel on core indicated.

1. Color: Polyvision, Arctic White As selected by Architect from full range of industry colors.

## 2.3 MARKERBOARD PANELS

A. Ceramic Steel Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core material, and porcelain-enamel face sheet with 65-80 value gloss finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

1. Face Sheet: uncoated base metal.
2. Manufacturer's Standard Core: Minimum 12 mm thick, with manufacturer's standard moisture-barrier backing.
3. MDF Core: 12 mm thick; with manufacturer's standard moisture-barrier backing.
4. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

B. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in Section 099123 "Interior Painting" and recommended in writing by visual display unit manufacturer for intended substrate.

## 2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.5 TACKBOARDS

Provide certification or validation of indoor air quality for tackboards.

A. Cork:
Provide tackboard consisting of a minimum 1/8 inch thick colored cork with burlap backing laminated to a minimum 1/4 inch thick colored cork with burlap backing laminated to a minimum 1/4 inch thick hardboard

B. Vinyl Covered:
Provide tackboard consisting of vinyl wall covering laminated to a minimum 1/4 inch thick cork laminated to a minimum 1/4 inch thick hardboard or particleboard, and aluminum frame.

C. Fabric Covered:
Provide tackboard consisting of a non-woven fabric covering laminated to a minimum 1/4 inch thick cork laminated to a minimum 1/4 inch thick hardboard or particleboard, and aluminum frame.

## 2.6 MONITOR WALL MOUNT BRACK

Provide for OFOI Monitors. Verify with Owners requirements.

A. Wall mount Monitor Bracket:
Provide adjustable arm bracket Milestone AV Technologies Model TS318TU Dual Stud

B. In Wall Backing plate:
Install to 2 adjacent studs minimum, per OPM -0179-13 to 12 gage ASTM 1008, C5, TYPE B.

C. Wall Studs:
Provide minimum 14 gage, 50 ksi minimum..

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.

C. Examine walls and partitions for proper preparation and backing for visual display units.

D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

D. Prime wall surfaces indicated to receive direct-applied, floor-to-ceiling visual display assemblies and as recommended in writing by primer/sealer manufacturer and visual display unit manufacturer.

## 3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Field-Assembled Visual Display Board Assemblies: Coordinate field-assembled units with grounds, trim, and accessories indicated. Join parts with a neat, precision fit.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of wall, as acceptable to Architect as indicated on approved Shop Drawings.

C. Visual Display Board Mounting Heights: Install visual display units at mounting heights indicated on Drawings.

D. Floor-to-Ceiling Markerboard Panels: Attach panels to wall surface with egg-size adhesive gobs at 16 inches (400 mm) o.c., horizontally and vertically.

1. Join adjacent panels with concealed steel splines for smooth alignment.

## 3.4 CLEANING AND PROTECTION

A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 101100

# SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

B. Related Requirements:

### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

### 1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

### 1.4 QUALITY ASSURANCE

A. In addition to complying with pertinent codes and regulations, comply with industry and trade standards normally associated with this product

### 1.5 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in CBC, Title 24, Part 2, Chapter 11B (2022 Edition).

1. Raised Characters shall comply with CBC 11B-703.2.

a. Character Type: Characters on signs shall be raised 1/32 inch minimum above their background and shall be sans serif uppercase characters duplicated in Braille. Characters and Braille shall be in a horizontal format.
b. Character Height: Character height measured vertically from the baseline of the character shall be 5/8 inch minimum and 2 inch maximum based on the height of the uppercase letter “I”.
c. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter “O” is 60 percent minimum and 110 percent maximum of the height of the letter “I”.
d. Stroke Thickness: Stroke thickness of the uppercase letter “I” shall be 15 percent maximum of the height of the character
e. Character and Line Spacing shall be in conformance to CBC 11B-703.2.7 and 11B-703.2.8.
f. Character Placement: Shall be placed in accordance with Paragraph 2.03, C below.

2. Visual Characters: Visual characters shall comply with CBC Section 11B-703.5. Characters shall be conventional in form and shall be uppercase or lowercase or a combination of both, as indicated on the drawings. Characters shall not be italic, oblique, highly decorative, or of other unusual forms.

a. Finish and Contrast: Characters and their backgrounds shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.
b. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter “O” is 60 percent minimum and 110 percent maximum of the height of the uppercase of the letter “I”.
c. Character Height: Minimum character height shall comply with CBC Table 11B-703.5.5.
d. Height from Finish Floor or Ground: Visual characters shall be 40 inches minimum above the finish floor or ground.
e. Stroke Thickness: Uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.

f. Character and Line Spacing: Shall be in accordance with CBC 11B-703.5.8 and 11B-703.5.9.

3. Braille: Contracted Grade 2 Braille, conforming to CBC 11B-703.3. Braille characters shall be inlaid optically correct acrylic Raster beads into computer drilled holes in the panel surface.

   a. Dimensions and Capitalization: Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.
   b. Position: Braille shall be positioned below the corresponding text in a horizontal format, flush left or centered. If text is multi-lined, Braille shall be placed below the entire line of text. Braille shall be separated 3/8 inch minimum and 1/2 maximum from any other tactile characters and 3/8 inch minimum from raised borders and decorative elements.

4. Pictograms: In conformance to CBC 11B-703.6. Pictograms shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.

   a. Finish and Contrast: Pictograms and their field shall have a non-glare finish. Pictograms shall contrast with their field with either a light pictogram on a dark field or a dark pictogram on a light field.
   b. Text Descriptors: Pictograms shall have text descriptors located directly below the pictogram field, and shall comply with CBC 11B-703.2, 11B-703.3 and 11B-703.4.

5. International Symbol of Accessibility (ISA): Shall comply with CBC 11B-703.7 and CBC Figure 11B-703.7.2.1. The ISA shall consist of a white figure on a blue background. The blue color shall be approximate to FS. 15090 in Federal Standard 595C.
6. Mounting Locations and Height: Signs with tactile characters shall be as indicated on the drawings and in conformance to CBC 11B-703.4.

   a. Mounting Locations:

      1) Identification signs for rooms and spaces shall be located on the wall adjacent to the latch side of the door, as one enters the room or space.
      2) Signs that identify exits shall be located at the exit door when approached in the direction of egress travel.
      3) Signs containing tactile characters shall be located so that a clear floor space 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degrees open position.
      4) Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
      5) Where a tactile sign is provided at a double door, with one active leaf, the sign shall be located at the inactive leaf.
      6) Where a tactile sign is provided at double doors with two active leaves, the sign shall be located to the right of the righthand door.
      7) Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.

7. Mounting height above finish floor or ground: Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

## 2.2 MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following:

1. ASI Sign Systems, Inc
2. Best Sign Systems, Inc
3. or equal

## 2.3 MATERIALS AND FABRICATION

A. Interior and Exterior Room Sign Materials

1. Substrate Panel: 1/4 inch thick, integrally colored or clear acrylic plastic, or laminated acrylic. Conforming to ASTM D4802; non-glare (matte), UV stable, suitable for interior and exterior use
2. Corners shall be eased
3. Colors as selected by Architect from manufacturer's custom color range
4. Fasteners

    a. Stainless steel tamper-proof screws and plastic anchors
    b. Signs mounted on fire-rated doors shall be secured with adhesive
    c. For installation on glass, fasten sign to glass with very high bond double faced tape. On opposite side of glass, anchor matching backplate to glass with very high-bond double-faced tape.

B. Characters and Symbols: Shall be fabricated by one of the processes described below:

1. Computer cut raised characters and graphics shall be cut from 1/16 inch integrally colored acrylic. Raised characters and graphics shall be inlaid 1/32 inch minimum into first surface of sign background, secured with adhesive so it cannot be removed without the use of tools. Raised characters and graphics shall have beveled, eased or rounded edges. Non-tactile text and graphics shall be applied to the second surface, and background color shall be applied to the second surface and protected with film or an additional backplate. Pictograms and other symbols including the International Symbol of Accessibility, which are included on signs with raised characters and Braille, are not required to be raised.
2. Raised characters and graphics including braille shall be integral to sign face and shall be formed into sign face by high pressure thermoforming using a negative mold. No applied, glued, welded tactile elements are acceptable. Raised characters and graphics shall have beveled, eased or rounded edges. No sharp, square edges are acceptable. Non-tactile text and graphics shall be applied to the second surface, and background color shall be applied to the second surface and protected with vinyl film. Pictograms and other symbols including the International Symbol of Accessibility, which are included on signs with raised characters and Braille, or other signs are not required to be raised.

## 2.4 ROOM IDENTIFICATION SIGN

A. Room Identification Sign with Room Name and Room Number: 7 inches high by 9 inches wide, minimum. Room name shall be raised characters 3/4 inches high minimum, and room number 1 inch minimum; and shall be accompanied with Braille indicators.

## 2.5 RESTROOM SIGNAGE

A. Restrooms shall be provided with geometric symbols and wall mounted pictograms with text descriptors.

B. Geometric Symbols

1. Male Restroom Door Sign: 0.125 inch thick equilateral triangle with edges 12 inches long, with vertex pointing upward, the triangle symbol shall contrast with the door, either light on dark background or dark on a light background. A male silhouette shall appear within the equilateral triangle in contrasting color to it.
2. Female Restroom Door Sign: 0.125 inch thick circle 12-inch diameter, the circle symbol shall contrast with the door, either light on dark background or dark on a light background. A female silhouette shall appear within the circle in contrasting color to it.
3. "All Gender" Restroom Door Sign (Single Occupancy Restrooms): 0.125 inch thick circle, 12-inch diameter with a 0.125 Inch thick equilateral triangle with the vertex pointing upward superimposed on the circle and within the 12-inch diameter. Triangle and circle shall be of contrasting colors; the circle symbol shall contrast with the door. A female and male silhouettes as well as the international symbol of accessibility shall appear within the equilateral triangle in contrasting color to it, and the word "restroom" shall appear on the bottom part of the circle in contrasting color to it.

C. Room Identification

1. Room Identification for Multiple-Occupancy Restrooms: Provide a 8 inch long by 8 inch tall room identification sign, including a pictogram of the International Symbol of Accessibility and a female or male silhouette. Text descriptor shall be "Girls" or "Boys" for students, and "Women" or "Men" for staff. Characters, braille, and pictograms and mounting locations shall be in conformance to article 2.03
2. Room Identification for Single-Occupancy Restrooms: Provide a 8 inch long by 8 inch tall room identification sign, including a pictogram of the International Symbol of Accessibility and a female and male silhouette. Text descriptor shall be "All Gender Restroom". Characters, braille, and pictograms and mounting locations shall be in conformance to article 2.03

## 2.6 RAISED CHARACTER AND BRAILLE EXIT SIGNS

A. Tactile Exit Sign Types:

1. "EXIT"
2. "EXIT ROUTE"

2.7 ASSISTIVE LISTENING DEVICE SIGN

A. Include International Symbol of Access for Hearing Loss, CBC Figure 11B-703.7.2.4, with text “Assistive-Listening System Available”. Use upper and lower case characters.

2.8 OCCUPANT LOAD SIGNS

A. Provide maximum occupancy load signs. Post in a conspicuous place near the main exit or exit access doorway from the room or space of rooms and areas indicated in the drawings.

B. Minimum size: 4 inches high by 8 inches wide, 7/8 inch high letters, 1 inch high numerals.

C. Sign to read: “MAXIMUM OCCUPANCY LOAD XXX”. Indicate occupant load shown on drawings.

2.9 FIRE SPRINKLER RISER ROOM SIGN

A. Locate one sign at each fire sprinkler riser room door as indicated in drawings.

B. Text: Sign to read “Fire Sprinkler Riser Inside”, white characters, 1 inch high on red background.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standards.

C. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
2. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
3. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep

adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

4. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

## 3.2 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films as signs are installed.

B. Clean sign and surrounding surfaces to remove all dirt and debris from work of this section. Maintain signs in a clean condition during construction and protect from damage.

END OF SECTION 101423.16

# SECTION 10 2113 - PHENOLIC TOILET COMPARTMENTS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Solid phenolic toilet compartments, urinal screens, and vision screens.

B. Related Requirements:

1 Division 01 - General Requirements.

2 Section 05 4100 - Structural Metal Stud Framing.

3 Section 06 1000 - Rough Carpentry.

4 Section 10 2813 - Toilet Accessories.

5 Section 10 2815 – Hand and Hair Dryers.

### 1.02 DESIGN REQUIREMENTS

A. Design and fabrication shall conform to requirements of ADAAG and CBC Chapter 11B.

B. Toilet Compartments: Floor supported overhead braced type units consisting of solid phenolic pilasters, panels and doors; plated steel leveling devices with stainless steel covers; and stainless steel fittings, hardware and fastenings.

C. Urinal Screens: Floor supported and wall hung type consisting of solid phenolic screen panels and plated steel leveling devices with stainless steel covers, stainless steel fittings and fastening.

D. Vision Panels: Floor- and wall-mounted solid phenolic type.

### 1.03 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating complete layout, elevations of partitions, thickness of solid phenolic panels, fastenings, proposed method of anchoring, size and spacing of anchors, details of construction, hardware, fittings, mountings, method of assembly, other related items, and installation details.

B. Product Data: Submit manufacturer's technical data for materials, fabrication, finishing, fastenings, hardware, and installation details.

C. Material Samples:

1. Submit full range of Samples of phenolic chips for initial color selection. Chips shall be at least 2-inch by 3-inch.

2. Submit Samples of hardware and fasteners.

D. Certificates: Furnish manufacturer's certification that materials meet or exceed Specification requirements.

1.04 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. ASTM A167: Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

2. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

3. Underwriters Laboratories Inc. (UL):

a. UL Fire Resistance Directory; applicable UL Design Numbers for application of fireproofing and conditions as indicated.

4. Chemical Resistance: Panels to meet or exceed Scientific Equipment Furniture Association's (S.E.F.A.) list of 49 standard chemicals.

5. Consistency:

a. Panels to have uniform thickness (+0.03 inch).

b. Panels to have uniform flatness (maximum difference of 0.03 inch) for a 10-foot span.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site with manufacturer's labels intact and legible, in sealed containers. Materials shall be kept dry.

B. Protect compartments and screens.

1.06 COORDINATION

A. Field Measurements: Secure field measurements prior to fabrication, for proper and adequate fabrication and installation of the Work of this section.

B. Furnish inserts and anchorage built into other construction for installation of toilet compartments, urinal screens and vision panels.

1.07 WARRANTY

A. Toilet Compartment Manufacturer shall provide a 25 year material warranty for solid phenolic panels and hardware.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer:

1. Qualifications of Toilet Compartment Manufacturer: Partition Manufacturer shall have been regularly engaged in the construction of Phenolic Toilet Compartments of the type specified for a minimum of five years.

B. Solid Phenolic Panels:

1. Formica Solid Phenolic panels with -692 Folkstone Celesta, 689 Stellar, Formica Corporation.

2. Wilsonart.

3. Nevamar Surface Systems.

4. Equal.

C. Hardware:

1. Galaxy Hardware, Series 8033.

2. Jacknob Corporation.

3. Equal.

2.02 MATERIALS

A. Toilet compartments panels, doors and pilasters; urinal screens and visual screens.

1. Core: Phenolic impregnated Kraft papers. Panel shall be at least 93 pounds per cubic foot to ensure full saturation of Kraft core.

2. Face Sheet: Over decorative papers impregnated with melamine resin and integrally compression molded with the core.

3. Fire Resistance: The panels shall have the following surface burning characteristics and smoke generation values in accordance with UL 723 classification and labeling in accordance with ASTM E84 Class A tests and shall be self-extinguishing.

a. Flame spread: Maximum 30 for ¾ inch thick panels; 30 for ½ inch thick panels.

b. Smoke developed: Maximum 70 for ¾ inch thick panels; 85 for ½ inch thick panels.

4. Panels shall be UL registered and labeled.

5. Panel shall be resistant to cleaning solvents and uric acid.

6. Product/Material Specification:

a. Modulus of Elasticity: 1.5 million psi minimum.

b. Shear Strength: 2,000 psi minimum.

c. Compressive strength: 24,000 psi minimum.

d. Water Absorption: 3 percent maximum.

e. Use Temperature: 350 degrees F maximum.

f. Surface and Edges: Non-porous.

g. Material Resistance: Will not support fungus or bacteria.

h. Uniform Load Deflection: ¼ inch maximum per Table A:

Table A: Uniform Load (lbs) which causes ¼ inch deflection at Center

(Shelves not fixed at either end, static load on E modulus of 2.0 by 106)* Uniform Load in pounds:

| Thickness | 12 by 24-inch | 12 by 36-inch | 12 by 48-inch | 24 by 36-inch |
|---|---|---|---|---|
| ½ inch | 370 | 110 | 45 | 220 |
| ¼ inch | 1,400 | 400 | 170 | 800 |

*Loads can be affected by temperature, humidity, time, and other environmental factors. Users should test shelves in appropriate environment. It is assumed that deflection greater than ¼ inch is undesirable aesthetically, even though rupture has not occurred.

B. Stainless Steel: ASTM A167, Type 304.

C. Concealed Fasteners and Leveling Devices:

1. Concealed Fasteners: Stainless steel.

2. Leveling Devices: Zinc or cadmium coated steel, Stainless steel.

2.03 FABRICATION

A. Doors shall be ¾ inch thick, panels ½ inch thick, pilasters 3/4 inch thick and screens ½ inch thick. Edges shall be machined to a radius of 3/16 inch; exposed surfaces shall be free of fabrication marks.

B. Pilasters: Flush, formed of ¾ inch thick solid phenolic panels. Edges shall be machined to a radius of 3/16 inch.

1. Door Dimensions: Unless otherwise indicated, furnish 24-inch wide in-swinging doors for standard toilet compartments, 36-inch wide clear opening out-swinging doors when located at the end, and 36-inch wide clear opening out-swinging doors when located at the side for stalls equipped for use by the physically disabled

2. Anchorage: Provide stainless steel anchorage, complete and threaded rods, washers, and leveling adjustment nuts at pilasters, to permit connection to floor slab. Furnish devices, which are designed to support pilasters from structure without transmitting load to floor fill.

3. Overhead Bracing: Provide anti-grip, decorative, heavy duty, extruded aluminum head rail with clear anodized finish.

C. Panels and Urinal Screens: Flush, formed of ½ inch thick solid phenolic panels with a one inch corner radius. Height and width as indicated in drawings.

2.04 HARDWARE

A. Door hardware shall be cast Type 304 stainless steel, as follows:

1. Hinges: 11 gage Cast Stainless Steel Hinge. Hinge shall be cast of type 304 stainless steel and shall have a Satin finish. Hinge shall be gravity type for self-closing action and shall be fully adjustable up to 360 degrees. Pivot pin shall be made of type 304 stainless steel. Only stainless steel components shall be used in the construction of the Hinge. Plastic inserts are unacceptable. Hinges shall provide emergency access by lifting the door. Hinges shall be pre-drilled for mounting to door and pilaster with Stainless Steel through-bolts. Stamped stainless steel is not acceptable.

a. Galaxy Hardware: CS-560 (LeftHand IN/RightHand OUT) or CS-561 (RightHand IN/LeftHand OUT).

b. Jacknob Corporation: 7273 (RightHand IN/LeftHand OUT) or 7283 (LeftHand IN/RightHand OUT).

c. Equal.

2. Continuous Hinge: Continuous 14 gauge stainless steel hinge (48.5”) shall be made of Type 302/304 Stainless Steel and shall have a Satin Finish. Hinge shall be 3” wide and shall have four (4) Stainless Steel wire springs for self-closing action. Pivot pin shall be .250” in diameter, and shall be made of Type 304 Stainless Steel. Hinges shall provide emergency access by lifting the door. Hinges shall be pre-drilled for mounting to door and pilaster with Theft Proof Stainless Steel Torx Head with Pin Through-Bolts. Brass inserts are unacceptable. Each Hinge Set is to be packaged in a separate carton, and is to be labeled by stock number, manufacturer, and left or right hand. Furnish one per door.

a. Galaxy Hardware: SS-953 (LeftHand IN/RightHand OUT) or SS-954 (RightHand IN/LeftHand OUT).

b. Jacknob Corporation: 7339 (RightHand IN/LeftHand OUT) or 7349 (LeftHand IN/RightHand OUT).

c. Equal.

2. Strike and Keeper with Emergency Access: Refer to Detail #1 of this section. Strike and keeper shall be heavy duty ASTM A167, Type 304 cast stainless steel with a polished satin finish. All outside corners and edges shall be rounded to ensure there are no sharp edges. The strike and keeper shall provide emergency egress by lifting of the door. The strike and keeper shall be 2.50” high, with the mounting holes at 1.50” O.C. The wall thickness shall be a minimum of .125”. The keeper shall have a minimum 7/8 inch tab to prevent impaling injuries. The strike and keeper shall be mounted to the pilaster with theft proof stainless steel

Torx Head with pin through-bolts. Strike and keeper shall have an integral rubber bumper door stop rated and able to withstand a sudden impact of 350 lbs. Stamped stainless steel strike and keepers are unacceptable. Extra door stops that encumber the door opening and create a hazard are unacceptable. The stock number shall be molded into the back of strike and keeper for ease in identification. Furnish one per door.

a. Galaxy Hardware: CS-458 (inswing strike & keeper), or CS-456 (outswing strike & keeper).

b. Jacknob Corporation 6283 (inswing strike & keeper), or 4913 (outswing strike & keeper).

c. Equal.

3. Slide Latch: Heavy duty cast stainless steel with satin finish. Slide latch shall be surface mounted. The slide bar shall be .150 inch thick, 1.020 inch wide and 3.720 inch long. Latch shall have an internal stainless steel buffering spring to prevent damage when door is inadvertently slammed against the latch. Mounting holes are to be spaced at 3.50 inch on center. Latch knob shall be riveted to the slide bar and welded to insure that the knob will not come off. Stock number shall be molded into the back of the slide latch for ease identification. Furnish one per door. Stamped stainless steel is not acceptable.

a. Galaxy Hardware: CS-233.

b. Jacknob Corporation: 5053

c. Equal.

4. Coat Hook: Heavy duty cast stainless steel with satin finish. Coat hook and bumper shall be 2.340 inch high, 1.230 inch wide and shall protrude out from the door 3.05 inch. The hook portion shall have a finished diameter of .250 inch thick. The stock number shall be molded into the back of the Coat Hook and Bumper for ease in identification. Furnish one per door. Stamped stainless steel is not acceptable. Mount at 48 inches maximum above finished floor in accessible toilet compartments.

a. Galaxy Hardware: CS-274.

b. Jacknob Corporation.

c. Bobrick: B-212.

d. Equal.

5. Door Stop: Heavy duty cast stainless steel with satin finish. Plated Zarnac Door stops are unacceptable. Door Stop shall have a 2.125 inch base diameter and shall protrude 1.80 inch from the Wall. The bumper at the end of the Door Stop shall be .250 inch thick. The diameter of the shaft shall be .6875 inch. The stock number shall be molded into the back of the Door Stop for ease in identification. Stamped stainless steel is not acceptable.

a. Galaxy Hardware: CS-276.

b. Jacknob Corporation: 4123.

c. Equal.

6. Pull Handle:

a. Heavy duty cast stainless steel with satin finish. Plated Zamac Door pulls are unacceptable. Pull Handle shall protrude from the face of the door .940 inch and shall be 4.735 inch long. The Pull Handle shall have mounting holes drilled and tapped for 10/24 threads at 3.50 inch on center. The Pull Handle shall be .655 inch wide and shall be mounted back to back with the slide latch. The stock number shall be molded into the back of the pull handle for ease in identification. Stamped stainless steel is not acceptable. Provide u-pull shape handle on each side of accessible toilet compartment doors.

1) Galaxy Hardware: CS-277.

2) Jacknob Corporation: 6253.

3) Equal.

b. Accessible Door Pull: 5-1/8 inch by 3 inch high stainless steel pull:

1) Galaxy Hardware: PH-200.

2) Jacknob Corporation: 6253.

3) All Partitions A0625.

4) Equal.

B. Pilaster Shoes: ASTM A167, Type 302/304 Stainless Steel, minimum 3-inch high, 18 gauge, finish with #3 Directional polish, attached with stainless steel through bolts.

C. Brackets: One piece double ear bracket or single ear bracket (at end partition) extending within 3 inches of top and bottom panel edges. Extruded 6063-T5 Aluminum with a satin anodized finish or 304 stainless steel. The minimum weight shall be 1.685 pounds per lineal foot. Inside opening of Bracket shall be .50 inch for panels, .75 inch for pilasters. Holes for mounting to wall and panel/pilaster shall be pre-drilled. Holes are to be spaced at 9 inches on center along the full length of the bracket for a total of twelve holes (double ear) for mounting to the wall and six holes (single ear) for mounting to the panel/pilaster. Each bracket is to have a minimum wall thickness of .125 inch.

D. Overhead Bracing (Headrail): Continuous heavy duty extruded 6063-T5 Aluminum Headrail with anti-grip profile. Head rail shall have integral reinforcing channel and curtain track. Head rail shall have Satin Anodized finish. Provide headrail corner brackets, wall brackets, and headrail end caps as required. The headrail and headrail brackets shall have a minimum wall height of 2 inch. The minimum wall thickness of the headrail and head ail brackets shall be .125 inch.

1. Galaxy: AL-115 (16’ antigrip headrail), EC-120 (3/4” END CAP), HP-132 (Headrail to wall bracket pack), HP-970 (Corner headrail bracket pack).

2. Jacknob Corporation: 80188 – Extruded Aluminum Headrail, 2109 Headrail Wall Brackets, 6672 Headrail End Caps.

3. Equal.

E. Chrome-plated, non-ferrous cast alloy material shall not be furnished for hinges, brackets, locks, latches and other fittings and accessories.

## PART 3 - EXECUTION

### 3.01 EXAMINATION AND PREPARATION

A. Before covering wall framing with finish materials, examine framing to ensure that backing plates and structural framing have been installed in such position as to receive all attachment screws.

B. Verify spacing of plumbing fixtures to ensure compatibility with installation of compartments.

C. Do not start the Work of this section until all deficiencies have been corrected.

### 3.02 INSTALLATION

A. Install partitions and screens as shown in the Shop Drawings and in accordance with manufacturer's instructions and as specified. Install straight, level and plumb.

B. No evidence of drilling, cutting or patching shall be visible in finished Work.

C. Fasten panel brackets securely to walls and ceilings with recommended anchoring devices.

D. Fasten panels and pilasters to brackets with through bolts and nuts.

E. Fasten urinal screen panels to walls with a continuous bracket.

F. Provide ½ inch spaces between wall surface and panels or pilasters.

G. Provide for adjustment of floor variations with non-breakable plastic shoes on pilasters. Conceal floor fastenings in pilaster shoes.

H. Furnish each toilet compartment door with top and bottom hinges, and door latch.

I. Install door strike keeper on each pilaster in alignment with door latch.

J. Furnish each toilet compartment door with one coat hook and bumper.

### 3.03 TOLERANCES OF INSTALLED WORK

A. Maximum Variation from Plumb or Level: 1/8 inch.

B. Maximum Misplacement from Intended Position: 1/8 inch.

### 3.03 ADJUSTING AND CLEANING

A. Hardware Adjustment: After installation, adjust hardware for proper operation. Install hinges on in-swinging doors to hold open approximately 30 degrees from the closed position when unlatched. Install hinges on out-swinging doors to return to the fully closed position. Door shall be plumb with pilasters when door is closed.

B. Adjust and align door hardware to uniform clearance at vertical edges of doors. Clearance space shall not exceed ¼ inch.

C. Cleaning: Clean compartments, hardware, and doors before Substantial Completion and leave free from imperfections. Remove protective coverings.

3.04 CLEANUP

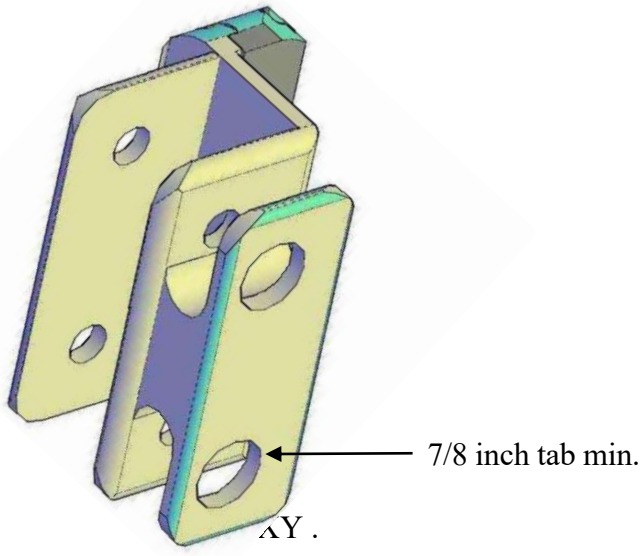
A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.05 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

DETAIL #1 – STRIKE AND KEEPER



SECTION 10 26 00 – CORNER GUARDS

Models: FS-10RN

## Part 1 - General

### 1.01 Summary

A. This section includes the following types of wall protection systems:
   1. Corner Guards
B. Related sections: The following sections contain requirements related to this section:
   1. Handrails, Wall Covering, Wall Panels, Door Protection; refer to section 10 26 00 "Wall and Door Protection"
   2. Blocking in walls for fasteners; refer to section 09 22 16 "Non-Structural Framing"

### 1.02 References

A. Codes (IBC, CBC, SBCCI, BOCA and Life Safety)
B. American Society for Testing and Materials (ASTM)
C. Underwriters Laboratories (UL)
D. California 01350 specification

### 1.03 Submittals

General: Submit the following in accordance with conditions of contract and Division 1 specification section 01 33 00 "Submittal Procedures":

A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
B. Shop drawings showing locations, extent and installation details of corner guards. Show methods of attachment to adjoining construction.
C. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture and pattern:
   1. 12" (304.8mm) long sample of each model specified.
D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

### 1.04 Quality Assurance

A. Code compliance: Assemblies should conform to all applicable codes including IBC, UBC, SBCCI, BOCA, Life Safety and CA 01350 (exception: fire barrier).
B. Fire performance characteristics: Provide engineered PVC FREE wall protection system components with UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class A/1 characteristics listed below:
   1. Flame spread: 25 or less
   2. Smoke developed: 450 or less
E. Fire performance characteristics: Provide engineered PVC FREE wall protection units with fire barrier that are identical to those tested in accordance with UL-263 (E-119) for one hour or two hour rated installation.

F. Impact strength: Provide wall protection components that have been tested for impact using a ram-type impact test in accordance with the applicable provisions of ASTM F476 -84 .
G. Abrasion testing in accordance with ASTM D 4060-7, Standard Test Methods for Abrasion Resistance of Organic Coatings by the Taber Abraser.
H. Chemical and stain resistance: Provide wall protection system components with chemical and stain resistance in accordance with ASTM D543.
I. Color match: Provide wall protection components that are color matched in accordance with the following:
    1. Delta Ecmc of no greater than 1.0 using CIELab color space. (Specifier note: Construction Specialties' colors are matched under cool white fluorescent lighting and computer controlled within manufacturing tolerances. Color may vary if alternate lighting sources are present.)
J. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

### 1.05 Delivery, Storage and Handling

A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
B. Store materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements. A minimum room temperature of 40°F (4°C) and a maximum of 100°F (38°C) should be maintained.
C. Material must be stored flat.

### 1.06 Project Conditions

A. Materials must be acclimated in an environment of 65°-75°F (18°-24°C) for at least 24 hours prior to beginning the installation.
B. Installation areas must be enclosed and weatherproofed before installation commences.

### 1.07 Warranty

A. Acrovyn 5-year Limited Warranty
- Applies to Interior Wall Protection orders that <u>do not</u> include recommended components or accessories
    - Assemblies = Brackets, Hardware
    - Accessories = Primer, Adhesive, Caulk, Trims & Moldings

B. Limited Lifetime Systems Warranty
- Applies to CS Interior Wall Protection projects that include all recommended components and accessories related to CS Interior Wall Protection Products.
    - Assemblies = Brackets, Hardware
    - Accessories = Primer, Adhesive, Caulk, Trims & Moldings

## Part 2 - Products

### 2.01 Manufacturer

A. Construction Specialties, 3 Werner Way, Lebanon, NJ 08833 USA 800-233-8493;
email: cet@c-sgroup.com

B. Drawings and specifications are based on manufacturer's literature from Construction Specialties, Inc. unless otherwise indicated. Other manufacturers must be approved equal by Architect/Owner.-

2.02 Materials

A. Engineered PVC FREE: Extruded material should be high-impact Acrovyn 4000 with Shadowgrain texture, nominal .078" (1.98mm) thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Colors to be indicated in the finish schedule from one of manufacturer's available colors and patterns.

A. Aluminum: Extruded aluminum retainers should be 6063-T6 alloy, nominal .070" (1.78mm) thickness. Minimum strength and durability properties as specified in ASTM B221.

B. Fasteners: All fasteners to be non-corrosive and compatible with aluminum retainers. All necessary fasteners to be supplied by the manufacturer.

2.03 Corner Guards

A. Engineered PVC FREE Corner Guards to be CS Acrovyn: Flush mounted, tamper resistant, guards consisting of continuous aluminum retainer with snap- on Acrovyn 4000 cover. Retainer to be taped and spackled into adjacent drywall. Extruded aluminum base and closure gasket where indicated. Attachment hardware shall be appropriate for wall construction.

1. Model integral fire barrier, specify FS-10RN 1HR (or FS-10MRN 1HR) for one hour fire rated installation or FS-10RN 2HR (or FS-10MRN 2HR) for two-hour fire rated installation. Select from one of Acrovyn™ solid colors, Acrovyn™ Woodgrains or Acrovyn™ Brushed Metals simulated patterns.

2.04 Fabrication

A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

Part 3 - Execution

3.01Examination

A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 Preparation

A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.

B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.03 Installation

A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware, and locating all components firmly into position, level and plumb.

B. Temperature at the time of installation must be between 65°-75°F (18°-24°C) and be maintained for at least 48 hours after the installation.

## 3.04 Cleaning

A. General: Immediately upon completion of installation, clean guards and accessories in accordance with manufacturer's recommended cleaning method.

B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

## 3.05 Protection

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

**SECTION 10 28 00**

**TOILET AND BATH ACCESSORIES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Toilet and Bath accessories.
   2. Underlavatory guards.
   3. Custodial Accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

   1. Construction details and dimensions.
   2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Material and finish descriptions.
   4. Features that will be included for Project.
   5. Manufacturer's warranty.

B. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

C. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, #4 Finish (Satin), 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

C. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

D. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

E. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.2 BATHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include:

B. Grab Bars (Standard Locations) 36” and 48” lengths.

1. Mounting: Flanges with concealed fasteners and anchors
Manufacturers
Bobrick B6806 Series
Bradley.
GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
American Standard.

2. Material: Stainless steel, 18 gage, Type 304

   a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.

   b. Gripping: Slip-Resistant texture

3. Outside Diameter: 1-1/4 inches.
4. Configuration and Length: As indicated on Drawings.
5. Lockset: Tumbler type.

C. Grab Bar
   1. Mounting: Flanges with concealed fasteners and anchors
   2. Material: Type 304 Stainless steel, 18 gauge
      a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
      b. Gripping: Slip-Resistant texture

   3. Outside Diameter: 1-1/2 inches.
   4. Configuration and Length: As indicated on Drawings.

D. Towel Bar 24”L (Standard Locations)
   1. Basis-of-Design Product: KOHLER COMPOSED TOWEL BAR K-73142-CP
   2. Finish: POLISHED CHROME

E. Bollard, Material Type 304 stainless steel.

   1. Basis-of-Design Product: Encore Commercial Products, Post Guard heavy duty 5/16” thick, with (2) threaded 5/8” bolts base, 4” outside diameter.
   2. Base attaches with Hilti concrete expansion anchors.

F. Diaper-Changing Station:
   1. Basis-of-Design Product: KOALA KARE, KB110-SSWM
   2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
      a. Engineered to support a minimum of 250-lb (113-kg)] static load when opened.
   3. Mounting: Face of Wall
   4. Material and Finish: Stainless steel, No. 4 finish (satin), with replaceable insulated polystyrene tray liner and rounded plastic corners.
   5. Nominal size: 35” wide by 20 high.

G. Coat Hook:

   1. Basis-of-Design Product: MODEL Bobrick B-671, SURFACE MOUNTED
   2. Finish: BRUSHED STEEL

H. Mirror Unit:
   1. Mirror with Shelf: Frame and mirror as described above, with Type 304 stainless steel shelf, 5 inches deep with 3/4 inch return edges on 4 sides, front and side return edges shall be hemmed. Bobrick B-292, ASI 0605, Bradley, or equal. Frame: Stainless-steel channel

a. Corners: Manufacturer's standard

2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

   a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

3. Size: 18”x36”

I. Toilet Paper Boxes:

1. For Public Restrooms:

   a. Non-accessible toilet compartments: Surface mounted, Bobrick-27460 double roll tissue holder, or equal.

   b. Accessible adult toilet rooms or compartments: semi-recessed Bobrick B-4388 or B-3888, ASI-0031, Bradley 5412 (double roll tissue holder without paper roll spindle stops), or equal.

2. For Staff Restrooms:

   a. Non-accessible toilet compartments: Bobrick B-27460, ASI 0264-1A2, (double roll tissue holder), Bradley, or equal.

   b. Accessible toilet rooms or compartments:

      1) Semi-recessed Bobrick B4388 or 3888, ASI 0031, Bradley 5412 (double roll tissue holder without paper roll spindle stops), or equal.

      2) Surface mounted Bobrick B-27460, ASI 0264-1A2, (double roll tissue holder), Bradley, or equal.

J. Paper Towel Boxes: Type 304 stainless steel, satin finish. Door with tumbler lock and piano hinge.

1. Surface mounted: Bobrick B-263, ASI 0245-SS, Bradley 252, or equal.

2. Semi-recessed: ASI 0457-2, Bradley 247-10, or equal.

3. Recessed: Bobrick B-35903, ASI 0457, Bradley 247, or equal.

K. Toilet Seat Cover Dispensers: Surface-mounted, Type 304 stainless steel, satin finish. Bobrick B-221, ASI 0477SM, Bradley, or equal.

L Sanitary Napkin Disposals

1. Disposals in non-accessible toilet compartments Surface-mounted, Type 304 stainless steel, satin finish, Bobrick B-270, ASI 0473-A, Bradley, or equal.

2. Disposals in accessible toilet rooms or compartments: recessed, semi-recessed or 3-inch maximum projection from wall surface; Bobrick B 353 (recessed), ASI 0473 (recessed), Bradley, or equal.

M. Liquid Soap Dispenser: 20 gage stainless steel, 40-ounce. capacity, tamper-proof cap and concealed vandal-proof mounting. Bobrick B-2111, Continental V 444SS, ASI 0347, or equal.

1. Provide with soap tray below.

N. Combination Paper Towel Dispenser/Waste Receptacle, Semi-recessed mounted, Type 304 stainless steel, satin finish. Bobrick model B-3944.

## 2.3 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. American Specialties, Inc.
   2. Bobrick Washroom Equipment, Inc.
   3. Bradley Corporation.

B. Mop and Broom Holder : Provided @ adjacent wall at each Floor Sink Location.
   1. Description: Anti-slip mop holders having spring loaded rubber cam that grips mop handles. Bobrick B239.
   2. Length: 36”.
   3. Mop/Broom Holders: 3, spring-loaded, rubber hat, cam type.
   4. 8” deep shelf and stainless steel rag hooks.
   5. Material and Finish: Stainless steel, No. 4 finish (satin).
   6. Bobrick model #B-224.

C. Custodial Shelf : Provided @ all EVS spaces. Coord exact location with Owner.
   1. Description: Anti-slip mop holders having spring loaded rubber cam that grips mop handles.
   2. Length: 36”.
   3. Mop/Broom Holders: 3, spring-loaded, rubber hat, cam type.
   4. 8” deep shelf and stainless steel rag hooks.
   5. Material and Finish: Stainless steel, No. 4 finish (satin).
   6. Bobrick model #B-224.

## 2.4 UNDER LAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: As applicable exposed locations. Provide at all exposed pipe/trap mounted sink locations. (not required at Accessible approach panel locations that physically separate from knees-pace)

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

B. Underlavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 450 lbf , when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 00

# SECTION 10 4413

# FIRE EXTINGUISHERS AND CABINETS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Section Includes:

1. Fire Extinguishers and Cabinets.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 04 2200 - Concrete Unit Masonry.

3. Section 06 1000 - Rough Carpentry.

4. Section 09 2900 - Gypsum Board.

### 1.02 SUBMITTALS

A. Shop Drawings: Indicate materials, sizes, anchorage, and installation details.

B. Product Data: Submit manufacturer's product literature, indicating product characteristics.

C. Material Samples: Submit manufacturer's standard cabinet color Samples for selection by Architect.

### 1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's wrapping to protect items.

B. Store items in a dry, enclosed area.

## PART 2 - PRODUCTS

### 2.01 FIRE EXTINGUISHERS AND CABINETS

A. Location: Fire extinguisher cabinets and fire extinguishers shall be installed where indicated on Drawings or as required by authorities having jurisdiction.

B. Manufacturer: Fire extinguishers and cabinets shall be manufactured by one of the following:

1. Potter-Roemer.

2. J. L. Industries.

3. Larsen's Manufacturing.

4. Modern Metal Products.

5. Waltrous.

6. Amerex (fire extinguishers).

7. Equal.

C. Fire Extinguisher Type: Provide a legally appropriate rechargeable fire extinguisher for every fire extinguisher cabinet and as otherwise indicated.

1. Classrooms, Corridors, Administration and Special Use Rooms, Cabinet mounted:

a. Type ABC multi-purpose dry chemical with UL rating 2A:10B:C, 5 pound size, also with red glossy polyester coated steel cylinder, pressure gage, hose and horn. Maximum Height: 15 ¼-inch. Maximum Cylinder Diameter: 4 ½-inch.

2. Underground Parking Structures, Cabinet mounted:

a. Type ABC multi-purpose dry chemical with UL rating 2A:20B:C, 10 pound. size, with red glossy polyester coated steel cylinder, pressure gage, hose and horn. Maximum Height: 20-inch. Maximum Cylinder Diameter: 5-inch.

3 Kitchens, Cabinet mounted:

a. Type BC multi-purpose dry chemical with UL rating 40B:C, 5 pound size, with red glossy polyester coated steel cylinder, pressure gage, hose and horn, Maximum Height: 15 ¼-inch, Maximum Cylinder Diameter: 4 ½-inch . K type (wet chemical) for suppression system back-up. UL Rating 2A:K, 6 liters, 2 ½ gallons, with heavy duty stainless steel cylinder, internal diameter not to exceed 7 inches.

4. LAN Rooms, Bracket mounted:

a. Type Halotron 1, EPA approved "Clean Agent" with UL rating 5B:C, 5 pounds size, with red glossy polyester coated steel cylinder, discharge nozzle and bracket. Maximum Height: 15 ¼-inch. Maximum Cylinder Diameter: 6-inch. Provide 16 gage steel bracket by same manufacturer as extinguisher.

5. Electrical, Science Rooms, Boiler, Fan, Heating Rooms, bracket mount:

   a. Type $CO_2$, carbon dioxide gas, with UL rating 5B:C. 10B:C, (5 pounds with red glossy polyester coated aluminum cylinder, hose and horn. Maximum Height, (not exceed): 17 ¾-inch. Maximum Cylinder Diameter, (not to exceed): 5 ¼-inch.

D. Fire Extinguisher Requirements:

1. Design Specification:

   a. Finish: Corrosion and impact resistant red epoxy.

   b. Valve Stem Assembly: Metal, reusable, connects to cylinder by threaded pipefitting, aluminum or steel siphon tube, and shatter resistant plastic face gage.

   c. Gage (if applicable) to Indicate: "Recharge," "fully charged (195 PSI)," and "over charge."

   d. Pull Pin: Metal, reusable and securely fastened to unit with metal, aluminum chain or very heavy plastic line approximately 4 ½-inch long.

   e. Mechanical Operation: Pistol grip, heavy duty metal handle (plastic not permitted), and shall be operated by a grip and squeeze lever.

2. Manufacturer Identification/Information: Manufacturer's name, date manufactured, model number, U.L. approval seal and number, contents operating instructions, Fire Marshall approval, etcetera shall be identified on the Fire Extinguisher.

3. Warning and First Aid Label: Fire extinguisher must indicate all standard warnings concerning breathing, eyes, skin and ingestion. Provide emergency and first aid procedures.

4. Repair Parts: The manufacturer and/or their representative shall maintain within the Los Angeles Metropolitan Area an adequate stock of replacement parts, available for immediate delivery.

6. Warranty:

   a. Manufacturer shall provide a five year material warranty.

   b. Installer shall provide a five year installation warranty.

7. Material Safety Data Sheet: Provide an MSDS sheet with every shipment.

E. Fire Extinguisher Cabinet: Potter-Roemer cabinets are listed as the standard of quality, products by other listed manufacturers are acceptable.

1. Fully recessed cabinet: Provide fully recessed, square trim edge cabinet with ½ inch projection:

    a. Potter-Roemer Fire Extinguisher Cabinet 7020:

        1) Door Style: either DVL (Duo Vertical Panel with lock) or E (Center Break Glass with lock), glass to be clear tempered safety glass.

        2) Cabinet Door and Frame: Cold rolled steel electrostatically applied, thermally fused polyester coating with recoatable white finish.

        3) Identification Lettering: Cabinet door to be furnished with die cut lettering indicating "FIRE EXTINGUISHERS" in contrasting color to cabinet finish, and either vertical or horizontal lettering depending upon door style.

2. Semi-recessed cabinet: Provide semi-recessed, square trim edge cabinet with 1 1/4 inch to 2-inch projection:

    a. Potter-Roemer Fire Extinguisher Cabinet 7022:

        1) Door Style: either DVL (Duo Vertical Panel with lock) or E (Center Break Glass with lock), glass to be clear tempered safety glass.

        2) Cabinet Door and Frame: Cold rolled steel with electrostatically applied, thermally fused polyester coating with recoatable white finish.

        3) Identification Lettering: Cabinet door to be furnished with die cut lettering indicating "FIRE EXTINGUISHERS" in contrasting color to cabinet finish, and either vertical or horizontal lettering depending upon door style.

3. Surface mounted cabinet: Provide surface mounted, square trim edge cabinet:

    a. Potter-Roemer Fire Extinguisher Cabinet 7024:

        1) Door Style: either DVL (Duo Vertical Panel with lock) or E (Center Break Glass with lock), glass to be clear tempered safety glass.

        2) Cabinet Door and Frame: Cold rolled steel with electrostatically applied, thermally fused polyester coating with re-coatable white finish.

3) Identification Lettering: Cabinet door to be furnished with die cut lettering indicating “FIRE EXTINGUISHERS” in contrasting color to cabinet finish, and either vertical or horizontal lettering depending upon door style.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Installation shall be in accordance with manufacturer’s recommendations.

B. Cabinets shall be installed plumb and level, where indicated on Drawings, at heights required by authorities having jurisdiction.

### 3.02 PROTECTION

A. Protect the Work of this section until Substantial Completion.

### 3.03 CLEANUP

A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION

**SECTION 10 44 16**

**PORTABLE FIRE EXTINGUISHERS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 10 44 13 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FM Global.

### 2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
1. Manufacturers: JL Industries or Larson Manufacturing Company
   a. Product: Cosmic 6E
   b. Nominal Capacity: 6 lb
   c. U/L Rating: 3A 40BC

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
5. Certification approval card

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Provide “date approved card” certified at turnover for the following 12 month period.

## 3.2 INSTALLATION

A. General: Install fire extinguishers in fire extinguisher cabinets specified elsewhere. Use multipurpose dry chemical type in all locations.

END OF SECTION 10 44 16

# SECTION 102814 - BABY CHANGING STATIONS

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Baby Changing Stations, Stainless Steel:
   1. Recessed-mounted horizontal design. (Koala Model KB310-SSRE)
   2. Recessed-mounted horizontal design with matte black finish. (Koala Model KB310-SSRE-MBLK)

### 1.2 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry, blocking in walls.

B. Section 092216 – Non-Structural Metal Framing, blocking in walls.

C. Section 093013 – Ceramic Tiling, coordination with tile layout and installation.

### 1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data sheets for each product specified, including the following.
   1. Installation instructions and recommendations, including templates and rough-in measurements.
   2. Storage and handling requirements and recommendations.
   3. Cleaning and maintenance instructions.

### 1.4 QUALITY ASSURANCE

A. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.

B. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA, ICC A117.1, International Building Code (IBC), and state building code requirements as applicable.

C. Baby Changing Stations: Provide products which comply with the following standards and requirements.
   1. Antimicrobial Treatment: Changing surfaces embedded with Microban®, with antibacterial claim substantiated by Kirby-Bauer test or other manufacturer approved equivalent standard industry test methodology.
   2. Americans with Disabilities Act (ADA).
   3. ICC A117.1 - Accessible and Usable Building and Facilities.
   4. ANSI Z535.4 - Product Safety Signs and Labels.
   5. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use.

6. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
7. TAS – Texas Accessibility Standard
8. European Standards: EN 12221 Changing units for domestic use.
9. CPSIA: Conformity with the U.S. Product Safety Commission product safety rules, bans, standards and regulations that include applicable chemical compliance requirements.

D. Manufacturing Location: United States.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.6 WARRANTY

A. Manufacturer's Warranties: Submit manufacturer's standard 5 year warranty for materials and workmanship and include a provision for replacement caused by vandalism.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Products: Based on the quality and performance requirements of the project, specifications are based solely on the products of Koala Kare Products, a Division of Bobrick, www.koalabear.com. Location of manufacturing shall be the United States.

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

2.2 BABY CHANGING STATIONS, STAINLESS STEEL

A. Recessed-Mounted Horizontal Design Stainless Steel Changing Station:
1. Basis of Design: Model KB310-SSRE with external stainless steel bag hook as manufactured by Koala Kare Products, a Division of Bobrick.
2. Basis of Design: Model KB310-SSRE-MBLK in matte black finish with external stainless steel bag hook as manufactured by Koala Kare Products, a Division of Bobrick.
3. Handles: Station shall have two solid handles that allow operation with less than 5 lbs. of force. Handles rest below 27" for cane detection when unit is in the down position.
4. Front Panel shall be deep drawn, one-piece, seamless, 18-8, Type 304, 20 gauge (0.91mm) stainless steel with satin finish and laser etched logo with rounded corners.
5. Aesthetics: Unit shall have no plastic covering or visible plastic on the front of the unit and no adhesive labels applied to the front panel.

6. Flange: Deep drawn, one-piece seamless, 18-8, Type 304, 18 gauge (1.2 mm) stainless steel with satin finish. Flange edges and corners shall have radii that complements the arc on the top, bottom, and side edges of the front panel.
7. Frame and Hinge Mechanism: Concealed 11-gauge chassis, compromised of 1" diameter integral steel-tubing that supports the changing bed and interacts with 11-gauge steel wall mounting bracket to provide steel-on-steel hinge stop. The wall frame shall serve as wall-mounting bracket.
8. External Diaper Bag Hook: 18-8, Type 304, 3/4 inch (19mm) diameter, wall-mounted, solid stainless steel rod with satin-finish.
9. Bed Surface: injection molded polypropylene with Microban® antimicrobial additive, and ISO 22196 tested for efficacy.
10. Surface is contoured, concave and smooth. Bed surface shall be minimum 535 sq. in.
11. Performance: Unit has minimal deflection from 90 degrees with a 200 lbs. static load placed in the center of the changing surface. Unit exceeds ASTM Standard F2285 static load requirement of 100 lbs.
12. Complies with requirements applicable in the jurisdiction of the project, including but not limited to ADA, TAS, ICC A117.1, International Building Code (IBC), and state building code requirements as applicable. Also complies with ASTM Standard F2285, Standard Consumer Safety Performance Specification for Diaper Changing Stations for Commercial use and EN 12221 for changing units for domestic use.
13. Dual Cavity Dispenser: Includes integral spring tab to make dispensing bed liners and diaper disposal sacks easier. Total 50 liner capacity. Equipped with tumbler lock, keyed alike Bobrick restroom accessories.
14. Operation: Concealed pneumatic cylinder providing controlled opening and closing of the changing station bed.
15. Instruction Graphics: Universal instruction graphics and safety messages in multiple languages.
16. Safety Straps: Replaceable, restraining straps.

## PART 3 EXECUTION

### 3.1 INSTALLATION

A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
   1. Verify wall blocking has been installed properly.
   2. Verify wall location does not interfere with door swings or use of fixtures.
   3. Use fasteners and anchors suitable for wall substrate and project conditions.
   4. Install units at location and height indicated on the Drawings.
   5. Install units level, plumb and in proper relationship with adjacent construction.
   6. Adjust for proper operation.

### 3.2 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 11 51 23 - LIBRARY STACK SYSTEMS

PART 1 – GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this section.

1.1 SUMMARY

A. Section Includes: Provide cantilever library bookstack shelving systems.

1.2 REFERENCES

A. American Library Association - Library Technology Reports, Tennsco Corporation

B. ANSI Z 39.73 - Single-Tier Steel Bracket Library Shelving

C. ASTM A 1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake Hardenable.

D. American Institute of Steel Construction - Standards for steel materials used for fabrication.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-installation Meeting: After approval of submittals but prior to starting installation of work of this section, hold a meeting at the site attended by the Architect, Inspector, Contractor, library stack shelving installer, and a technical representative of the library stack shelving manufacturer. The installer and material manufacturer's technical representative shall inspect the conditions to receive work of this section and report defective conditions to Architect and Contractor.

B. Scheduling: The work of this section shall not commence until rough work within the areas to receive library stack system is complete. Finish work, including painting and installation of ceilings shall be complete. Heating, ventilating and air conditioning system work shall be in place and operating.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data:

1. Provide complete manufacturer’s catalog, showing components and accessories proposed for use.

C. Include manufacturer's designated Southern California Area Representative.

D. Shop Drawings: Provide complete shop drawings, showing plans, elevations of each shelving type, layout, relationship and connections to structure. Provide details of erection and assembly. Identify shelving and components by types noted on drawings and in this section. Provide dimensioned drawings for each type of shelving and each component.

E. Selection Samples: For initial selection of colors, submit manufacturer’s color chart showing full range of standard colors. Vendors must provide a minimum of 12 color selections.

F. Samples: Submit color samples, not smaller than 2 inches by 3 inches showing all available colors.

1. If deviations from this specification are proposed, submit one 90" high by 36" wide by 20" deep shelving unit for review. Each component of shelving unit shall bear labels indicating gauge of steel.

G. Seismic Calculations: Provide calculations, prepared and signed by a professional engineer registered in the State of California. Calculations shall show compliance with applicable codes and specified seismic requirements.

H. Manufacturer's Experience Qualifications: Submit evidence, satisfactory to Architect, of manufacturer's experience record as specified. Submit list of not less than 10 projects in the greater Los Angeles area, completed within the last 5 years.

I. Installer's Experience Qualifications: Submit list of not less than 5 projects, extending over a period of not less than 5 years, indicating installer's experience record. Submit letter from manufacturer showing manufacturer's approval for installer of the products.

J. Installation Instructions: Submit manufacturer's printed installation procedures.

K. Certification: Submit a letter from the manufacturer stating compliance with all specifications. Include a listing of steel gauges for each component. List any deviations for each item where the proposed product does not meet the specifications.

1.5 QUALITY ASSURANCE

A. Seismic Requirements: Conform to the 2022 California Building Code. The entire bookstack system anchorage shall be capable of resisting a lateral seismic force, Fp per ASCE 7-16 section 13.3.1, in the most critical direction, acting simultaneously with a vertical seismic force specified in ASCE 7-16 section 13.3.1. All allowable stresses and other design criteria shall be as permitted by the applicable code or ICC evaluation report. Wp used in calculating Fp is defined here as the weight of the shelving system plus the weight of the material stored.

B. Source Limitations: Obtain library stack shelving system through one source from a single

vendor.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver products in manufacturer's original packaging, with trade names and labels intact. Library stack shelving components shall not be delivered to site until building is complete, finish flooring is installed, and the area is clean, free from debris and ready for installation.

B. Storage and Handling Requirements: Store products in a clean, dry, interior location. Handle in manner to avoid damage to products and finishes.

1.7 SITE CONDITIONS

A. Field Measurements: Verify quantities of library bookstack units before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

1.8 WARRANTY

A. Manufacturer Warranty: Provide manufacturer's 5-year warranty against defects in materials and workmanship.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURER:

A. Estey, A Division of Tennsco Corp.
201 Tennsco Drive
Dickson TN 37056-1888
(800) 251-8183
(615) 446-8000
FAX (800) 722-0134
www.tennsco.com
e-mail: infotenn@tennsco.com

Represented in Southern California by
Parker Braverman
Yamada Enterprises
16552 Burke Lane
Huntington Beach CA 92647
(714) 843-9882
FAX (714) 843-8202
www.yamadaenterprises.com
e-mail: parker@yamadaenterprises.com

2.2 BASIC MATERIALS:

A. Steel: Conform to ASTM A 1008/A1008M, cold rolled double annealed, fully pickled and free from scale and buckles.

B. Plastic laminate: As selected by Architect or as indicated on drawings.

2.3 SYSTEM DESCRIPTION

A. Shelving shall be of cantilever design and manufactured in true unit construction. Each book stack section shall be capable of removal as a modular unit from any range without disturbing adjacent units. Relocation and reuse of removed sections can be accomplished without requiring additional parts.

B. The uprights and cross member supports make up the fully welded frame construction. Uprights shall be punched for bolting additional weld frame units into the book stack range. Shelving design shall allow for either static or mobile installation. Starter/Adder and/or diagonal sway-braced systems are not acceptable.

C. Capacity: Each shelf shall have a minimum clearance between end brackets of 35-13/32 inch. Unit widths shall be 36 inches nominal overall. Units shall be capable of supporting 50 pounds evenly distributed weight per linear foot of shelving, multiplied times the number of shelves per unit, without deflection considered excessive by industry standards.

2.4 ESTEY 2-INCH WELD FRAME LIBRARY SHELVING:

A. Upright Columns of the Welded Frame:

1. Form of not less than 14-gauge steel into a channel shape with 3/4-inch stiffening flanges on the inside of the upright. Overall dimensions shall be 2 inches in the web and 1-1/4 inch across the front and rear area surfaces.

2. Each welded frame shall consist of 2 uprights, each with 4 right angle bends, for a total of 8 right angle bends per welded frame.

3. Uprights shall be perforated the full height with a series of 1/4 inch by 5/8-inch slots spaced one inch on vertical centers and located within 5/16 inch of the outer web surface. Every fifth and sixth slot shall have square corners as viewed against the remaining rounded corner slots to aid visual alignment of shelves. This pattern shall be repeated over the full height of the upright.

B. Top Spreaders of the Welded Frame:

1. Minimum 14-gauge steel closed tube measuring not less than one inch by 3 inch in cross section. Spreader shall be electrically welded to uprights in appropriate locations to minimize sway.

C. Bottom Spreaders of the Welded frame:

1. Minimum 16-gauge steel channel shape measuring not less than one inch by 1-3/4 inch in cross section. The outer ends of the channel shall be punched to receive leveling nuts and floor levelers.

2. Bottom spreader shall be electrically welded to uprights with open portion of channel positioned upward. Welded frames shall be of heights and widths as specified. Provide 2 adjustable inverted hex type floor levelers for each bottom spreaders. Floor levelers shall be attached to bottom spreaders with snap fit "T" nuts.

D. Leveler shall be located 1-5/16 inches from the front edge of the bracket and shall have 5/16-18 threads that run 1-1/4 inches to allow for compensation of uneven floors. The base of the leveler shall be 3/32 inches thick and shall be hexagonal in shape with a 3/4-inch measurement across the flats. The top of the level shall be made to accept a 1/4-inch socket to allow for easy adjustment of the units.

E. Seismic Gussets: Form gussets from not less than 16-gauge steel in a trapezoid shape. The height shall be 39 inches finishing flush to the front and back of the unit. The bottom of each gusset shall have a one-inch flange for the gusset to rest on. Attach gussets at 3 points in the weld frame via 1/4-20 nuts and bolts. In addition, the gusset shall be bolted to the base brackets to provide additional strength. Floor anchoring holes in the gusset shall align with the base bracket holes to allow the anchors to pass through both components.

F. Adjustable Base Brackets shall be designed to fit snugly in and around welded frame upright. Formed of not less than 16-gauge steel with front and top faces flanged on a 5/16" radius and the exposed corner smoothly rounded to prevent damage to books (sloped front edge is not permitted). Brackets shall have a 90-degree flange at bottom which will rest on floor covering and provide for floor anchorage. Top and front edge of base bracket shall be flanged outward approximately 1/4 inch and profile of this bracket shall match that of adjustable shelves and bracket and in addition shall have a hole in the embossment for attaching adjoining base brackets with fastener contained within the embossment.

G. Recessed Kickplates: One-piece construction, formed of not less than 20-gauge steel, 36 inches wide, 3 inches high, painted black powder epoxy or same color as shelving. Kickplate shall have top and bottom flanges for stiffening. Return flanges at both ends of the kick strip shall have elongated holes for bolting to the base bracket. Kickplate shall be adjustable to allow for unlevel floors.

H. End Brackets:

1. Shelf end brackets: Formed of not less than 16-gauge steel with front and top faces flanged on a 5/16" radius and the exposed corner smoothly rounded to prevent damage to books (sloped front edge is not permitted). The rear edge shall have 2 crimped hooks at the top for engaging frame upright slots, and a positioning tab at the bottom to prevent accidental dislodgement. The bracket shall incorporate 2 lances with protruding dimples in the sides for securing shelf side flanges. Bracket design allows for shelf adjustment upward and downward (i.e. "walking-the-shelf")

without disturbing any of the other shelves. Emboss bracket to prevent overlapping of adjoining brackets. Brackets shall extend not less than 6 inchs above the shelf surface.

I. Adjustable Base Shelves

1. Integral back base shelves: Formed from not less than 18-gauge steel into a one-piece construction designed to fit snugly around base brackets without the need for fasteners. Front height shall be 3-5/16 inches, built in backstop shall be 2 inches and sides have stiffening flanges. Provide one sliding wire divider per base shelf.

2. Multipurpose base shelves: Formed of 18-gauge steel with the front and rear edges having a box-formed, 13/16-inch-high profile. The nominal depth of the shelf shall be 2 inch greater than the actual dimension when used in a flat shelf position. The sides of the shelf shall be flanged for locking into base bracket lances. The shelf also shall have a form that is 5-3/8-inch depth to allow the shelf to be installed in a sloped position. When in the sloped position the shelf shall have an angle of 20 degrees.

3. Periodical base shelves: Hinged to shelf brackets, which engage in slots in the upright. Sloped display shelves shall be 14-inch actual height with a 1-5/16-inch flange at the bottom and boxed flanged upwards with inside safety hem. A 12-inch-deep nominal storage shelf shall be included to store back issues. Brackets allow for a slope of approximately 17 degrees from vertical. Each periodical shelf shall have a minimum clearance of not less than 7 inches when display shelf is in the upright position. Sloped shelves shall be equipped with rubber bumpers for sound deadening and shall remain positively in the open position.

J. Adjustable shelves:

1. One piece divider shelf with back: Formed from 18-gauge steel into a one-piece construction with the front edge having a box-formed, 13/16 inch high profile. The rear edge shall be formed up to create a 6-7/16-inch-high backstop. Shelf and backstop shall be slotted on one inch centers to accept adjustable dividers. The nominal depth of the shelf shall be one inch greater than the actual dimension. The sides of the shelf shall be flanged for locking into end bracket lances. Provide five dividers per shelf. Dividers shall have an overall height of 7-7/16 inch.

2. Integral back shelves: Formed from 18-gauge steel into a one-piece construction with the front edge having a box-formed 13/16-inch-high profile. The rear edge shall be formed up to create a 2-inch integral back formed to accept a sliding wire book support. The nominal depth of the shelf is one inch greater than the actual dimension. The sides of the shelf shall be flanged for locking into end bracket lances. Provide one sliding wire book support per shelf.

3. Multipurpose shelves: Formed of 18-gauge steel with the front and rear edges having a box-formed, 13/16-inch-high profile. The nominal depth of shelf shall be 2 inches greater than the actual dimension when used in a flat shelf position. The

sides of the shelf shall be flanged for locking into end bracket lances. The shelf shall have a form that is 5-3/8 inches deep to allow the shelf to be installed in a sloped position. When in the sloped position the shelf will have an angle of 20 degrees.

4. Periodical display shelves: Hinged to shelf brackets, which engage in slots in upright. Sloped display shelves shall be 14-inch actual height with a 1-5/16 inch flange at the bottom and boxed flanged upwards with inside safety hem. A 12-inch-deep nominal storage shelf shall be included to store back issues. Brackets allow for a slope of approximately 17 degrees from vertical. Each periodical shelf shall have a minimum clearance of not less than 7 inches when display shelf is in the upright position. Sloped shelf shall be equipped with rubber bumpers for sound deadening and shall remain positively in the open position.

2.5 ACCESSORIES:

A. Sliding wire divider: A cast nylon block shall engage into the upturned rear lip of the integral back adjustable or base shelf. A 1/4-inch diameter chrome wire, approximately 6 inches high, formed in a "D" formation shall be affixed to the plastic block and slide smoothly along the rear lip of the shelf. Sliding book supports shall be readily adjustable and capable of supporting normal loads imposed by shelved books.

B. Shelf dividers: Formed of not less than 20-gauge steel. Each divider shall have 3 hooks, one on the bottom and 2 on the rear. These shall allow for the divider to be installed, removed and relocated with ease.

C. Canopy brackets for wood tops: Integral bracket supports for wood/HPL canopy tops shall be formed of 14-gauge steel. Brackets shall have 3 hooks at the rear to engage the column slots and permit easy adjustment of top with maximum possible protection against dislodgment. Brackets shall be fastened to the top with galvanized steel angles.

D. Upright closure strips: Used to enclose the upright when stack lighting is used. Closure strip is removable for ease of maintenance to wiring for stack lighting.

E. Wall clip: Form from not less than 11-gauge steel one inch wide formed into a 2 inch by 3-inch angle. The angle shall have two 5/8 inch by 5/16-inch attachment slots 5/8 inch from each leg end. There shall be a 5/16-inch diameter hole 1-5/8 inches from the 3-inch leg end for attaching single faced units to the wall.

F. Steel canopy tops: Formed of not less than 19-gauge steel. Tops have a 13/16-inch front edge and extend the full width and depth of the unit base. Tops shall be supported by 14-gauge brackets engaged in slots in the frame upright. Provide on all 78”H and 90”H units as noted on plan.

G. Continuous canopy tops: Shall be 1-1/4”-thick MDF core with high-pressure laminate on both faces and 3mm PVC edge on all sides. Provide as noted on plan on 45”H units.

H. High-pressure laminate end panels: Panels shall be 1” thick MDF core with high-pressure laminate on both faces and a 3mm PVC on all sides. Provide at all range ends. On units

with stack lighting, end panel must cover the stack lighting light box housing.

I. Worden Verge Lite mobile shelving: Series of straight, curved, custom and bench units with a fixed center shelf and lockable Shepherd casters. Panel faces are high-pressure laminate with a 3mm PVC edge on all sides.

J. Magbox (standard) #3521. Quantity of 27 required.

K. Bartco/Estey LED stack lighting: Shall include a custom 3"H light box housing designed to seamlessly integrate with Estey cantilever shelving. Fixture is 2-1/4" O.D. Tubular Series with slender aluminum arms projecting the rotatable fixture. LEDs shall be 90+ CRI 3000K linear regular light output with 830 lumen per foot and shall be dimmable. Lens is extruded acrylic with medium frost. Arms and fixtures shall be Satin Silver finish. The housing will also include a 9'L uplight. Housing shall be painted to match the steel shelving. Provide motion sensors as required.

2.6 FINISH:

A. Finish of all components shall be epoxy powdercoat applied electrostatically. The finish shall have a minimum thickness of 1.0 to 1.8 mils, semi-gloss (ASTM D 523, gloss rating 40-50) in color or colors as indicated or as selected.

1. Abrasion resistance: The finish requires a minimum of 60 liters of sand to remove finish to bare metal, as determined by Library Technology test guidelines.

2. Adhesion of finish:

a. Bending: Parallel and transverse, no effect, as determined by Library Technology test guidelines.

b. Impact: Finished side and back side, no effect, as determined by Library Technology test guidelines.

3. Chemical resistance:

a. Alcohol, Isopropyl, 95 percent: No effect.

b. Acetic acid, 10 percent: No effect.

c. Machine oil: No effect.

d. Household Ammonia, undiluted: No effect.

e. Lye, 10 percent solution: No effect.

4. Washable.

5. Fade resistant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect areas to receive library stack shelving. Verify that temperature and humidity conditions of spaces are stable and approximately as conditions for the completed project. Verify that floor finishes are installed and that floors are level within tolerances required for satisfactory installation.

3.2 PREPARATION

A. Surface Preparation: Clean floor surfaces to receive library stack shelving.

3.3 INSTALLATION

A. Install shelving as indicated on approved submittals and in accordance with manufacturer's printed instructions. Rigidly anchor to floors and walls.

B. Adjustment: Adjust leveling devices so that finished columns are in straight rows and plumb; and shelving is level and in alignment.

3.4 FIELD QUALITY CONTROL:

A. Replace or repair components that are damaged due to shipping and or handling. Replacement components shall match existing units in color, design and function. There shall be no evidence of components that have been replaced.

3.5 CLEANING

A. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

END OF SECTION

## SECTION 22 00 00

## GENERAL PLUMBING REQUIREMENTS

### PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The General conditions, supplementary conditions, special Requirements, and applicable portions of Division 1 of the specification are a part of this Division and the requirements contained herein are supplementary to them.

B. This Division is an integrated whole comprising interrelated and interdependent sections and shall be considered in its entirety in determining requirements.

C. Refer to other sections of this Division for additional requirements or information regarding the subjects of this Section.

1.2 ABBREVIATIONS AND DEFINITIONS (as used on Division 23 Drawings and herein)

A. This Division is abbreviated and includes incomplete sentences. Supply omitted words by inference.

B. Symbols: "S" means submittals are required; "M/O" means Maintenance/Operating data is required; see paragraphs hereinafter.

C. "Provide" means furnish, install and connect unless otherwise described in specific instances.

D. "Piping" means pipes, fittings, valves and all like pipe accessories connected thereto.

E. "Extend", "Submit", "Repair", "Abandon", "Replace", "Remove" and similar words mean that the Contractor (or his designated subcontractor) shall accomplish the action described.

F. "Codes" or "Code" means all codes, laws, statutes, rules, regulations, ordinances, orders, decrees, and other requirements of all legally constructed authorities and public utility franchise holders having jurisdiction.

G. "Products", "Materials" and "Equipment" are used interchangeably and mean materials, fixtures, equipment, accessories, etc.

H. "Utility Areas" are defined as mechanical, electrical, janitorial, and similar rooms or spaces which are normally used or occupied only by custodial or maintenance personnel. "Public Areas" are defined as the rooms or spaces which are not included in the utility areas definition.

I. "Building Boundary" includes concrete walkways immediately adjacent to the building structure.

J. "Below Grade" means buried in the ground, unless noted otherwise.

K. "Substantial Plumbing Completion" means all components of all systems are functioning but lacking in final adjustment.

L. Pressure rating specified (such as for valves and the like) means design working pressure for and with references to the fluid which the device will serve.

1.3 DESCRIPTION

A. Provide a complete and operable installation, including all labor, supervision, materials, equipment, tools, apparatus, transportation, warehousing, rigging, scaffolding and other equipment and services necessary to accomplish the work in accordance with the intent and meaning of these drawings and specifications.

1.4 RELATED WORK

A. Coordination: Refer to Architectural, Civil, Structural, Mechanical and Electrical Drawings for the construction details and coordinate the work of this Division with that of other Divisions. Order the work of this Division so that progress will harmonize with that of other Divisions and all work will proceed expeditiously. The work of this Division shall include direct responsibility for the correct placing and connection of plumbing work in relation to the work of other Divisions.

B. Examine other Divisions for work related to the work of this Division especially Division 23 – MECHANICAL and Division 26 - ELECTRICAL.

1.5 EXISTING CONDITIONS

A. Visit the site prior to bidding and investigate the existing conditions which affect or will be affected by the work of this Division. Become thoroughly familiar with the working conditions and take into account any special or unusual features peculiar to this job. By the act of submitting a Bid, the Contractor will be deemed to have complied with the forgoing, to have accepted such conditions, and to have made allowance therefore in preparing his Bid.

B. The location of existing concealed utility lines are shown in accordance with reference data received by the Architect. The Architect does not guarantee the accuracy of such data. The points of connection are therefore approximate and the Bidder shall include adequate funds in his bid to cover costs of connection regardless of their exact location.

C. Exercise extreme caution during trenching operations. Repair the damage caused by such operations to existing utility lines at no cost to the Owner, whether the lines are shown on drawings or not.

1.6 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, request clarification.

B. The Architect shall interpret the drawings and the specifications, and his decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.

C. In case of conflict not clarified prior to Bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful bidder as soon as feasible after the Award and if appropriate a deductive change order will be issued.

D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option".

1.7 WATER (DOMESTIC AND FIRE), SANITARY (AND STORM) SEWERS AND NATURAL GAS SERVICE

A. Within 5 days after award of contract, notify the serving utilities that the project is under construction and apply for permanent service in the name of the Owner. Furnish pertinent load and location information to them including the required dates for permanent service. Verify service locations and conform to utility company requirements. Contractor shall pay charges for permanent service connections levied by the utilities for which he will be reimbursed by the Owner. The reimbursement shall be limited to the actual amount of the utility service charges and a copy of the billing from the utility company shall accompany the Contractor's invoice.

1.8 PERMITS AND INSPECTIONS

A. Obtain, schedule and pay for permits, licenses, approvals, tests, and inspections required by legally constituted authorities and public utility franchise holders having jurisdiction over the work.

B. Afford the Architect's representative every facility for evaluating the skill and competence of the mechanics and to examine the materials. Concealed work shall be reopened when so directed during his periodic visits.

1.9 CODES AND REGULATIONS

A. By submitting a bid, Contractor is deemed to represent himself as competent to accomplish the work of this Division in conformance with applicable Codes. In case of conflict between the Contract documents and the Code requirements, the Codes shall take precedence. Should such conflicts appear, cease work on the parts of the contract affected and immediately notify the Architect in writing. It shall be the Contractor's responsibility to correct, at no cost to the Owner, any work he executes in violation of Code requirements. Specify references to codes elsewhere in this Division are either to aid the Contractor in locating applicable information or to deny him permission to use options which are permitted by Codes.

B. Applicable Codes: (Current editions unless otherwise noted)

1. All local codes; city and/or County as applicable
2. OSHA requirements
3. California Building Code
4. California Mechanical Code
5. California Plumbing Code
6. California Code of Regulations (CCR) Titles
7. Fire Marshal Regulations
8. Regulations of all other authorities having jurisdiction.

C. Where conflict or variation exists among codes, the most stringent shall govern.

D. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.

E. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.

F. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.

G. Permits and Certificates of Inspection: Furnish the originals.

H. Testing procedures and test results required in this and other sections. Furnish 2 copies.

I. Other data required by other sections of this Division. Furnish 2 copies.

## 1.10 RECORD AND DOCUMENTATION

A. Accumulate the following and deliver to the Owner's representative prior to final acceptance of the work:

1. Record (As-Built) Drawings:

   a. Maintain in good order in the field office a complete set of prints for all work being done under Division 23. Update the drawings daily with neat and legible annotations in red ink showing the work as actually installed.
   b. The actual size, location and elevation of all buried lines, valve boxes, manholes, monuments, and stub-outs shall be accurately located and dimensioned from building walls or other permanent landmarks.
   c. Furnish the originals.

2. Operation and Maintenance Manual: Furnish an operation and maintenance manual covering the stipulated plumbing systems and equipment. Seven copies of the manual, bound in hardback binders or an approved equivalent, shall be provided to the Architect in accordance with the Division 1 section on Maintenance and Operation Manuals. Furnish one complete manual prior to the time that system or equipment tests are performed. Furnish the remaining manuals before the contract is completed. The following identification shall be inscribed on the cover:

   OPERATION AND MAINTENANCE MANUAL

   PROJECT TITLE.....

   CONTRACTOR.....

Provide a table of contents. Insert tab sheets to identify discrete subjects. Instruction sheets shall be legible and easily understood, with large sheets of drawings folded in. The manual shall be complete in all respects for all materials, piping, valves, devices and equipment, controls, accessories and appurtenances stipulated. Include as a minimum the following:

a. Updated approved materials list, shop drawings and catalog information of all items indicated by symbol "M/O" at titles or beginning of paragraphs.
b. System layout showing piping, valves and controls.
c. Wiring and control diagrams with data to explain detailed operation and control of each component.
d. A control sequence describing start-up, operation and shutdown.
e. Detailed description of the function of each principal component of the system.
f. Procedure for starting.
g. Procedure for operation.
h. Shut-down instruction.
i. Installation instructions.
j. Adjustments, maintenance and overhaul instructions.
k. Lubrication schedule including type, grade, temperature range and frequency.
l. Safety precautions, diagrams and illustrations.
m. Test procedures.
n. Performance data.
o. Parts lists, with manufacturer's names and catalog numbers.
p. Preventive maintenance schedule.
q. Service organization with name, address and telephone number.
r. Valve identification chart and schedule.
s. ASME certification

B. Standard Compliance: Where equipment or materials are specified to conform with requirements of standards of recognized technical or industrial organizations such as American National Standards (ANSI), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), Underwriters Laboratories (UL), American Refrigeration Institute (ARI), American Gas Association (AGA), or National Electrical Manufacturer's Association (NEMA), that use a label or published listing as a method of indicating compliance, proof of such conformance shall be submitted and approved. The label or listing of the specified organization will be acceptable evidence.

C. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.

D. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.

E. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.

F. Permits and Certificates of Inspection: Furnish the originals.

G. Testing procedures and test results required in this and other sections. Furnish 2 copies.

H. Other data required by other sections of this Division. Furnish 2 copies.

1.11 TOOLS

A. Provide all special tools needed for proper operation and routine adjustment and maintenance of systems and equipment. Deliver tools to Owner's representative and request a receipt for same.

**PART 2 -PRODUCTS**

2.1 MATERIALS AND EQUIPMENT

A. Standard Products: Materials and equipment shall be essentially the standard cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be their latest standard designs that comply with the specification requirements. Materials and equipment shall duplicate items that have been in satisfactory commercial or industrial use at least two years prior to bid opening. Where two or more units of the same type of equipment are required, these units shall be products of a single manufacturer. The components thereof, however, are not required to be exclusively of the same manufacturer. Each major component of equipment shall have manufacturer's name, address, model, and serial number on a nameplate securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

B. Whenever on the plans, or in these specifications, products are identified by the name of one manufacturer, it is intended that equivalent products of other manufacturers are acceptable, unless otherwise indicated, if accepted as a substitution by the Architect. Where three or more manufacturers are listed as "acceptable manufacturers" however, then the products furnished shall be the product of one of the manufacturers listed. Manufacturers listed as "acceptable manufacturers" shall meet quality and performance of a particular one specified by both name and catalog number.

2.2 SUBSTITUTIONS

A. General: Should the Contractor desire to substitute for specified products, he shall submit with the Material List a complete list of the requested substitutions. The request shall contain complete descriptive information of the products. Samples for evaluation shall also be submitted upon the Architect's request. If in the Architect's opinion the products as presented in this first submittal are in variance with the specified products, or if the information submitted is not sufficiently complete to allow proper evaluation, the substitution will be disallowed from consideration and the specified products shall be furnished. By proposing a substitution, it is deemed that the Contractor shall bear the cost of any changes (whether architectural, structural, electrical or mechanical) necessary to accommodate the substitution.

B. Specific: Refer to other sections of this Division for additional requirements.

2.3 SUBMITTALS

A. General:

1. Provide for all items indicated with the symbol "S" at titles or beginning of paragraphs in accordance with the Division 1 section covering submittals and as herein specified. Where warranty of longer than one year is specified, include such warranty with submittal. Architect's review of the submittal is only for general conformance with design compliance with the information given in the contract documents. The submittal procedure is required as an effort to minimize the problems which occur due to the discovery of Contractor non-compliance at the construction site. The Contractor is responsible for conformation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination of work of all Divisions of the work. Deviations, if any, from Contract documents shall be clearly and completely indicated (by a separate letter if deviations are extensive) in the submittals, and the lack of such is deemed complete compliance with Contract Documents without any deviations. Submittals favorably processed will not relieve the Contractor of responsibility for deviations not so reported nor for errors in the submittal.
2. In addition to the above, upon permission to proceed after review of submittal and prior to the installation of work, submit dimensioned and scaled drawings (not less than 1/4-inch equal to one foot) of all mechanical equipment rooms and areas. Such layouts shall indicate, but not be limited to, all plumbing equipment, control panels, piping, housekeeping pads, ductwork, tube pull, access and maintenance clearances, and other like items. The layout shall also indicate major equipment to be provided under other Sections of work.
3. Contractor Stamp: All submittals shall be stamped with the following text and signed by the Contractors representative:

   "IT IS HEREBY CERTIFIED THAT THE PRODUCTS SHOWN AND MARKED IN THIS SUBMITTAL ARE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS AND CAN BE INSTALLED IN THE ALLOCATED SPACES EXCEPT WHERE NOTED AS DEVIATIONS.

   CERTIFIED BY:---------- DATE:----------

4. All submittals shall be complete and with catalog data and information properly marked to show, among other things, equality of material (where substitution is allowed and desired), adequacy in capacity and performance to meet minimum capacities of performance as specified or indicated. Arrange the submittals in the same sequence as these specifications, and reference (at the upper right-hand corner) the particular specification provision for which each submittal is intended. Incomplete submittals will be rejected.
5. For all work under Division 23, the notations by the Contractor or Supplier on submittal documents "Per Plans and Specifications", or "As Specified", or similar wording or phrasing is not acceptable and will be cause of rejection. Complete descriptive submittals are required for all Division 23 work.
6. Refer to the other sections of this Division for specific requirements.

B. Material List: Within 15 days after award of Contract, submit for approval a complete list of materials proposed for use. Furnish names and addresses of manufacturers, catalog numbers (where applicable) types and trade names. For purposes of uniformity, only one manufacturer will be accepted for each class or type of material. This list is in addition to Shop Drawings.

C. Shop Drawings: Submit shop drawings with such promptness as to cause no delay in the work. Do not commence fabrication of the equipment until the approved drawings are received from the Owner's representative.

D. Other Submittals: As required by other sections of this Division.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND INSTALLATION METHODS

A. Workmanship shall be in the best standard practice of the trade.

B. Execute the work so as to contribute to ease of operation and maintenance, maximum accessibility and best appearance. Execute it so that the installation will conform and adjust itself to the building structure, its equipment and its usage. The work shall be symmetrical, plumb, uniform, properly aligned, and firmly secured in place.

C. Install equipment in accordance with the manufacturer's instructions and recommendations unless otherwise noted or specified.

3.2 TESTS

A. General:

1. Demonstrate that all components of the work of this Division have been provided and that they operate in accordance with the Contract Documents.
2. Provide instruments and personnel for tests and demonstrations. Submit signed test results.

B. Specific: Refer to the other sections of this Division for test requirements.

3.3 DELIVERY, HANDLING, STORAGE OF MATERIALS AND PROTECTION OF WORK

A. Protect materials against dirt, water, chemical and mechanical damage both while in storage and during construction.

B. Cover materials in such a manner that no finished surfaces will be damaged, marred or splattered with plaster or paint, and all moving parts will be kept clean and dry.

C. Replace or refinish any damaged materials including fronts of control panels, ductwork fittings, and shop fabricated ductwork.

D. Keep cabinets and other openings closed to prevent entry of foreign matter.

3.4 CLEANUP AND HOUSEKEEPING

A. Cleaning shall be done as the work proceeds. Periodically remove waste and debris to keep the site as clean as is practical.

B. Leave exposed parts of the plumbing work in a neat, clean and usable condition, with painted surfaces unblemished and plated metal surfaces polished.

## 3.5 PROJECT CONDITIONS

A. Site Examinations and Conditions:

1. Regard information relative to existing conditions, services and structure as approximate only. Verify dimensions and locations, and be knowledgeable of all working conditions before submitting Bid. Verify pressure, location, size, and elevation of existing services (to which points of connection are to be made or crossed) as soon as possible and prior to commencement of any new work.
2. Make minor deviations necessary to conform to actual locations and conditions. Submission of Bid presumes proper examination of Site, locations, dimensions and conditions, and no additional cost will be honored for lack of such examinations.

B. Existing Services: Examine the Contract Drawings and visit the project site to ascertain the extent of the existing services. Where existing equipment/services serving existing structures and/or existing structures to be demolished are to remain in service, reroute, relocate, or extend such existing equipment and/or services to accommodate this project without additional cost.

C. Interruption of Existing Services: Where it is necessary to reroute existing services or utilities, or to make connections of new work to existing services or utilities, give timely written notice of such intent to the Owner and secure written approval before proceeding. Make all such interruptions at such time as permitted by the Owner. Anticipate such interruptions to be made outside of normal working hours or normal working days; therefore, no additional cost will be permitted for such work. Except in a case of emergency involving life, limb or health, do not operate any existing equipment (including valves). Where such operations are necessary, they shall be performed by the Owner's personnel.

D. Access and Placement of Work:

1. Check and coordinate for clearance, accessibility and placement of equipment either by going through openings provided or by placing equipment during construction. Ordering of equipment to be shipped, disassembled, or disassembly of equipment at Project Site and re-assembly of equipment to accomplish this requirement shall be executed without additional cost. Where provided openings are inadequate to accommodate equipment, provide new openings and restoration of same, all at no additional cost. Obtain written approval for new openings before proceeding.

2. Verify location of all plumbing fixtures and equipment within finished spaces with the Architectural Drawings. In the event that Plumbing Drawings do not indicate exact locations, or are in conflict with the Architectural Drawings, obtain information regarding proper locations. Installation of work without proper instruction under such circumstances will result in relocation of work, when directed, without additional cost.

E. Verification and Coordination: Drawings indicating suggested distribution routes are diagrammatic only, and all scaled and figured dimensions are approximate and are indicated for estimating purposes only. The Drawings do not indicate necessary offsets and like items. Do not construe Contract Drawings as fabrication drawings. Prior to fabrication and installation of work, verify all dimensions, sizes and distribution routes with actual conditions, and prepare submittal and fabrication drawings. Coordinate to avoid possible conflicts and resolve same where such exist. Install work to conform to structure, avoid obstruction, preserve headroom, and keep openings and passageway clear. Changes necessary, resulting from such verification and coordination, shall not be a cause for additional cost.

F. See Drawings for extent of demolition.

## 3.6 WARRANTY

A. Guarantee, in writing, all work against fault of any product or workmanship for a period of not less than one year after formal acceptance by the Owner; except, where longer periods are specified in the Specifications, such longer periods shall govern. However, when any component fails at any time during this period, the warranty period for such component and all other components that are inactive because of said failure shall be suspended. The warranty period for such component shall resume running for the remaining portion of the warranty period when failed component is completely repaired and in operation; however, in no case shall the resumed portion of the warranty period be less than 3 months in duration.

B. Neither payments for work, nor total or partial occupancy of work by the Owner, within or prior to the warranty period specified, shall be construed as acceptance of faulty work or shall condone any negligence of omission of Contractor in doing the work.

## 3.7 SAFETY REQUIREMENTS

A. Enclose and guard belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts in accordance with the OSHA 1910.219. Insulate, guard, and cover any high-temperature equipment and piping so located as to endanger personnel or creature a fire hazard.

## 3.8 MANUFACTURER'S RECOMMENDATIONS

A. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material or equipment being installed, furnish printed copies of these recommendations to the installing Contractor and Architect prior to installation. Do not proceed with the installation of the item until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

**END OF SECTION 22 00 00**

## SECTION 22 05 23

## GENERAL-DUTY VALVES FOR PLUMBING PIPING

### PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze swing check valves.
3. Bronze gate valves.

B. Related Sections:

1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.

1.2 SUBMITTALS

A. Product Data: For each type of valve indicated.

1.3 QUALITY ASSURANCE

A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

B. NSF Compliance: NSF 61 for valve materials for potable-water service.

### PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Handlever: For quarter-turn valves NPS 6 and smaller.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Solder Joint: With sockets according to ASME B16.18.

2.2 BRASS BALL VALVES

A. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. DynaQuip Controls.
c. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
d. Milwaukee Valve Company.
e. NIBCO INC.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Forged brass.
f. Ends: Threaded.
g. Seats: PTFE or TFE.
h. Stem: Brass.
i. Ball: Chrome-plated brass.
j. Port: Full.

2.3 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products from one of the following:

a. American Valve, Inc.
b. Crane Co.; Crane Valve Group; Crane Valves.
c. Milwaukee Valve Company.
d. NIBCO INC.
e. Powell Valves.
f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

g. Standard: MSS SP-80, Type 3.
h. CWP Rating: 200 psig.
i. Body Design: Horizontal flow.
j. Body Material: ASTM B 62, bronze.
k. Ends: Threaded.
l. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Jenkins Valves.
    c. Crane Co.; Crane Valve Group; Stockham Division.
    d. Hammond Valve.
    e. Kitz Corporation.
    f. Milwaukee Valve Company.
    g. NIBCO INC.
    h. Red-White Valve Corporation.

2. Description:

    a. Standard: MSS SP-80, Type 4.
    b. CWP Rating: 200 psig.
    c. Body Design: Horizontal flow.
    d. Body Material: ASTM B 62, bronze.
    e. Ends: Threaded.
    f. Disc: PTFE or TFE.

## 2.4 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Valve, Inc.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Division.
    e. Hammond Valve.
    f. Kitz Corporation.
    g. Milwaukee Valve Company.
    h. NIBCO INC.
    i. Powell Valves.
    j. Red-White Valve Corporation.
    k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    l. Zy-Tech Global Industries, Inc.

2. Description:

    a. Standard: MSS SP-80, Type 1.
    b. CWP Rating: 200 psig.
    c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    d. Ends: Solder joint.
    e. Stem: Bronze.
    f. Disc: Solid wedge; bronze.
    g. Packing: Asbestos free.
    h. Handwheel: Bronze.

B. Class 125, RS Bronze Gate Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Valve, Inc.
    b. Crane Co.; Crane Valve Group; Crane Valves.
    c. Crane Co.; Crane Valve Group; Jenkins Valves.
    d. Crane Co.; Crane Valve Group; Stockham Division.
    e. Hammond Valve.
    f. Kitz Corporation.
    g. Milwaukee Valve Company.
    h. NIBCO INC.
    i. Powell Valves.
    j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

    a. Standard: MSS SP-80, Type 2.
    b. CWP Rating: 200 psig.
    c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    d. Ends: Solder joint.
    e. Stem: Bronze.
    f. Disc: Solid wedge; bronze.
    g. Packing: Asbestos free.
    h. Handwheel: Bronze.

**PART 3 - EXECUTION**

3.1 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

3.2 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball, or gate valves.
2. Throttling Service: Ball valves.
3. Pump-Discharge Check Valves:

    a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
    b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Angle Valves: Class 125, bronze disc.
3. Ball Valves: One piece, full port, brass with brass trim.
4. Bronze Swing Check Valves: Class 125, bronze disc.
5. Bronze Gate Valves: Class 125, NRS.

B. Pipe NPS 2-1/2 and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
2. Iron Gate Valves: Class 125, NRS.
3. Iron Globe Valves: Class 125.

**END OF SECTION 22 05 23**

## SECTION 22 05 29

## HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

### PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe positioning systems.
6. Equipment supports.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:

1. Trapeze pipe hangers.
2. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Welding certificates.

1.4 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

**PART 2 - PRODUCTS**

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 THERMAL-HANGER SHIELD INSERTS

A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength and vapor barrier.

B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.4 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.5 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.6 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.7 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

**PART 3 - EXECUTION**

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. See Division 22 plumbing fixture Sections for requirements for pipe positioning systems for plumbing fixtures.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
    d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

## 3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

## 3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

## 3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

## 3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.

F. Use padded hangers for piping that is subject to scratching.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
3. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
4. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
5. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
6. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
7. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
8. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.

K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).

8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

P. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

**END OF SECTION 22 05 29**

## SECTION 22 05 53

## IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

### PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.

1.2 SUBMITTAL

A. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:

1. Material and Thickness: Aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches (38 mm) high.

**PART 3 - EXECUTION**

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Pipe Label Color Schedule:

1. Domestic Water Piping:

a. Background Color: White.
b. Letter Color: Black.

2. Sanitary Waste and Storm Drainage Piping:

a. Background Color: White.
b. Letter Color: Black.

**END OF SECTION 22 05 53**

## SECTION 22 07 19

## PLUMBING PIPING INSULATION

### PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic hot-water piping.
2. Domestic recirculating hot-water piping.
3. Roof drains and rainwater leaders.
4. Supplies and drains for handicap-accessible lavatories and sinks.

B. Related Sections:

1. Division 22 Section "Domestic Water Piping."

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

C. Field quality-control reports.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

## PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," and "Indoor Piping Insulation Schedule," articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 INSULATING CEMENTS

A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-84.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide products from one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

E. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

F. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide products from one of the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.4 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
b. Eagle Bridges - Marathon Industries; 405.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
d. Mon-Eco Industries, Inc.; 44-05.
e. Pittsburgh Corning Corporation; Pittseal 444.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F.
5. Color: White or gray.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
b. Eagle Bridges - Marathon Industries; 405.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

## 2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.

## 2.6 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. (34 g/sq. m) with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
b. Vimasco Corporation; Elastafab 894.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Johns Manville; Zeston.
b. P.I.C. Plastics, Inc.; FG Series.
c. Proto Corporation; LoSmoke.
d. Speedline Corporation; SmokeSafe.

2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White.
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

C. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
c. RPR Products, Inc.; Insul-Mate.

2. Finish and thickness are indicated in field-applied jacket schedules.
3. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
4. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
5. Factory-Fabricated Fitting Covers:

a. Same material, finish, and thickness as jacket.
b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
c. Tee covers.
d. Flange and union covers.
e. End caps.
f. Beveled collars.
g. Valve covers.

h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 428 AWF ASJ.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABI, Ideal Tape Division; 488 AWF.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
c. Compac Corporation; 120.
d. Venture Tape; 3520 CW.

2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

2.9 SECUREMENTS

A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping and Seals.

2.10 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Engineered Brass Company.
b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
c. McGuire Manufacturing.
d. Plumberex.
e. Truebro; a brand of IPS Corporation.
f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Truebro; a brand of IPS Corporation.
b. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

**PART 3 - EXECUTION**

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

## 3.3 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

## 3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers,

valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

## 3.5 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

## 3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer’s recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

## 3.7 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

## 3.8 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

## 3.9 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

## 3.10 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

    a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

## 3.11 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

## 3.12 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

## 3.13 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Hot and Recirculated Hot Water: Insulation shall be the following:

1. Flexible Elastomeric: 1 inch thick.

B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities: Insulation shall be the following:

1. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

3.14 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. PVC, Color-Coded by System: 20 mils thick.

D. Piping, Exposed:

1. PVC, Color-Coded by System: 20 mils thick.

3.15 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. PVC, Color-Coded by System: 20 mils thick.

D. Piping, Exposed:

1. PVC: 20 mils thick.

**END OF SECTION 22 07 19**

# SECTION 22 11 16

# DOMESTIC WATER PIPING

## PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Specialty valves.
3. Flexible connectors.
4. Water meters furnished by utility company for installation by Contractor.

1.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to ASCE/SEI 7.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61 for potable domestic water piping and components.

## PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

1. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
2. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

B. Soft Copper Tube: ASTM B 88, Type K water tube, drawn temper.

1. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

2. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

## 2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

B. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

## 2.4 SPECIALTY VALVES

A. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

## 2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

1. Description:

a. Pressure Rating: 250 psig at 180 deg F.
b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:

a. Factory-fabricated, bolted, companion-flange assembly.
b. Pressure Rating: 300 psig.
c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Description:

a. Non conducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig.
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

E. Dielectric Nipples:

1. Description:

a. Electroplated steel nipple.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Male threaded or grooved.

d. Lining: Inert and noncorrosive, propylene.

2.6 FLEXIBLE CONNECTORS

A. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 250 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

**PART 3 - EXECUTION**

3.1 EARTHWORK

A. Comply with requirements in Division 32 Section "Sitework Concrete" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

D. Install shutoff valve, hose-end drain valve, strainer, and test tee with valve, inside the building at each domestic water service entrance. Comply with Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "General–Duty Valves for Plumbing Piping" for pressure-reducing valves.

G. Install domestic water piping level without pitch and plumb.

H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

L. Install piping adjacent to equipment and specialties to allow service and maintenance.

M. Install piping to permit valve servicing.

N. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

O. Install piping free of sags and bends.

P. Install fittings for changes in direction and branch connections.

Q. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.

H. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Piping: Join according to ASTM D 2855.

J. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

## 3.4 VALVE INSTALLATION

A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.

B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

## 3.5 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. NPS 1-1/2and Smaller: Fitting-type coupling.
2. NPS 2and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition unions.

## 3.6 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 Smaller: Use dielectric unions.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4Use dielectric nipples.

D. Dielectric Fittings for NPS 5 to NPS 6: Use dielectric flange kits.

## 3.7 FLEXIBLE CONNECTOR INSTALLATION

A. Install stainless-steel-hose flexible connectors in steel domestic water piping.

## 3.8 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2and larger.

## 3.9 IDENTIFICATION

A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

B. Label pressure piping with system operating pressure.

## 3.10 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

    a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
    b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.11 CLEANING

A. Clean and disinfect potable water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Under-building-slab, domestic water piping, NPS 2and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; and brazed joints.

D. Aboveground domestic water piping, NPS 2and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L cast-copper solder-joint fittings; and soldered joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2and larger.
2. Throttling Duty: Use ball or globe valves for piping NPS 2and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2and larger.
3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

**END OF SECTION 22 11 16**

# SECTION 22 11 19

# DOMESTIC WATER PIPING SPECIALTIES

## PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following domestic water piping specialties:

1. Vacuum breakers.
2. Temperature-actuated water mixing valves.
3. Water hammer arresters.
4. Trap-seal primer valves.

B. See Division 22 Section "Domestic Water Piping" for water meters.

1.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig (860 kPa), unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

## PART 2 - PRODUCTS

2.1 VACUUM BREAKERS

A. Hose-Connection Vacuum Breakers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MIFAB, Inc.
b. Prier Products, Inc.

c. Woodford Manufacturing Company.

3. Standard: ASSE 1001.
4. Body: Bronze, non-removable, with manual drain.
5. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
6. Finish: Chrome or nickel plated.

2.2 TEMPERATURE-ACTUATED WATER MIXING VALVES

A. Primary, Thermostatic, Water Mixing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Symmons Industries, Inc.

2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig (860 kPa).
4. Type: Exposed-mounting, thermostatically controlled water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Valve Pressure Rating: 125 psig (860 kPa) minimum, unless otherwise indicated.
9. Tempered-Water Setting: 10 deg F (deg C).
10. Tempered-Water Design Flow Rate: 0.5 gpm (L/s).
11. Valve Finish: Polished, chrome plated.
12. Piping Finish: Copper.

2.3 WATER HAMMER ARRESTERS

A. Water Hammer Arresters:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. PPP Inc.
b. Sioux Chief Manufacturing Company, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

3. Standard: ASSE 1010 or PDI-WH 201.
4. Type: Copper tube with piston.
5. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

2.4 TRAP-SEAL PRIMER VALVES

A. Supply-Type, Trap-Seal Primer Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. MIFAB, Inc.
   b. PPP Inc.
   c. Sioux Chief Manufacturing Company, Inc.
   d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

3. Standard: ASSE 1018.
4. Pressure Rating: 125 psig (860 kPa) minimum.
5. Body: Bronze.
6. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
7. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
8. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

**PART 3 - EXECUTION**

3.1 INSTALLATION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

B. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and

C. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.

   1. Install thermometers and water regulators if specified.
   2. Install cabinet-type units recessed in or surface mounted on wall as specified.

D. Install water hammer arresters in water piping according to PDI-WH 201.

E. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

F. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

G. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

   1. Primary, thermostatic, water mixing valves.
   2. Supply-type, trap-seal primer valves.

3.2 FIELD QUALITY CONTROL

A. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

3.3 ADJUSTING

A. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

**END OF SECTION 22 11 19**

# SECTION 22 13 19

# SANITARY WASTE PIPING SPECIALTIES

## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following sanitary drainage piping specialties:

1. Cleanouts.
2. Floor drains.
3. Roof flashing assemblies.
4. Through-penetration firestop assemblies.
5. Miscellaneous sanitary drainage piping specialties.
6. Flashing materials.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FRP: Fiberglass-reinforced plastic.

C. HDPE: High-density polyethylene plastic.

D. PE: Polyethylene plastic.

E. PP: Polypropylene plastic.

F. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Retain paragraph and subparagraphs below if required by seismic criteria applicable to Project. Coordinate with Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."

C. Field quality-control test reports.

D. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agencies.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate size and location of roof penetrations.

**PART 2 - PRODUCTS**

2.1 CLEANOUTS

A. Metal Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

    a. Oatey.
    b. Sioux Chief Manufacturing Company, Inc.
    c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    d. Watts Drainage Products Inc.
    e. Zurn Plumbing Products Group; Light Commercial Operation.

3. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
4. Size: Same as connected branch.
5. Type: Threaded, adjustable housing.
6. Body or Ferrule: Cast iron.
7. Clamping Device: Not required.
8. Outlet Connection: Threaded
9. Closure: Brass plug with tapered threads.
10. Adjustable Housing Material: Cast iron with threads.
11. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
12. Frame and Cover Shape: Round.
13. Top Loading Classification: Heavy (Exterior) Medium (Interior) Duty.
14. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
15. Standard: ASME A112.3.1.
16. Size: Same as connected branch.
17. Housing: Stainless steel.
18. Closure: Stainless steel with seal.
19. Riser: Stainless-steel drainage pipe fitting to cleanout.

B. Cast-Iron Wall Cleanouts <WCO #>:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Watts Drainage Products Inc.
f. Zurn Plumbing Products Group; Specification Drainage Operation.

3. Standard: ASME A112.36.2M. Include wall access.
4. Size: Same as connected drainage piping.
5. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
6. Closure: Countersunk plug.
7. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
8. Wall Access: Round, deep, chrome-plated bronze cover plate with screw.
9. Wall Access: Round wall-installation frame and cover.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains <FD-#>:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Watts Drainage Products Inc.
e. Zurn Plumbing Products Group

3. Standard: ASME A112.6.3
4. Pattern: Floor.
5. Body Material: Gray iron.
6. Seepage Flange: Not required.
7. Anchor Flange: Not required.
8. Clamping Device: Not required.
9. Outlet: Bottom.
10. Coating on Interior and Exposed Exterior Surfaces: Not required.
11. Sediment Bucket: Not required.
12. Top or Strainer Material: Nickel bronze.
13. Top of Body and Strainer Finish: Nickel bronze.
14. Top Shape: Round.
15. Dimensions of Top or Strainer: 4 Inch
16. Top Loading Classification: Medium Duty
17. Funnel: Not required
18. Inlet Fitting: Not required.
19. Trap Material: Cast iron.
20. Trap Pattern: Standard P-trap.
21. Trap Features: Trap-seal primer valve drain connection.

2.3 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ProSet Systems Inc.

2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Fitting in subparagraph below is for use with plastic stacks.
6. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
7. Special Coating: Corrosion resistant on interior of fittings.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.

B. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

C. Sleeve Flashing Device:

1. Description: Manufactured, cast-iron fitting, with clamping device that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches (51 mm) above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

D. Stack Flashing Fittings:

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
2. Size: Same as connected stack vent or vent stack.

E. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

F. Expansion Joints:

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

2.5 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm) thickness.
2. Vent Pipe Flashing: 8 oz./sq. ft. (2.5 kg/sq. m or 0.27-mm) thickness.

C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch (1.01-mm) minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.

D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

E. Fasteners: Metal compatible with material and substrate being fastened.

F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

G. Solder: ASTM B 32, lead-free alloy.

H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

**PART 3 - EXECUTION**

3.1 INSTALLATION

A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.

B. Install cleanouts in above ground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
4. Locate at base of each vertical soil and waste stack.

C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:

    a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
    b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
    c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.

3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

F. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.

G. Assemble and install ASME A112.3.1, stainless-steel channel drainage systems according to ASME A112.3.1. Install on support devices so that top will be flush with surface.

H. Assemble non-ASME A112.3.1, stainless-steel channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

I. Assemble FRP channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

J. Assemble plastic channel drainage system components according to manufacturer's written instructions. Install on support devices so that top will be flush with adjacent surface.

K. Install fixture air-admittance valves on fixture drain piping.

L. Install stack air-admittance valves at top of stack vent and vent stack piping.

M. Install air-admittance-valve wall boxes recessed in wall.

N. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

O. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

P. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.

Q. Assemble open drain fittings and install with top of hub 2 inches (51 mm) above floor.

R. Install deep-seal traps on floor drains and other waste outlets, if indicated.

S. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.

T. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

U. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

V. Install vent caps on each vent pipe passing through roof.

W. Install frost-resistant vent terminals on each vent pipe passing through roof. Maintain 1-inch (25-mm) clearance between vent pipe and roof substrate.

X. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.

Y. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch (25-mm) clearance between vent pipe and roof substrate.

Z. Assemble components of FOG disposal systems and install on floor. Install trap, vent, fresh-air inlet, and flow-control fitting according to authorities having jurisdiction. Install shelf fastened to reinforcement in wall construction and adjacent to unit, unless otherwise indicated. Install culture bottle, culture metering pump, timer, and control on shelf. Install tubing between culture bottle, metering pump, and chamber.

AA. Install grease interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing.

1. Above-Floor Installation: Set unit with bottom resting on floor, unless otherwise indicated.
2. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor.
3. Recessed Floor Installation: Set unit in receiver housing having bottom or cradle supports, with receiver housing cover flush with finished floor.
4. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.

BB. Install grease removal devices on floor. Install trap, vent, and flow-control fitting according to authorities having jurisdiction. Install control panel adjacent to unit, unless otherwise indicated.

CC. Install oil interceptors, including trapping, venting, and flow-control fitting, according to authorities having jurisdiction and with clear space for servicing. Coordinate oil-interceptor storage tank and gravity drain with Division 23 Section "Facility Fuel-Oil Piping."

DD. Install solids interceptors with cleanout immediately downstream from interceptors that do not have integral cleanout on outlet. Install trap on interceptors that do not have integral trap and are connected to sanitary drainage and vent systems.

EE. Install wood-blocking reinforcement for wall-mounting-type specialties.

FF. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

## 3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. FOG Disposal Systems: Connect inlet and outlet to unit, connect flow-control fitting and fresh-air inlet piping to unit inlet piping, and connect vent piping between trap and media chamber. Connect electrical power.

D. Grease Interceptors: Connect inlet and outlet to unit, and connect flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.

E. Grease Removal Devices: Connect controls, electrical power, factory-furnished accessories, and inlet, outlet, and vent piping to unit.

F. Oil Interceptors: Connect inlet, outlet, vent, and gravity drawoff piping to unit; flow-control fitting and vent to unit inlet piping; and gravity drawoff and suction piping to oil storage tank.

G. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

H. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

## 3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.
2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Division 07 Section "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 LABELING AND IDENTIFYING

A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION 22 13 19**

## SECTION 23 00 00

## GENERAL MECHANICAL REQUIREMENTS

### PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

A. The General conditions, supplementary conditions, special Requirements, and applicable portions of Division 1 of the specification are a part of this Division and the requirements contained herein are supplementary to them.

B. This Division is an integrated whole comprising interrelated and interdependent sections and shall be considered in its entirety in determining requirements.

C. Refer to other sections of this Division for additional requirements or information regarding the subjects of this Section.

1.02 ABBREVIATIONS AND DEFINITIONS (as used on Division 23 Drawings and herein):

A. This Division is abbreviated and includes incomplete sentences. Supply omitted words by inference.

B. Symbols: "[S]" means submittals are required; "[M/O]" means Maintenance/Operating data is required; see paragraphs hereinafter.

C. "Provide" means furnish, install and connect unless otherwise described in specific instances.

D. "Piping" means pipes, fittings, valves and all like pipe accessories connected thereto.

E. "Ductwork" means ducts, plenums, compartments, casings or any like devices, including the building structure, which are used to convey or contain air.

F. "Extend", "Submit", "Repair", "Abandon", "Replace", "Remove" and similar words mean that the Contractor (or his designated subcontractor) shall accomplish the action described.

G. "Codes" or "Code" means all codes, laws, statutes, rules, regulations, ordinances, orders, decrees, and other requirements of all legally constructed authorities and public utility franchise holders having jurisdiction.

H. "Products", "Materials" and "Equipment" are used interchangeably and mean materials, fixtures, equipment, accessories, etc.

I. "Utility Areas" are defined as mechanical, electrical, janitorial, and similar rooms or spaces which are normally used or occupied only by custodial or maintenance personnel. "Public Areas" are defined as the rooms or spaces which are not included in the utility areas definition.

J. "Building Boundary" includes concrete walkways immediately adjacent to the building structure.

K. "Below Grade" means buried in the ground.

L. "Substantial Mechanical Completion" means all components of all systems are functioning but lacking in final adjustment.

M. Pressure rating specified (such as for valves and the like) means design working pressure for and with references to the fluid which the device will serve.

1.03 DESCRIPTION:

A. Provide a complete and operable installation, including all labor, supervision, materials, equipment, tools, apparatus, transportation, warehousing, rigging, scaffolding and other equipment and services necessary to accomplish the work in accordance with the intent and meaning of these drawings and specifications.

1.04 RELATED WORK:

A. Coordination: Refer to Architectural, Civil, Structural, and Electrical Drawings for the construction details and coordinate the work of this Division with that of other Divisions. Order the work of this Division so that progress will harmonize with that of other Divisions and all work will proceed expeditiously. The work of this Division shall include direct responsibility for the correct placing and connection of mechanical work in relation to the work of other Divisions.

B. Examine other Divisions for work related to the work of this Division especially Division 26 - ELECTRICAL.

1.05 EXISTING CONDITIONS:

A. Visit the site prior to bidding and investigate the existing conditions which affect or will be affected by the work of this Division. Become thoroughly familiar with the working conditions and take into account any special or unusual features peculiar to this job. By the act of submitting a Bid, the Contractor will be deemed to have complied with the forgoing, to have accepted such conditions, and to have made allowance therefore in preparing his Bid.

B. The location of existing concealed utility lines are shown in accordance with reference data received by the Architect. The Architect does not guarantee the accuracy of such data. The points of connection are therefore approximate and the Bidder shall include adequate funds in his bid to cover costs of connection regardless of their exact location.

C. Exercise extreme caution during trenching operations. Repair the damage caused by such operations to existing utility lines at no cost to the Owner, whether the lines are shown on drawings or not.

1.06 DRAWINGS AND SPECIFICATIONS:

A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, request clarification.

B. The Architect shall interpret the drawings and the specifications, and his decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.

C. In case of conflict not clarified prior to Bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful bidder as soon as feasible after the Award and if appropriate a deductive change order will be issued.

D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option."

1.07 PERMITS AND INSPECTIONS:

A. Obtain, schedule and pay for permits, licenses, approvals, tests, and inspections required by legally constituted authorities and public utility franchise holders having jurisdiction over the work.

B. Afford the Architect's representative every facility for evaluating the skill and competence of the mechanics and to examine the materials. Concealed work shall be reopened when so directed during his periodic visits.

1.08 CODES AND REGULATIONS:

A. By submitting a bid, Contractor is deemed to represent himself as competent to accomplish the work of this Division in conformance with applicable Codes. In case of conflict between the Contract documents and the Code requirements, the Codes shall take precedence. Should such conflicts appear, cease work on the parts of the contract affected and immediately notify the Architect in writing. It shall be the Contractor's responsibility to correct, at no cost to the Owner, any work he executes in violation of Code requirements. Specify references to codes elsewhere in this Division are either to aid the Contractor in locating applicable information or to deny him permission to use options which are permitted by Codes.

B. Applicable Codes: (Current editions unless otherwise noted)
   1. All local codes; city and/or County as applicable
   2. OSHA requirements
   3. California Building Code
   4. California Mechanical Code
   5. California Plumbing Code
   6. California Code of Regulations (CCR) Titles
   7. Fire Marshal Regulations
   8. Regulations of all other authorities having jurisdiction

C. Where conflict or variation exists among codes, the most stringent shall govern.

D. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.

E. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of

materials and equipment, submit certified copies of test reports specified in the individual sections.

F. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.

G. Permits and Certificates of Inspection: Furnish the originals.

H. Testing procedures and test results required in this and other sections. Furnish 2 copies.

I. Other data required by other sections of this Division. Furnish 2 copies.

1.09 RECORD AND DOCUMENTATION:

A. Accumulate the following and deliver to the Owner's representative prior to final acceptance of the work:
   1. Record (As-Built) Drawings:
      a. Maintain in good order in the field office a complete set of prints for all work being done under Division 23. Update the drawings daily with neat and legible annotations in red ink showing the work as actually installed.
      b. The actual size, location and elevation of all buried lines, valve boxes, manholes, monuments, and stub-outs shall be accurately located and dimensioned from building walls or other permanent landmarks.
      c. Furnish the originals.
   2. Operation and Maintenance Manual: Furnish an operation and maintenance manual covering the stipulated mechanical systems and equipment. Seven copies of the manual, bound in hardback binders or an approved equivalent, shall be provided to the Architect in accordance with the Division 1 section on Maintenance and Operation Manuals. Furnish one complete manual prior to the time that system or equipment tests are performed. Furnish the remaining manuals before the contract is completed. The following identification shall be inscribed on the cover:
      OPERATION AND MAINTENANCE MANUAL
      PROJECT TITLE.....
      CONTRACTOR.....
   3. Provide a table of contents. Insert tab sheets to identify discrete subjects. Instruction sheets shall be legible and easily understood, with large sheets of drawings folded in. The manual shall be complete in all respects for all materials, piping, valves, devices and equipment, controls, accessories and appurtenances stipulated. Include as a minimum the following:
      a. Updated approved materials list, shop drawings and catalog information of all items indicated by symbol "[M/O]" at titles or beginning of paragraphs.
      b. System layout showing piping, valves and controls.
      c. Wiring and control diagrams with data to explain detailed operation and control of each component.
      d. A control sequence describing start-up, operation and shutdown.
      e. Detailed description of the function of each principal component of the system.
      f. Procedure for starting.
      g. Procedure for operation.
      h. Shut-down instruction.

i. Installation instructions.
j. Adjustments, maintenance and overhaul instructions.
k. Lubrication schedule including type, grade, temperature range and frequency.
l. Safety precautions, diagrams and illustrations.
m. Test procedures.
n. Performance data.
o. Parts lists, with manufacturer's names and catalog numbers.
p. Preventive maintenance schedule.
q. Service organization with name, address and telephone number.
r. Valve identification chart and schedule.
s. ASME certification
t. Air Balance report.

B. Standard Compliance: Where equipment or materials are specified to conform with requirements of standards of recognized technical or industrial organizations such as American National Standards (ANSI), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), Underwriters Laboratories (UL), American Refrigeration Institute (ARI), American Gas Association (AGA), or National Electrical Manufacturer's Association (NEMA), that use a label or published listing as a method of indicating compliance, proof of such conformance shall be submitted and approved. The label or listing of the specified organization will be acceptable evidence.

C. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.

D. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.

E. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.

F. Permits and Certificates of Inspection: Furnish the originals.

G. Testing procedures and test results required in this and other sections. Furnish 2 copies.

H. Other data required by other sections of this Division. Furnish 2 copies.

1.10 TOOLS:

A. Provide all special tools needed for proper operation and routine adjustment and maintenance of systems and equipment. Deliver tools to Owner's representative and request a receipt for same.

1.11 CONSTRUCTION COST BREAKDOWN:

A. To assist the Architect and Engineer in evaluation of the construction cost, the Contractor shall prepare and submit for review a construction cost breakdown for the major subdivisions of the mechanical work.

B. Subdivide each item on the breakdown into two headings: labor and materials. Include overhead and profit in each entry.

C. Cost breakdowns shall be submitted and approved prior to the first payment request. Send one copy of the breakdown directly to the Engineer and the remaining copies sent through regular channels.

**PART 2 - PRODUCTS**

2.01 MATERIALS AND EQUIPMENT:

A. Standard Products: Materials and equipment shall be essentially the standard cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be their latest standard designs that comply with the specification requirements. Materials and equipment shall duplicate items that have been in satisfactory commercial or industrial use at least two years prior to bid opening. Where two or more units of the same type of equipment are required, these units shall be products of a single manufacturer. The components thereof, however, are not required to be exclusively of the same manufacturer. Each major component of equipment shall have manufacturer's name, address, model, and serial number on a nameplate securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.

B. Whenever on the plans, or in these specifications, products are identified by the name of one manufacturer, it is intended that equivalent products of other manufacturers are acceptable, unless otherwise indicated, if accepted as a substitution by the Architect. Where three or more manufacturers are listed as "acceptable manufacturers" however, then the products furnished shall be the product of one of the manufacturers listed. Manufacturers listed as "acceptable manufacturers" shall meet quality and performance of a particular one specified by both name and catalog number.

2.02 SUBSTITUTIONS:

A. General: Should the Contractor desire to substitute for specified products, he shall submit with the Material List a complete list of the requested substitutions. The request shall contain complete descriptive information of the products. Samples for evaluation shall also be submitted upon the Architect's request. If in the Architect's opinion the products as presented in this first submittal are in variance with the specified products, or if the information submitted is not sufficiently complete to allow proper evaluation, the substitution will be disallowed from consideration and the specified products shall be furnished. By proposing a substitution, it is deemed that the Contractor shall bear the cost of any changes (whether architectural, structural, electrical or mechanical) necessary to accommodate the substitution.

B. Specific: Refer to other sections of this Division for additional requirements.

2.03 SUBMITTALS:

A. General:

1. Provide for all items indicated with the symbol "[S]" at titles or beginning of paragraphs in accordance with the Division 1 section covering submittals and as herein specified. Where warranty of longer than one year is specified, include such warranty with submittal. Architect's review of the submittal is only for general conformance with design compliance with the information given in the contract documents. The submittal procedure is required as an effort to minimize the problems which occur due to the discovery of Contractor non-compliance at the construction site. The Contractor is responsible for conformation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination of work of all Divisions of the work. Deviations, if any, from Contract documents shall be clearly and completely indicated (by a separate letter if deviations are extensive) in the submittals, and the lack of such is deemed complete compliance with Contract Documents without any deviations. Submittals favorably processed will not relieve the Contractor of responsibility for deviations not so reported nor for errors in the submittal.
2. In addition to the above, upon permission to proceed after review of submittal and prior to the installation of work, submit dimensioned and scaled drawings (not less than 1/4-inch equal to one foot) of all mechanical equipment rooms and areas. Such layouts shall indicate, but not be limited to, all mechanical equipment, control panels, piping, housekeeping pads, ductwork, tube pull, access and maintenance clearances, and other like items. The layout shall also indicate major equipment to be provided under other Sections of work.
3. Contractor Stamp: All submittals shall be stamped with the following text and signed by the Contractors representative:
   "IT IS HEREBY CERTIFIED THAT THE PRODUCTS SHOWN AND MARKED IN THIS SUBMITTAL ARE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS AND CAN BE INSTALLED IN THE ALLOCATED SPACES EXCEPT WHERE NOTED AS DEVIATIONS.
   CERTIFIED BY:---------- DATE:----------
4. All submittals shall be complete and with catalog data and information properly marked to show, among other things, equality of material (where substitution is allowed and desired), adequacy in capacity and performance to meet minimum capacities of performance as specified or indicated. Arrange the submittals in the same sequence as these specifications, and reference (at the upper right-hand corner) the particular specification provision for which each submittal is intended. Incomplete submittals will be rejected.
5. For all work under Division 23, the notations by the Contractor or Supplier on submittal documents "Per Plans and Specifications", or "As Specified", or similar wording or phrasing is not acceptable and will be cause of rejection. Complete descriptive submittals are required for all Division 23 work.
6. Refer to the other sections of this Division for specific requirements.

B. Material List: Within 15 days after award of Contract, submit for approval a complete list of materials proposed for use. Furnish names and addresses of manufacturers, catalog numbers (where applicable) types and trade names. For purposes of uniformity, only one manufacturer will be accepted for each class or type of material. This list is in addition to Shop Drawings.

C. Shop Drawings: Submit shop drawings with such promptness as to cause no delay in the work. Do not commence fabrication of the equipment until the approved drawings are received from the Owner's representative.

D. Other Submittals: As required by other sections of this Division.

**PART 3 - EXECUTION**

3.01 WORKMANSHIP AND INSTALLATION METHODS:

A. Workmanship shall be in the best standard practice of the trade.

B. Execute the work so as to contribute to ease of operation and maintenance, maximum accessibility and best appearance. Execute it so that the installation will conform and adjust itself to the building structure, its equipment and its usage. The work shall be symmetrical, plumb, uniform, properly aligned, and firmly secured in place.

C. Install equipment in accordance with the manufacturer's instructions and recommendations unless otherwise noted or specified.

3.02 TESTS:

A. General:
1. Demonstrate that all components of the work of this Division have been provided and that they operate in accordance with the Contract Documents.
2. Provide instruments and personnel for tests and demonstrations. Submit signed test results.

B. Specific: Refer to the other sections of this Division for test requirements.

3.03 DELIVERY, HANDLING, STORAGE OF MATERIALS AND PROTECTION OF WORK:

A. Protect materials against dirt, water, chemical and mechanical damage both while in storage and during construction.

B. Cover materials in such a manner that no finished surfaces will be damaged, marred or splattered with plaster or paint, and all moving parts will be kept clean and dry.

C. Replace or refinish any damaged materials including fronts of control panels, ductwork fittings, and shop fabricated ductwork.

D. Keep cabinets and other openings closed to prevent entry of foreign matter.

3.04 CLEANUP AND HOUSEKEEPING:

A. Cleaning shall be done as the work proceeds. Periodically remove waste and debris to keep the site as clean as is practical.

B. Leave exposed parts of the mechanical work in a neat, clean and usable condition, with painted surfaces unblemished and plated metal surfaces polished.

3.05 PROJECT CONDITIONS:

A. Site Examinations and Conditions:
   1. Regard information relative to existing conditions, services and structure as approximate only. Verify dimensions and locations, and be knowledgeable of all working conditions before submitting Bid. Verify pressure, location, size, and elevation of existing services (to which points of connection are to be made or crossed) as soon as possible and prior to commencement of any new work.
   2. Make minor deviations necessary to conform to actual locations and conditions. Submission of Bid presumes proper examination of Site, locations, dimensions and conditions, and no additional cost will be honored for lack of such examinations.

B. Existing Services: Examine the Contract Drawings and visit the project site to ascertain the extent of the existing services. Where existing equipment/services serving existing structures and/or existing structures to be demolished are to remain in service, reroute, relocate, or extend such existing equipment and/or services to accommodate this project without additional cost.

C. Interruption of Existing Services: Where it is necessary to reroute existing services or utilities, or to make connections of new work to existing services or utilities, give timely written notice of such intent to the Owner and secure written approval before proceeding. Make all such interruptions at such time as permitted by the Owner. Anticipate such interruptions to be made outside of normal working hours or normal working days; therefore, no additional cost will be permitted for such work. Except in a case of emergency involving life, limb or health, do not operate any existing equipment (including valves). Where such operations are necessary, they shall be performed by the Owner's personnel.

D. Access and Placement of Work:
   1. Check and coordinate for clearance, accessibility and placement of equipment either by going through openings provided or by placing equipment during construction. Ordering of equipment to be shipped, disassembled, or disassembly of equipment at Project Site and re-assembly of equipment to accomplish this requirement shall be executed without additional cost. Where provided openings are inadequate to accommodate equipment, provide new openings and restoration of same, all at no additional cost. Obtain written approval for new openings before proceeding.
   2. Verify location of all plumbing fixtures and equipment within finished spaces with the Architectural Drawings. In the event that Mechanical Drawings do not indicate exact locations, or are in conflict with the Architectural Drawings, obtain information regarding proper locations. Installation of work without proper instruction under such circumstances will result in relocation of work, when directed, without additional cost.

E. Verification and Coordination: Drawings indicating suggested distribution routes are diagrammatic only, and all scaled and figured dimensions are approximate and are indicated for estimating purposes only. The Drawings do not indicate necessary offsets and like items. Do not construe Contract Drawings as fabrication drawings. Prior to fabrication and installation of work, verify all dimensions, sizes and distribution routes with actual conditions, and prepare submittal and fabrication drawings. Coordinate to avoid possible conflicts and resolve same where such exist. Install work to conform to structure, avoid obstruction,

preserve headroom, and keep openings and passageway clear. Changes necessary, resulting from such verification and coordination, shall not be a cause for additional cost.

3.06 WARRANTY:

A. Guarantee, in writing, all work against fault of any product or workmanship for a period of not less than one year after formal acceptance by the Owner; except, where longer periods are specified in the Specifications, such longer periods shall govern. However, when any component fails at any time during this period, the warranty period for such component and all other components that are inactive because of said failure shall be suspended. The warranty period for such component shall resume running for the remaining portion of the warranty period when failed component is completely repaired and in operation; however, in no case shall the resumed portion of the warranty period be less than 3 months in duration.

B. Neither payments for work, nor total or partial occupancy of work by the Owner, within or prior to the warranty period specified, shall be construed as acceptance of faulty work or shall condone any negligence of omission of Contractor in doing the work.

3.07 SAFETY REQUIREMENTS:

A Enclose and guard belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts in accordance with the OSHA 1910.219. Insulate, guard, and cover any high-temperature equipment and piping so located as to endanger personnel or creature a fire hazard.

3.08 MANUFACTURER'S RECOMMENDATIONS:

A. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material or equipment being installed, furnish printed copies of these recommendations to the installing Contractor and Architect prior to installation. Do not proceed with the installation of the item until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

**END OF SECTION**

## SECTION 23 05 00

## BASIC MECHANICAL MATERIALS AND METHODS

### PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

A. The contract documents shall apply in their entirety to the work specified herein.

B. Submittals: Submit shop drawings and manufacturer's data on each item marked [S] in accordance with the Division 1 section on submittals and Section 230000, General Mechanical Requirements.

C. Maintenance and Operation Manuals: Provide manufacturer's maintenance and operation manuals on each item marked [M/O] in accordance with the Division 1 section on maintenance and operation manuals and Section 230000, General Mechanical Requirements.

### PART 2 - PRODUCTS

2.01 ELECTRICAL MOTORS: [S] [M/O]

A. Provide all motors indicated on drawings necessary for equipment under the Mechanical Work. See electrical drawings for voltage and phase of electrical services.

B. Unless otherwise specified, all motors 1/2 HP or larger: heavy duty, ball bearing, squirrel cage induction type in drip proof or splash proof enclosure, 1.15 service factor, and shall be suitable for the voltage system specified or indicated. Motor speed shall not exceed 1750 rpm unless otherwise indicated or specified. Motors exposed outdoors: either epoxy encapsulated winding or TEFC enclosure.

C. Each motor shall have sufficient starting torque to start the apparatus driven.

D. Provide all motors with junction boxes or terminals boxes and provide adjustable slide rails for all motors with belt drives. All motors shall have a nameplate voltage rating of the specified operating voltage.

E. Provide overload protection on single phase motors.

F. Motors rated 1 HP and larger shall have shaft, bearings, and etc. capable of operating with multiple grooved sheaves and two or more belts.

G. Provide with nameplates permanently attached to exterior housing with manufacturer's name and all electrical characteristics specified thereon.

H. Motors shall be Lincoln, Westinghouse, General Electric, or approved equivalent.

I. Brake horsepower shall not exceed 90% of rated motor horsepower.

2.02 MOTOR STARTERS: [S] [M/O]

A. See Electrical Drawings for voltage and phase of electrical services.

B. Starters for motors will be provided under Division 26. Provide to Division 26 the data necessary for motor starter heater sizing for all motors.

C. Enclosure: NEMA 1 (unless location of starters dictates otherwise) of sufficient size to contain all accessories specified.

2.03 BELT DRIVES: [S] [M/O]

A. V Type. Drives requiring not more than 2 belts: variable pitch type; size for mid-point of operating range. Drives requiring 3 or more belts: nonadjustable constant speed type. Provide belts in matched sets.

B. All belt drives shall have a minimum rating of 1.5 times the motor nameplate horsepower rating.

2.04 BELT AND DRIVE GUARDS: [S]

A. Provide all rotating equipment drives and couplings with suitable guards.

B. Drive guards shall be as standard by the equipment manufacturer.

C. Belt guards shall be as standard by the equipment manufacturer.

2.05 DIELECTRIC UNIONS: [S]

A. Dielectric unions or flanged unions: constructed so that two pipes being connected are completely insulated (including bolt sleeves and washers) from each other with no metal-to-metal contact; EPCO or approved equivalent.

B. Unions shall have a water-impervious insulation barrier capable of limiting galvanic current to 1 percent of the short-circuit current in a corresponding bimetallic joint and, when dry, shall also be able to withstand a 600-volt breakdown test.

2.06 PRESSURE AND TEMPERATURE TEST PLUGS: [S]

A. Brass body and gasketed cap, 1/4-inch mpt fitting to receive either a temperature or pressure probe 1/8-inch O.D. with neoprene (max. 200 degrees F) at 500 psi or nordel (max. 275 degrees F) at 500 psi valve core; "Pete's Plug" or approved equivalent.

2.07 PIPING SUPPORTS: [S]

A. See Section 230548, Vibration, and Seismic Controls for HVAC Piping and Equipment regarding structural supports in compliance with seismic requirements; supports shall be as specified therein. Unless otherwise indicated or superseded by cited seismic requirements, pipe hangers and supports as follows:
   1. See Section 230548, Vibration, and Seismic Controls for HVAC Piping and Equipment for resilient support of pipes.

B. Pipe Hangers: Carbon steel hanger with plain (black) or galvanized finish.
   1. Piping 5-inches or smaller: Conforms to Manufacturer's Standardization Society (MSS) SP-58, Type 5 hangers; Kin-Line 450 or approved equivalent.

2. Hangers for copper piping shall be furnished with a processed felt lining; Kin-Line 450F or approved equivalent.

C. Pipe Clamps: Carbon steel with plain (black) or galvanized finish. Provide with copper finish for use on copper piping.
   1. For Vertical Piping: Conforms to MSS SP-58, Type 8; Kin-Line 470 or approved equivalent.
   2. For Horizontal Piping and Framing Channels: Short clamp (strap) for channel mounting; Kin-Line 477 or approved equivalent.

D. U-Bolts: Carbon steel U-bolt with plain (black) or galvanized finish and four finished hex nuts; conforms to MSS SP-58 type 24; Kin-Line 438 or approved equivalent.

E. Pipe Anchor Chair: Unit consisting of a carbon steel, notched, HR channel; U-bolt; and hex nuts; Kin-Line 438, or approved equivalent. (no known equivalent).

F. Pipe Anchors:
   1. Welded Tee Pipe Anchor, for piping 3-inches to 6-inches: Steel, welded, tee-shaped anchor; Pipe Shields Model C1000, or approved equivalent (no known equivalent).

G. Trapeze Hangers: Trapeze hangers for piping shall be used where indicated or required and shall be fabricated in accordance with SMACNA Seismic Restraint Guide, latest edition.

H. Support Channels: 1-5/8-inch by 1-5/8-inch, 12 gauge steel channel. Single channel: Superstrut A-1200, or approved equivalent. Double channel: Superstrut A-1202, or approved equivalent.

I. Hanger Rods: Solid mild steel, sizes as specified below.

| Pipe Size | Rod Diameter |
|---|---|
| 1/2-inch through 2-inches | 3/8-inch |
| 2-1/2-inches through 3-1/2 inches | 1/2-inch |
| 4-inches and 5-inches | 5/8-inch |

J. Sound and Electrolysis Isolators: Provide sound and electrolysis isolators at all hangers and supports for un-insulated piping and on other piping where incompatible metals would contact each other. Isolators shall be factory fabricated, hinged, cadmium plated steel shell with processed, non-conducting hair felt isolating pad permanently attached with adhesive; Stoneman "Trisolators", or approved equivalent.
   1. Option: Piping isolators for bare un-insulated piping can be integral part of the pipe hanger.

K. Connection of Hangers to Structure: Factory fabricated steel devices or other equal suitable steel inserts, clamps, and brackets as required, Devices shall comply to MSS-SP-58.

2.08 PIPE INSULATION INSERTS: [S]

A. All insulated piping 2-inches and larger shall be provided with pipe insulation inserts with steel jackets at all pipe hangers and supports.

B. Pipe Insulation Inserts: Insert shall consist of a galvanized steel jacket, minimum of 26 gauge to 16 gauge thickness depending on pipe size, and a waterproofed calcium silicate insulation insert impregnated with a fire resistive vapor barrier compound; insert thickness shall match the thickness of the specified insulation and shall extend a maximum of 1-inch beyond sheet metal; pipe Shields Model A2000, Kin-Line #463CW or approved equivalent.

2.09 ACCESS DOORS: [S]

A. Flush-mounted sheet metal access doors with lock and concealed hinge; stainless steel door; Milcore, or approved equivalent.
   1. Access doors through fire-rated separations shall have like fire rating.

2.10 EQUIPMENT IDENTIFICATION: [S]

A. General: Identify all equipment using brass discs or laminated plastics. Install as specified below in readily visible locations not interfering with insulation or equipment operation.
   1. Brass Discs: Provide minimum 0.040-inch in thickness and 2-inches in diameter or square. Top line of each tag shall have 1/4-inch high black filled letters to indicate designation of service. Bottom line shall have 7/16-inch high black filled numbers to indicate equipment or valve number.
   2. Laminated Plastic: Provide white on black with engraved black letters. The equipment identifying name and number lettering size shall be a minimum of 1/4-inch in height, nameplate data 3/16-inch in height and the manufacturer's name and location 1/8-inch in height. Provide laminated plastic tags either 2-1/2-inches by 3-1/2-inches or 3-1/2-inches by 5-inches, as required.

2.11 PIPING IDENTIFICATION: [S]

A. Piping identification shall be by semi-rigid plastic markers or vinyl coated cloth; minimum information: base color, flow direction arrow, and fluid being conveyed.
   1. Service Markers, Interior Locations: W.H. Brady Co. Type B-500 vinyl coated cloth tape or Type B-350 Perma-Code Thin Film, or approved equivalent.
   2. Service Markers, Exterior Locations: W.H. Brady Co. Type B-946G, Brady B-915 Snap-on, or approved equivalent. Apply mechanically affixed with coated wire straps or approved equivalent.

B. Base color coding and size of letters and arrows shall conform to ANSI A 13.1, "Scheme for the Identification of Piping Systems."

2.12 PRIMERS AND PAINTS: [S]

A. All equipment furnished under Division 23, unless otherwise noted, shall be furnished with a factory applied prime coat.

B. Where field priming or touch-up priming is required, primer shall be as follows for ferrous metal surfaces:
   1. Metal Surfaces, Not Galvanized: Latex, corrosion resistant primer suitable for metal surfaces or Epoxy-polyamide, green primer paint, formula 150, type I (QPL).

2. Metal Surfaces, Galvanized: Galvanized repair compound with high zinc dust content; ZRC Cold Galvanizing Compound, or approved equivalent (no known equivalent).

C. Finish painting of Mechanical equipment furnished under Division 23: See Division 9 section on painting.
1. Non-metallic surfaces: Latex (Acrylic Emulsion, Exterior Wood and Masonry) Paint.

2.13 SEALANTS: [S]

A. Non-fireproof Penetrations: Silicone rubber sealant; DowCorning 785/4, or approved equivalent.

B Fireproof Penetrations: Sealant shall comply with ASTM-E-814 (UL 1479 or UL 94); 3M Brand Fire Barrier Penetration Sealing System with CP-25 caulk, or approved equivalent.

2.14 SEALANTS, WATERSTOP:

A. Cold applied, pre-formed, plasticized, waterstop sealing compound consisting of blends of refined hydrocarbon resins and plasticizing compounds; Synko-Flex Waterstop and Primer, or approved equivalent (no known equivalent).

2.15 BOLTED MECHANICAL SEALS: [S]

A. Seals shall be modular, bolted, mechanical link type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. Tightening of the bolts shall cause the rubber sealing elements to expand to form a water-tight seal between the pipe and the sleeve; Thunderline "Link-Seal" Model LS, or approved equivalent.

2.16 PIPE SLEEVES:

A. Sleeves in Concrete Floor Slabs: Schedule 40 black steel pipe.

B. Sleeves in all Fire Walls (regardless of Construction), Concrete or Masonry Walls: Schedule 40 black steel pipe.

C. Sleeves in all Walls and Partitions (except Fire Walls, Concrete or Masonry Walls): 18-gauge galvanized steel.

2.17 NON-SHRINK GROUT:

A. Non-shrink, non-metallic, non-corrosive cementious grout; 5000 psi compressive strength at 28 days; Sika SilkaGrout 212, or approved equivalent.

2.18 VENT STACK FLASHING:

A. Factory-fabricated, caulk type flashing for piping up to 8-inches; Josam 26450, or approved equivalent.

**PART 3 - EXECUTION**

3.01 GENERAL:

A. Install products in accordance with product manufacturer's recommendations. After installation of systems and until formal acceptance of systems by the Owner, be responsible for operation and maintenance of systems.

3.02 FORMING, CUTTING, AND PATCHING:

A. Provide Forming, recesses, chases, blocking and grounds necessary for Mechanical Work.

B. Provide cutting (including core drilling and saw cutting), patching and repairing existing structures to accommodate the Mechanical Work. Such work shall include voids, holes, and the like resulting from removal of existing or addition of new Mechanical Work. Restoration shall match existing work.

C. Core drill all holes through existing concrete structures. Before drilling through any structural members, obtain written permissions form the Architect. Before coring, check all proposed hole locations with electronic device to assure clearance of obstruction (i.e., reinforcement bars, piping, conduits, etc.).

D. Saw cut all existing concrete and masonry openings and slabs.

3.03 ELECTRICAL WORK:

A. Coordinate with Division 26. See Division 26 Contract Documents for voltage and phase of electrical services.

B. All power wiring and conduits for same serving motors, and where indicated on Division 26 Contract Drawings, to mechanical control panels, separate or equipment mounted, shall be provided under Division 26.

C. The following shall be provided under Division 23:
   1. Pre-wired mechanical control panels.
   2. All automatic or temperature control and interlock wiring, regardless of voltage, and conduits for same necessary for proper operation of equipment under Division 23. This includes interlock wiring between motor starter coils, interlocking relays, contactors, mechanical equipment control panels, temperature control devices, and temperature control panels.
   3. Power wiring and conduits for same not indicated on the Division 26 Contract Drawings to mechanical control panels (separate or equipment mounted).

D. Install all wiring under Division 23 in rigid conduit or electrical metallic tubing indoors and in rigid conduit outdoors. All such wiring shall be concealed.

3.04 BELT DRIVES:

A. Select drives for proper speed required for conditions indicated. Conditions indicated are estimated conditions and may vary under actual operating conditions. To adjust speed for actual operating conditions, change drive as often as necessary, at no additional cost.

3.05 DIELECTRIC UNIONS:

A. Install dielectric unions in acceptable locations and provide devices for all piping and equipment connections where ferrous and copper metal is joined.

B. Where piping is buried, provide additional protection in the following manner. Thoroughly clean device and piping surfaces 5-feet upstream and downstream of connection point. Prime piping surface to be covered. Wrap connection point and piping with double wrapping of identified pressure-sensitive tape.

3.06 FLASHING:

A. Flash and counter flash with metal to make waterproof all penetrations through roofs or exterior walls. Roof flashing shall have a minimum 8-inch skirt. The metal flashing and counterflashing shall be the same material as the equipment to which they are attached. Factory-fabricated flashing may be used for piping. Prior to any interior finish work, test the integrity of all flashing with water hose.

3.07 WELDING:

A. All welding shall comply with provisions of applicable ASME Boiler and Pressure Vessel Code, ANSI Code for Pressure Piping, or other statutes or ordinances having jurisdiction. All welders shall be certified for all welding positions under the qualification tests prescribed by the National Certified Welding Bureau; National Association of Plumbing, Heating, Cooling Contractors; or by other reputable testing laboratories, using procedures covered in the ASME Boiler and Pressure Vessel Code (BPVC), Section IX, Qualification standards for Welding and Brazing Procedures, Welders, Brazers and Welding and Brazing Operators; and shall hold a current certification of qualifications obtained within 12 months prior to date of contract. Prior to welding operation, submit for review evidence of such certification.

B. Welded joints, fabrication, assembly and erection shall conform to the requirements of ANSI B 31.1 “Power Piping” of the American National Standard Code for Pressure Piping. Perform all welding by the metal arc welding process, either manual, semi-automatic, or automatic.

3.08 PIPE SUPPORT INSTALLATION:

A. Support all piping, horizontal and vertical, with clamps or brackets. Independently support all line-mounted equipment. Provide at least one hanger for each branch piping and at each change of direction. Secure all hanger rods with double nuts and lock washers. Do not use perforated (plumber's) tape. Support vertical multiple-story piping at each floor with pipe clamps.

B. Maximum Hanger Spacing:

1. Copper Piping: 1-1/2-inches and smaller, hangers at 6-feet; 2-inches and larger, hangers at 10-feet.
2. In all cases, space pipe supports to provide adequate support for the pipes, the medium in the pipes, insulation, valves, and fittings to prevent any sagging or separation of joints.

3.09 PIPING INSTALLATION:

A. Layout of work:
1. Perform all dimensional layout of the Work and establish all lines and grades as set forth on the Drawings.
2. Be responsible for conformity of the finished work with drawings and specifications.

B. Installation:
1. Inspect all piping prior to installation. Pipe found unsatisfactory on inspection or damaged by handling shall be promptly removed from the job site.
2. All piping systems shall be graded and valved to provide complete drainage, venting, and control of all systems.
3. Use reducing fittings for pipe size changes; do not use brushings. Make all changes in pipe material with pipe adapters.
4. Prior to installation of piping to or at mechanical equipment, verify with the equipment manufacturers as to the clearance required for maintenance, repair, inspection, and part replacement for the respective equipment. Install piping to provide such clearance so that an absolute minimum of piping is required to be disturbed. Provide means for removal of such piping. Provide unions, flanges, and mechanical couplings at connections to equipment.
5. Where equipment connection sizes are smaller than piping sizes indicated, make size reduction immediately adjacent to the equipment connections. Flanges or unions at such equipment connection points may be the same size as the equipment connections.
6. Conceal all piping in finished portions of the building unless noted otherwise on the Drawings.
7. Coupled short sections of pipe, bushings, close nipples, long screws, bullhead tees and crosses are prohibited. Bullhead tees and crosses are permitted only in fire sprinkler systems.
8. Install all piping in such a manner as to prevent any undue noise from the flow of water under normal conditions.
9. Branch tees in piping, provided that the branch size is two pipe sizes or smaller than the main size, may be made with factory-manufactured outlet fittings with funneled inlet and with socket or threaded outlet as required. The fittings schedule shall be the same as the piping to which they are connected. For copper tubing fittings shall be joined to main by silver brazing. The use of extruded tees for branch takeoffs that are fabricated from the piping material being installed is expressly prohibited and will be rejected.
10. Install piping to permit free expansion and contraction, except where the Drawings specifically indicate an anchor or guide. Do not connect stiffening structural members to bends or elbows.

11. Use offsets necessary to prevent undue strain on piping. The springing of piping into place is prohibited.
12. Select and install pipe supports and hangers in such a manner as to impose only negligible restraint on the free movement of piping and not deform piping. No anchors shall be employed, except as indicated on Drawings.
13. Locate pipe supports as close as possible to valves or other heavy piping specialties.
14. Carefully locate supports and hangers so they do not hinder free movement of adjoining piping or occupy open space in a pipe rack.
15. Mark all stub-outs below grade with monuments identifying the services.
16. Provide shut-off valves at each division of main piping and at each branch serving one room or a group of adjoining rooms to enable isolation of fluid carrying piping systems for each portion of the building (buried piping excepted).
17. Valves shall be full size of the line in which they are installed (automatic control valves excepted). Prior to installation of control valves, verify with control manufacturer as to sizes, piping hookup, and the like for same.
18. Install valves with stems straight up wherever possible; do not install valves with stems below the horizontal position.
19. Provide spool between two adjacent valves.
20. Properly grade all water piping to provide flow, air elimination, and drainage. Do not install piping so as to create noise or flow impairment.
21. Separately pipe, with shut-off valve, equipment drains to nearest floor drain, or as noted on Contract Drawings.
22. Do not permit the use of any mechanical piping system under this Division of Work to be used as electrical grounding.

3.10 PIPE JOINTS:

A. Threaded Steel or Brass Pipe:
1. Cut square and remove all burrs. Ream for full flow.
2. Cut threads with clean dies. Apply thread compound to male threads only. Refer to specific piping system for type of thread compound.
3. After joining, not more than three full threads shall remain exposed. Coat exposed threads of steel pipe with appropriate type red paint.
4. Make-up brass, chrome plated pipe, or stainless steel pipe with strap wrenches.

B. Copper Tubing:
1. Cut square and remove all burrs. Ream for full flow.
2. Clean outside ends of tubing and male fittings and sockets of female fittings to bright finish. Clean with emery cloth.
3. Properly apply flux to surfaces being jointed. Application and type of flux shall be as recommended by the specific brazing or solder manufacturer.
4. Remove stems, washers and internal parts of valves prior to brazing or soldering.
5. Refer to specific piping system for type of brazing metal and solder.

C. Ductile Iron Pipe and Fitting Mechanical Joints: Install mechanical joints in accordance with AWWA C 600.

D. Grooved Pipe and Fitting Mechanical Joints: Install joints including grooving of pipe, in accordance with the coupling and fittings manufacturer's recommendations and printed

instructions. Before couplings are assembled, pipe ends and gasket exterior surfaces shall be lightly coated with a lubricant manufactured especially for this application and recommended by the coupling and fitting manufacturer.

E. Flanged Joints: Use flanged joints for making piping connections to flanged valves, fixtures, and equipment, and to other flanged piping components. Install joints so that flange faces bear uniformly on gaskets. Engage bolts so that there is complete threading through the nuts and tighten so that bolts are uniformly stressed (equally torqued).

F. Solvent-Weld Joints in Plastic Piping: Install solvent welded joints for CPVC, PVC or ABS plastic piping in accordance with the recommendations and printed instructions of each respective pipe and fitting manufacturers and with requirements of pertinent ASTM standards.

3.11 PIPE SLEEVES AND PLATES:

A. Sleeves:
1. Provide sleeves for all pipes passing through walls, partitions of floor slabs unless specified otherwise.
2. Sleeves in concrete floor slabs: Sleeves shall project 2-inches above finished floors, unless specified otherwise.
3. Sleeves in all Fire Walls (regardless of construction), Concrete or Masonry Walls: Finished flush with wall finish, unless specified otherwise.
4. Sleeves in all Walls and Partitions (except Fire Walls, Concrete or Masonry Walls): Finished flush with wall or partition finish.
5. Provide 1/2-inch clearance completely around pipe between sleeve and non-insulated piping, except where pipes pass through exterior walls below grade, provide full 1-inch clearance between pipe and sleeve.
6. Sleeves for insulated piping shall be sized for insulation, pipe and clearance specified for non-insulated pipes.
7. Caulk sleeves set in fire rated construction with sealant specified for fireproof penetrations and caulk sleeves set in non-fireproof construction with sealant specified for non-fireproof penetrations.
8. Seal sleeves watertight when they are installed in outside walls, walls below grade and in floor slabs with waterproof epoxy grout, except as specified otherwise.

B. Plates: Provide chrome-plated hinged escutcheon plates with locking devices where pipes pierce finished surfaces. Plates shall fit outside of pipe insulation.

3.12 EQUIPMENT INSTALLATION:

A. Install equipment where shown, as indicated, and in accordance with the manufacturer's recommendations for the specific service.

B. Provide anchor bolts, setting Drawings and templates for setting equipment.

C. Assure correct alignment of equipment after setting.

D. Where grouting is necessary, use non-shrink type.

E. Before bolting any equipment coat threads with an anti-seize and lubricating compound. Do not use powder driven anchors unless written permission has been obtained from the Architect.

F. Provide all exposed moving or rotating parts of machines with guards in compliance with OSHA requirements. Install all guards in removable sections, if necessary, and with studs and wing nuts for removal of same in maintenance. Make provision for RPM readings on guards covering end of shafts; enclose fan belts at both sides of belts.

3.13 MAINTENANCE AND ACCESS TO EQUIPMENT:

A. Where valves, dampers, control devices, coils, or other like devices (i.e, plumbing P-trap, water hammer arresters, gauges, thermometers) requiring maintenance, checking or readings are inaccessibly concealed in walls or ceilings, and where indicated, provide square or rectangular access doors. Where space permits, doors for ceiling installation shall not be less than 18-inches by 18-inches. Prior to installation, verify all access locations.

B. Where there are lubrications within equipment, extend such to exterior of equipment.

3.14 REVIEW OF WORK:

A. Do not allow or cause any mechanical work to be covered, concealed or enclosed until such work has been tested and reviewed. Should such work be covered, concealed or enclosed before being tested and reviewed, such shall be uncovered and thereafter restored at no additional cost.

3.15 EQUIPMENT IDENTIFICATION:

A. Manufacturer's Nameplates: Provide all equipment with manufacturer's nameplates secured to the respective equipment and indicating, but not being limited to, the manufacturer's name, model, size, serial number, capacity and electrical characteristics. Clean, polish and protect all such nameplates with a coat of clear protective finish.

B. Equipment Tags: Identify all equipment (such as machinery, motor starters, control panels, pushbuttons and other like devices) exposed to view with identification tags. Secure tags to equipment surface. Where size or surface curvature does not permit such, secure with No. 16 brass jack chain.

C. Valve Tags:
   1. Identify each valve with a tag with distinguishing number. Secure tags to valves with No. 16 brass jack chain.
   2. Provide valve chart and schedule in aluminum frame with clear heavy plastic shield, and mount same at location directed. Indicate on the Record Drawings the location of valves with numbers corresponding to the valve schedule. Valve chart and schedule shall include, but not be limited to, tag number, location, usage/function, valve manufacturer's name and valve model number. Numbers for new valves shall continue from existing valve numbering system.

D. Piping Identification:

1. Identify each pipe, whether concealed or exposed, as to the content and character of material it carries (piping buried excepted).
2. Location of Markers: Not to exceed 20-feet on straight run of pipe (including risers and drops) and so located as to be conspicuously visible from any reasonable vantage point; adjacent each valve; adjacent each tee; at each side of penetration of the structure or enclosure; at each obstruction.

3.16 PRIMING, PAINTING, AND COATING:

A. Properly clean surfaces to be touched up of rust, dirt, scale, wax and other deleterious materials. Prime surfaces. Touch up with like material all damaged galvanized or factory-primed metal surfaces. Do not prime over manufacturer's nameplates on equipment.

B. Coat all bare steel parts of piping accessories below grade with coats of coal-tar based bituminous mastic.

C. Except for factory priming, factory finish painting and otherwise specified under this Article, all field priming (except touch up) and finish painting shall be under other Divisions.

D. Paint flat black interior surfaces of all concealed unlined galvanized sheet metal ductwork behind air outlets and inlets.

E. All exposed insulation surfaces in finished areas shall be ready for finish painting; glue size if necessary.

3.17 CLEANING AND DE-GREASING OF PIPING:

A. General:
1. Clean all piping systems to remove all dirt, grease, scale, foreign substances, etc., as specified in each separate section of the Specifications.
2. Prior to commencing work, submit for approval a complete procedure for cleaning and flushing for each separate piping system. Include flushing source, system inlet flushing pressure and size of inlet and outlet flushing connections with their locations for each system. Install flushing connections at all low points of each piping system to ensure complete flushing of the system.
3. Use air and/or gas blown through the lines of gas and air systems, unless specified otherwise, to prove the piping clean. All other piping systems shall be thoroughly flushed out with water unless specified otherwise.

3.18 TESTING OF PIPING:

A. Provide notification of test at least three working days prior to tests on all part of any piping system. Do not allow or cause any piping system to be insulated, covered, concealed or enclosed until such systems have been tested and reviewed.

B. Provide all necessary materials (including temporary isolation valves or caps), pumps, testing media and labor for testing. Temporarily remove any device in piping system which will not withstand test pressure specified, and reinstall same after successful testing. Test time begins to accrue full test pressure is achieved.

C. Testing and inspection of all piping systems and associated equipment for leaks shall be accomplished after installation and cleaning and prior to placing into service. Flanges, threaded joints and all welds shall be left unpainted and un-insulated until the piping systems have been approved.

D. A rigid visual inspection of each specific piping system shall be made prior to conducting tightness tests, to ascertain that all appurtenances and equipment are provided, properly connected and supported, and in all respects ready for testing.

E. Equipment such as safety valves and similar equipment shall not be subjected to the piping system test pressure. Equipment shall either be disconnected from the piping or be isolated by valves or blanks during testing and reinstalled after acceptance by the Owner.

F. Indicating pressure gauges mounted locally may be tested with the lines provided the test pressure does not exceed the scale range.

G. Orifice plates, rotometers, displacement meters and other line inserts shall either not be installed until completion of all testing, or shall be removed prior to any tests and reinstalled after test has been accepted by the Owner.

H. The application of pressure to a system shall be under control at all times, so that in no case shall the test pressure be exceeded by more than 6 percent.

I. Gauges used for testing shall be tested for accuracy as directed or approved by the Owner, and then installed as close as possible to the low point of the piping system.

J. Do not apply test pressure until the piping system and its contents approach the same temperature.

K. While piping is under test, exercise care so that excessive pressure does not occur due to increase in ambient temperature.

L. Piping test pressure shall be as noted in tabulation. If test pressures are not specified, they shall be 150 percent of design pressure for the specific system being tested.

M. Conduct hydrostatic tests with water at a temperature below 100 degrees F.
   1. Fill the system slowly with water and vent at highest points to expel the air before pressurizing.
   2. Carefully examine all joints for leaks or defects.
   3. Provide connections as required to accomplish the above.

N. Keep accurate test records of each line or system tested and provide copies of same to Owner after acceptance. Each test shall include:
   1. Identification of piping system and test number.
   2. Testing medium.
   3. Test pressure.
   4. Date of test acceptance.

3.19 TESTS AND ADJUSTMENTS:

A. At the completion of the Work, completely adjust all valves and equipment for their proper use and rating.

**END OF SECTION**

## SECTION 23 05 29

## HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

### PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:
1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fastener systems.
4. Equipment supports.

1.02 PERFORMANCE REQUIREMENTS:

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.03 SUBMITTALS:

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
1. Trapeze pipe hangers.
2. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of trapeze hangers
2. Design Calculations: Calculate requirements for designing trapeze hangers.

D. Welding certificates.

1.04 QUALITY ASSURANCE:

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

1.05 METAL PIPE HANGERS AND SUPPORTS:

A. Carbon-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:
1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

**PART 2 - PRODUCTS**

2.01 TRAPEZE PIPE HANGERS:

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.02 THERMAL-HANGER SHIELD INSERTS:

A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.

B. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.03 FASTENER SYSTEMS:

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.04 EQUIPMENT SUPPORTS:

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.05 MISCELLANEOUS MATERIALS:

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
   1. Properties: Nonstaining, noncorrosive, and nongaseous.
   2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

**PART 3 - EXECUTION**

3.01 HANGER AND SUPPORT INSTALLATION:

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
   1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
   2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:
   1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
   2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

Equipment support in first paragraph below requires calculating and detailing at each use.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:
1. Attach clamps and spacers to piping.
   Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.02 EQUIPMENT SUPPORTS:

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.03 METAL FABRICATIONS:

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.04 ADJUSTING:

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.05 PAINTING:

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.06 HANGER AND SUPPORT SCHEDULE:

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and support and metal trapeze pipe hanger and attachments for general service applications.

F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
   2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
   3. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
   4. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
   5. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
   2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
   2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.

3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
   a. Light (MSS Type 31): 750 lb (340 kg).
   b. Medium (MSS Type 32): 1500 lb (680 kg).
   c. Heavy (MSS Type 33): 3000 lb (1360 kg).
8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches (32 mm).
2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

**END OF SECTION**

## SECTION 23 05 53

## IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

### PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:
1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Duct labels.

1.02 SUBMITTAL:

A. Product Data: For each type of product indicated.

### PART 2 - PRODUCTS

2.01 EQUIPMENT LABELS:

A. Metal Labels for Equipment:
1. Material and Thickness: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: Black.
3. Background Color: White.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.02 WARNING SIGNS AND LABELS:

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Yellow.

C. Background Color: Black.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.03 PIPE LABELS:

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
   1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
   2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.04 DUCT LABELS:

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Blue.

C. Background Color: White.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.
   1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
   2. Lettering Size: At least 1-1/2 inches (38 mm) high.

**PART 3 - EXECUTION**

3.01 PREPARATION:

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.02 EQUIPMENT LABEL INSTALLATION:

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.03 PIPE LABEL INSTALLATION:

A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:
   1. Refrigerant Piping:
      a. Background Color: Black.
      b. Letter Color: White.

3.04 DUCT LABEL INSTALLATION:

A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:
   1. Blue: For cold-air supply ducts.
   2. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
   3. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet (15 m) in each space where ducts are exposed or concealed by removable ceiling system.

**END OF SECTION**

# SECTION 23 05 93

# TESTING, ADJUSTING, AND BALANCING FOR HVAC

## PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.

1.02 DEFINITIONS:

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TAB Specialist: An entity engaged to perform TAB Work.

1.03 SUBMITTALS:

A. Contract Documents Examination Report: Submit the contract documents Review report as specified in Part 3.

B. Strategies and Procedures Plan: Within 60 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

C. Sample Report Forms

D. Instrument Calibration reports to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.04 COORDINATION:

A. Notice: Provide seven days advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION**

3.01 EXAMINATION:

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine fan-coil units and verify that they are accessible and their controls are connected and functioning.

J. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

K. Examine operating safety interlocks and controls on HVAC equipment.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 PREPARATION:

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.

3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Isolating and balancing valves are open and control valves are operational.
6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING:

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems."

1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units0.

3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS:

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling-unit components.

K. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS:

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
b. Measure static pressure directly at the fan outlet or through the flexible connection.
c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

a. Report the cleanliness status of filters and the time static pressures are measured

.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Commissioning Authority for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.06 PROCEDURES FOR MOTORS:

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

3.07 PROCEDURES FOR CONDENSING UNITS:

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.08 PROCEDURES FOR HEAT-TRANSFER COILS:

A. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.09 TOLERANCES:

A. Set HVAC system's air flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

3.10 REPORTING:

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.11 FINAL REPORT:

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.

13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Fan drive settings including settings and percentage of maximum pitch diameter.
    e. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

    1. Quantities of outdoor, supply, return, and exhaust airflows.
    2. Duct, outlet, and inlet sizes.
    3. Balancing stations.
    4. Position of balancing devices.

E. Fan Coil and Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

    1. Unit Data:

        a. Unit identification.
        b. Location.
        c. Make and type.
        d. Model number and unit size.
        e. Manufacturer's serial number.
        f. Unit arrangement and class.
        g. Discharge arrangement.
        h. Sheave make, size in inches (mm), and bore.
        i. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
        j. Number, make, and size of belts.
        k. Number, type, and size of filters.

    2. Motor Data:

        a. Motor make, and frame type and size.
        b. Horsepower and rpm.
        c. Volts, phase, and hertz.
        d. Full-load amperage and service factor.
        e. Sheave make, size in inches (mm), and bore.
        f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

    3. Test Data (Indicated and Actual Values):

        a. Total air flow rate in cfm (L/s).
        b. Total system static pressure in inches wg (Pa).
        c. Fan rpm.
        d. Discharge static pressure in inches wg (Pa).
        e. Filter static-pressure differential in inches wg (Pa).
        f. Cooling-coil static-pressure differential in inches wg (Pa).
        g. Heating-coil static-pressure differential in inches wg (Pa).

h. Outdoor airflow in cfm (L/s).
i. Return airflow in cfm (L/s).
j. Outdoor-air damper position.
k. Return-air damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch (mm) o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).

3. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm (L/s).
b. Average face velocity in fpm (m/s).
c. Air pressure drop in inches wg (Pa).
d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
h. Refrigerant expansion valve and refrigerant types.
i. Refrigerant suction pressure in psig (kPa).
j. Refrigerant suction temperature in deg F (deg C).

G. Gas-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btu/h (kW).
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and rpm.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.

1. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm (L/s).
b. Entering-air temperature in deg F (deg C).
c. Leaving-air temperature in deg F (deg C).
d. Air temperature differential in deg F (deg C).
e. Entering-air static pressure in inches wg (Pa).
f. Leaving-air static pressure in inches wg (Pa).

g. Air static-pressure differential in inches wg (Pa).
h. Low-fire fuel input in Btu/h (kW).
i. High-fire fuel input in Btu/h (kW).
j. Manifold pressure in psig (kPa).
k. High-temperature-limit setting in deg F (deg C).
l. Operating set point in Btu/h (kW).
m. Motor voltage at each connection.
n. Motor amperage for each phase.

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Suction static pressure in inches wg (Pa).

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).
d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated air flow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual air flow rate in cfm (L/s).

j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

J. Instrument Calibration Reports:

1. Report Data:

a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.12 INSPECTIONS:

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.

2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure water flow of at least 5 percent of terminals.
c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
d. Verify that balancing devices are marked with final balance position.
e. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Commissioning Authority.
3. Commissioning Authority. shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.

2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.13 ADDITIONAL TESTS:

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

**END OF SECTION**

## SECTION 23 07 13

## DUCT INSULATION

### PART 1 - GENERAL

1.01 SUMMARY:

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
6. Indoor, exposed, Type I, commercial, kitchen hood exhaust.
7. Indoor concealed oven and warewash exhaust.
8. Indoor exposed oven and warewash exhaust.
9. Outdoor, concealed supply and return.
10. Outdoor, exposed supply and return.

B. Related Sections:

1. Division 23 Section "HVAC Equipment Insulation."
2. Division 23 Section "HVAC Piping Insulation."
3. Division 23 Section "Metal Ducts" for duct liners.

1.02 SUBMITTALS:

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content and chemical components.
2. Laboratory test Reports for credit EQ 4. For adhesives and sealants, documentation indicating that the product complies with the testing and product requirements of the California Department of Health Services “Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small Scale Environmental Chambers,” including 2004 Addenda.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

D. Field quality-control reports.

E. Qualification Data: For Qualified Installer.

F. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction. Indicating, interpreting and certifying test results for compliance of insulation materials.

G. Field Quality Control Reports.

1.03 QUALITY ASSURANCE:

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

**PART 2 - PRODUCTS**

2.01 INSULATION MATERIALS:

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corp.; SoftTouch Duct Wrap.
b. Johns Manville; Microlite.
c. Owens Corning; SOFTR All-Service Duct Wrap.

G. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corp.; Commercial Board.
b. Johns Manville; 800 Series Spin-Glas.
c. Owens Corning; Fiberglas 700 Series.

2.02 FIRE-RATED INSULATION SYSTEMS:

A. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Unifrax Corporation; FyreWrap.
b. 3M; Fire Barrier Wrap Products.
c. Thermal Ceramics; FireMaster Duct Wrap.

2.03 ADHESIVES:

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
4. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
d. Mon-Eco Industries, Inc.; 22-25.

5. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Dow Corning Corporation; 739, Dow Silicone.
b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
c. P.I.C. Plastics, Inc.; Welding Adhesive.
d. Speedline Corporation; Polyco VP Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.04 MASTICS:

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
b. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
b. Eagle Bridges - Marathon Industries; 550.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
d. Mon-Eco Industries, Inc.; 55-50.
e. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms (1.2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.05 SEALANTS:

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
b. Eagle Bridges - Marathon Industries; 405.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.06 FACTORY-APPLIED JACKETS:

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.07 FIELD-APPLIED FABRIC-REINFORCING MESH:

A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. (34 g/sq. m) with a thread count of 10 strands by 10 strands/sq. in. (4 strands by 4 strands/sq. mm), in a Leno weave, for ducts.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
b. Vimasco Corporation; Elastafab 894.

2.08 FIELD-APPLIED JACKETS:

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
    b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
    c. RPR Products, Inc.; Insul-Mate.

2. Sheet and roll stock ready for shop or field sizing.
3. Finish and thickness are indicated in field-applied jacket schedules.
4. Moisture Barrier for Indoor Applications: 1-mil- (0.025-mm-) thick, heat-bonded polyethylene and kraft paper.
5. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.

D. Self-Adhesive Outdoor Jacket: 60-mil- (1.5-mm-) thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white, stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, provide the following:

    a. Polyguard Products, Inc.; Alumaguard 60.

2.09 TAPES:

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches (75 mm).
3. Thickness: 11.5 mils (0.29 mm).
4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. ABI, Ideal Tape Division; 491 AWF FSK.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    c. Compac Corporation; 110 and 111.
    d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches (75 mm).
3. Thickness: 6.5 mils (0.16 mm).

4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for ind.oor and outdoor applications.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches (50 mm).
3. Thickness: 6 mils (0.15 mm).
4. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. ABI, Ideal Tape Division; 488 AWF.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
c. Compac Corporation; 120.
d. Venture Tape; 3520 CW.

2. Width: 2 inches (50 mm).
3. Thickness: 3.7 mils (0.093 mm).
4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

2.10 SECUREMENTS:

A. Aluminum Bands: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 1/2 inch (13 mm) wide with wing seal or closed seal.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

B. Insulation Pins and Hangers:

1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, provide products by one of the following:

1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
2) GEMCO; Perforated Base.
3) Midwest Fasteners, Inc.; Spindle.

b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
c. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, provide products by one of the following:

1) GEMCO; Nylon Hangers.
2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.

b. Baseplate: Perforated, nylon sheet, 0.030 inch (0.76 mm) thick by 1-1/2 inches (38 mm) in diameter.
c. Spindle: Nylon, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches (63 mm).
d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:

a. Products: Subject to compliance with requirements, provide products by one of the following:

1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
2) GEMCO; Peel & Press.
3) Midwest Fasteners, Inc.; Self Stick.

b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
c. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
d. Adhesive-backed base with a peel-off protective cover.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

a. Products: Subject to compliance with requirements, provide products by one of the following:

1) AGM Industries, Inc.; RC-150.
2) GEMCO; R-150.
3) Midwest Fasteners, Inc.; WA-150.
4) Nelson Stud Welding; Speed Clips.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

a. Products: Subject to compliance with requirements, provide products by one of the following:

1) GEMCO.
2) Midwest Fasteners, Inc.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

1. Wire: 0.080-inch (2.0-mm) nickel-copper alloy.
2. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. C & F Wire.

2.11 CORNER ANGLES:

A. PVC Corner Angles: 30 mils (0.8 mm) thick, minimum 1 by 1 inch (25 by 25 mm), PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

B. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14.

**PART 3 - EXECUTION**

3.01 PREPARATION:

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.02 GENERAL INSTALLATION REQUIREMENTS:

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm) o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.03 PENETRATIONS:

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).

1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches (50 mm).
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.04 INSTALLATION OF MINERAL-FIBER INSULATION:

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.

b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not overcompress insulation during installation.
e. Impale insulation over pins and attach speed washers.
f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation

joints. Install additional pins to hold insulation tightly against surface at cross bracing.

c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.

d. Do not overcompress insulation during installation.

e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

   b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches (75 mm).

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.

6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

3.05 FIELD-APPLIED JACKET INSTALLATION:

A. Where FSK jackets are indicated, install as follows:

   1. Draw jacket material smooth and tight.
   2. Install lap or joint strips with same material as jacket.
   3. Secure jacket to insulation with manufacturer's recommended adhesive.
   4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
   5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.

   1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with

weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.06 FIRE-RATED INSULATION SYSTEM INSTALLATION:

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.

B. Insulate duct access panels and doors to achieve same fire rating as duct.

C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07 Section "Penetration Firestopping."

3.07 FINISHES:

A. Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.08 FIELD QUALITY CONTROL:

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.09 DUCT INSULATION SCHEDULE, GENERAL:

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
6. Indoor, exposed, Type I, commercial, kitchen hood exhaust.
7. Outdoor, concealed supply and return.
8. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE:

A. All supply and return and outside air duct insulation shall be mineral fiber blanket or board, 0.75 lb/cu. ft nominal density, of thickness to achieve R 8.0.

B. All exhaust ducts serving Type I Hoods shall be insulated with two layers of 1-1/2 inch thick fire rated duct wrap.

3.11 INDOOR, FIELD-APPLIED JACKET SCHEDULE:

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:

1. None.

D Ducts and Plenums, Exposed:

1. None.

**END OF SECTION**

## SECTION 23 07 19

## HVAC PIPING INSULATION

## PART 1 - GENERAL

1.01 SUMMARY:

A. Section includes insulating the following HVAC piping systems:

1. Refrigerant suction and hot-gas piping, indoors and outdoors.

B. Related Sections:

1. Division 23 Section "HVAC Equipment Insulation."
2. Division 23 Section "Duct Insulation."

1.02 SUBMITTALS:

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For adhesives and sealants, documentation including printed statement of VOC content and chemical components.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

E. Field quality-control reports.

1.03 QUALITY ASSURANCE:

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.04 COORDINATION:

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

## PART 2 - PRODUCTS

2.01 INSULATION MATERIALS:

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

D. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

E. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

F. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, without factory-applied jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.02 INSULATING CEMENTS:

A. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449.

1. Products: Subject to compliance with requirements, provide products by the following:

a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

2.03 ADHESIVES:

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

1. Products: Subject to compliance with requirements, provide products by the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-84.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Aeroflex USA, Inc.; Aeroseal.
b. Armacell LLC; Armaflex 520 Adhesive.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
    b. Eagle Bridges - Marathon Industries; 225.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
    d. Mon-Eco Industries, Inc.; 22-25.

2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.04 MASTICS:

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    b. Vimasco Corporation; 749.

2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
    a. Eagle Bridges - Marathon Industries; 550.
    b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
    c. Mon-Eco Industries, Inc.; 55-50.
    d. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms (1.2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.05 SEALANTS:

A. FSK and Metal Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
b. Eagle Bridges - Marathon Industries; 405.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide products by the following:
2. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

a. Materials shall be compatible with insulation materials, jackets, and substrates.
b. Fire- and water-resistant, flexible, elastomeric sealant.
c. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
d. Color: White.
3. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.06 FACTORY-APPLIED JACKETS:

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
3. PVDC Jacket for Outdoor Applications: 6-mil- (0.15-mm-) thick, white PVDC biaxially oriented barrier film with a permeance at 0.01 perm (0.007 metric perm) when tested according to ASTM E 96/E 96M and with a flame-spread index of 5 and a smoke-developed index of 25 when tested according to ASTM E 84.

a. Products: Subject to compliance with requirements, provide products by the following:

1) Dow Chemical Company (The); Saran 540 Vapor Retarder Film and Saran 560 Vapor Retarder Film.

2.07 FIELD-APPLIED FABRIC-REINFORCING MESH:

A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. (34 g/sq. m) with a thread count of 10 strands by 10 strands/sq. in. (4 strands by 4 strands/sq. mm), in a Leno weave, for pipe.

1. Products: Subject to compliance with requirements, provide products by the following:

a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
b. Vimasco Corporation; Elastafab 894.

2.08 FIELD-APPLIED JACKETS:

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil face, fiberglass-reinforced scrim with kraft-paper backing.

C. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005, Temper H-14.
1. Products: Subject to compliance with requirements, provide products by one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
c. RPR Products, Inc.; Insul-Mate.

2. Sheet and roll stock ready for shop or field sizing.
3. Finish and thickness are indicated in field-applied jacket schedules.
4. Moisture Barrier for Indoor Applications: 1-mil- (0.025-mm-) thick, heat-bonded polyethylene and kraft paper.
5. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
6. Factory-Fabricated Fitting Covers:

a. Same material, finish, and thickness as jacket.
b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
c. Tee covers.
d. Flange and union covers.
e. End caps.
f. Beveled collars.
g. Valve covers.
h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

D. Self-Adhesive Outdoor Jacket: 60-mil- (1.5-mm-) thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors;

consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with stucco-embossed aluminum-foil facing.

1. Products: Subject to compliance with requirements, provide products by the following:

    a. Polyguard Products, Inc.; Alumaguard 60.

2.09 TAPES:

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ

2. Width: 3 inches (75 mm).
3. Thickness: 11.5 mils (0.29 mm).
4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. ABI, Ideal Tape Division; 491 AWF FSK.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    c. Compac Corporation; 110 and 111.
    d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.

2. Width: 3 inches (75 mm).
3. Thickness: 6.5 mils (0.16 mm).
4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide products by one of the following:

    a. ABI, Ideal Tape Division; 370 White PVC tape.
    b. Compac Corporation; 130.
    c. Venture Tape; 1506 CW NS.

2. Width: 2 inches (50 mm).

3. Thickness: 6 mils (0.15 mm).
4. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide products by one of the following:

a. ABI, Ideal Tape Division; 488 AWF.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
c. Compac Corporation; 120.
d. Venture Tape; 3520 CW.

2. Width: 2 inches (50 mm).
3. Thickness: 3.7 mils (0.093 mm).
4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

2.10 SECUREMENTS:

A. Aluminum Bands: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch (0.51 mm) thick, 1/2 inch (13 mm) wide with wing seal or closed seal.
1. Products: Subject to compliance with requirements, provide products by one of the following:

a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

C. Wire: 0.080-inch (2.0-mm) nickel-copper alloy.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. C & F Wire.

## PART 3 - EXECUTION

3.01 PREPARATION:

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.02 GENERAL INSTALLATION REQUIREMENTS:

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm) o.c.

a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.03 PENETRATIONS:

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.04 GENERAL PIPE INSULATION INSTALLATION:

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

.5 Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.05 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION:

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.

2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.06 INSTALLATION OF MINERAL-FIBER PREFORMED PIPE INSULATION:

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches (150 mm) o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.07 FIELD-APPLIED JACKET INSTALLATION:

A. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.

2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

C. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

3.08 FINISHES:

A. Pipe Insulation with ASJ or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.09 FIELD QUALITY CONTROL:

A. Perform tests and inspections.

B. Tests and Inspections:
1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL:

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
1. Drainage piping located in crawl spaces.

2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE:

A. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric or Mineral-fiber, preformed pipe insulation, 1 inch (25 mm) thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing: Flexible elastomeric, 1 inch (25 mm) thick.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE:

A. Refrigerant Suction and Hot-Gas Piping: Insulation shall be one of the following:

1. Flexible Elastomeric: 2 inches (50 mm) thick.

2. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches (50 mm) thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing: Insulation shall be the following:

1. Flexible Elastomeric: 2 inches (50 mm) thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE:

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. None.

D. Piping, Exposed:

1. PVC: 20 mils (0.5 mm) thick.

3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE:

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Concealed:

1. None.

D. Piping, Exposed:

1. PVC: 20 mils (0.5 mm) thick.

**END OF SECTION**

## SECTION 23 23 00

## REFRIGERANT PIPING

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.02 PERFORMANCE REQUIREMENTS

Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 185 psig (1276 kPa).
2. Suction Lines for Heat-Pump Applications: 325 psig (2241 kPa).
3. Hot-Gas and Liquid Lines: 325 psig (2241 kPa).

1.03 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.04 QUALITY ASSURANCE

A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.05 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.01 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:
1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

2.02 VALVES AND SPECIALTIES

Diaphragm Packless Valves:
1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
3. Operator: Rising stem and hand wheel.
4. Seat: Nylon.
5. End Connections: Socket, union, or flanged.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 275 deg F (135 deg C).

B. Packed-Angle Valves:
1. Body and Bonnet: Forged brass or cast bronze.
2. Packing: Molded stem, back seating, and replaceable under pressure.
3. Operator: Rising stem.
4. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
5. Seal Cap: Forged-brass or valox hex cap.
6. End Connections: Socket, union, threaded, or flanged.
7. Working Pressure Rating: 500 psig (3450 kPa).
8. Maximum Operating Temperature: 275 deg F (135 deg C).

C. Check Valves:
1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
3. Piston: Removable polytetrafluoroethylene seat.
4. Closing Spring: Stainless steel.
5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
6. End Connections: Socket, union, threaded, or flanged.
7. Maximum Opening Pressure: 0.50 psig (3.4 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 275 deg F (135 deg C).

D. Service Valves:
1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig (3450 kPa).

E. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.
1. Body and Bonnet: Plated steel.

2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch (16-GRC) conduit adapter, and 24-V ac coil.
6. Working Pressure Rating: 400 psig (2760 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).
8. Manual operator.

F. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
2. Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Seat Disc: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Working Pressure Rating: 400 psig (2760 kPa).
6. Maximum Operating Temperature: 240 deg F (116 deg C).

G. Thermostatic Expansion Valves: Comply with ARI 750.
1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F (4.4 deg C).
6. Superheat: Nonadjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 450 psig (3100 kPa).

H. Straight-Type Strainers:
1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig (3450 kPa).
5. Maximum Operating Temperature: 275 deg F (135 deg C).

I. Angle-Type Strainers:
1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig (3450 kPa).
6. Maximum Operating Temperature: 275 deg F (135 deg C).

J. Moisture/Liquid Indicators:
1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).

K. Replaceable-Core Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina or charcoal.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).

L. Permanent Filter Dryers: Comply with ARI 730.
1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina or charcoal.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).

M. Liquid Accumulators: Comply with ARI 495.
1. Body: Welded steel with corrosion-resistant coating.
2. End Connections: Socket or threaded.
3. Working Pressure Rating: 500 psig (3450 kPa).
4. Maximum Operating Temperature: 275 deg F (135 deg C).

2.03 REFRIGERANTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

DuPont Company; Fluorochemicals Div.
Honeywell, Inc.; Genetron Refrigerants.
INEOS Fluor Americas LLC.

**PART 3 - EXECUTION**

PIPING APPLICATIONS

A. Suction Lines NPS 1-1/2 (DN 40) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

B. Suction Lines NPS 2 to NPS 4 (DN 50 to DN 100) for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

D. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

E. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications:
   1. NPS 1-1/2 (DN 40) and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

F. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

G. Safety-Relief-Valve Discharge Piping:
   1. NPS 1-1/2 (DN 40) and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

3.01 VALVE AND SPECIALTY APPLICATIONS

A. Install diaphragm packless valves in suction and discharge lines of compressor.

B. Install service valves for gage taps at strainers if they are not an integral part of strainers.

C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.

D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.

E. Install a full-sized, three-valve bypass around filter dryers.

F. Install solenoid valves upstream from each expansion valve. Install solenoid valves in horizontal lines with coil at top.

G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
   1. Install valve so diaphragm case is warmer than bulb.
   2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
   3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

H. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
   1. Solenoid valves.
      a. Thermostatic expansion valves.
      b. Compressor.

K. Install filter dryers in liquid line between compressor and thermostatic expansion valve.

L. See Evaluations for discussion of flexible connectors.

M. Install flexible connectors at compressors.

3.02 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate

friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls" for solenoid valve controllers, control wiring, and sequence of operation.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Install refrigerant piping in protective conduit where installed belowground.

N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:
   1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
   2. Install horizontal suction lines with a uniform slope downward to compressor.
      a. Use double-suction riser for maximum compressor efficiencies if load variation is expected.
   3. Install traps and double risers to entrain oil in vertical runs.
      a. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

R. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping."

T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section "Escutcheons for HVAC Piping."

3.03 PIPE JOINT CONSTRUCTION

A. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

B. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
   2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.04 HANGERS AND SUPPORTS

A. Piping hangers and supports must accommodate expansion and contraction, vibration, dead load of piping and its contents, and seismic-bracing requirements.

B. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

C. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
   2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.
   5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

D. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

   1. NPS 1/2 (DN 15): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
   2. NPS 5/8 (DN 18): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
   3. NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod size, 1/4 inch (6.4 mm).
   4. NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
   5. NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
   6. NPS 2 (DN 50): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).

E. Support multifloor vertical runs at least at each floor.

3.05 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
b. Fill system with nitrogen to the required test pressure.
c. System shall maintain test pressure at the manifold gage throughout duration of test.
d. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
e. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.06 SYSTEM CHARGING

A. Charge system using the following procedures:
1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
4. Charge system with a new filter-dryer core in charging line.

3.07 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

**END OF SECTION**

# SECTION 23 31 13

# METAL DUCTS

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.02 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7. SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.

8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

C. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

D. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:

a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Sprinklers.
e. Access panels.
f. Perimeter moldings.

E. Welding certificates.

1.04 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
3. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
4. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

## PART 2 - PRODUCTS

2.01 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.02 ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Lindab Inc.
McGill AirFlow LLC.
SEMCO Incorporated.
Sheet Metal Connectors, Inc.
Spiral Manufacturing Co., Inc.

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible.

1. Transverse Joints in Ducts Larger Than 60 Inches (1524 mm) in Diameter: Flanged.

D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger Than 90 inches (2286 mm) in diameter with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.03 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90 (Z275).
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

E. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.04 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width:3 inches (76 mm).
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and shall be rated for 10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.05 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.

3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.06 SEISMIC-RESTRAINT DEVICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.; a division of Cooper Industries.
2. Ductmate Industries, Inc.
3. Hilti Corp.
4. Kinetics Noise Control.
5. Loos & Co.; Cableware Division.
6. Mason Industries.
7. TOLCO; a brand of NIBCO INC.
8. Unistrut Corporation; Tyco International, Ltd.

B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of the ICC Evaluation Service.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

D. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

**PART 3 - EXECUTION**

3.01 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.02 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.03 ADDITIONAL INSTALLATION REQUIREMENTS FOR COMMERCIAL KITCHEN HOOD EXHAUST DUCT

A. Install commercial kitchen hood exhaust ducts without dips and traps that may hold grease, and sloped a minimum of 2 percent to drain grease back to the hood.

B. Install fire-rated access panel assemblies at each change in direction and at maximum intervals of 20 feet (6 m) in horizontal ducts, and at every floor for vertical ducts, or as indicated on Drawings. Locate access panel on top or sides of duct a minimum of 1-1/2 inches (38 mm) from bottom of duct.

C. Do not penetrate fire-rated assemblies except as allowed by applicable building codes and authorities having jurisdiction.

## 3.04 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
   1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
   2. Outdoor, Supply-Air Ducts: Seal Class A.
   3. Outdoor, Exhaust Ducts: Seal Class C.
   4. Outdoor, Return-Air Ducts: Seal Class C.
   5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class B.
   6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class A.
   7. Unconditioned Space, Exhaust Ducts: Seal Class C.
   8. Unconditioned Space, Return-Air Ducts: Seal Class B.
   9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg (500 Pa) and Lower: Seal Class C.
   10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg (500 Pa): Seal Class B.
   11. Conditioned Space, Exhaust Ducts: Seal Class B.
   12. Conditioned Space, Return-Air Ducts: Seal Class C.

## 3.05 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

   1. Where practical, install concrete inserts before placing concrete.
   2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
   3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
   4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
   5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet (5 m).

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## 3.06 SEISMIC-RESTRAINT-DEVICE INSTALLATION

A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems" and ASCE/SEI 7.

1. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m) o.c.
2. Brace a change of direction longer than 12 feet (3.7 m).

B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install cable restraints on ducts that are suspended with vibration isolators.

E. Install seismic-restraint devices using methods approved by an evaluation service member of the ICC Evaluation Service.

F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

G. Drilling for and Setting Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

## 3.07 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

## 3.08 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat black latex paint over a compatible galvanized steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

## 3.09 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

## 3.10 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected to Fan Coil Units:

a. Pressure Class: Positive 1-inch wg (250 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Constant-Volume Air-Handling Units:

a. Pressure Class: Positive 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

3. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

B. Return Ducts:

1. Ducts Connected to Fan Coil Units:

a. Pressure Class: Positive or negative 1-inch wg (250 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Air-Handling Units:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).
a. Minimum SMACNA Seal Class: B.
b. SMACNA Leakage Class for Rectangular: 12.
c. SMACNA Leakage Class for Round and Flat Oval: 12.

3. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

C. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

a. Pressure Class: Negative 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
c. SMACNA Leakage Class for Rectangular: 12.

d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Air-Handling Units or supply fans:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

3. Ducts Connected to Commercial Kitchen Hoods: Comply with NFPA 96.

a. Exposed to View: Type 304, stainless-steel sheet, No. 4 finish.
b. Concealed: Type 304, stainless-steel sheet, No. 2D finish.
c. Welded seams and joints.
d. Pressure Class: Positive or negative 3-inch wg (750 Pa).
e. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
f. SMACNA Leakage Class: 3.

4. Ducts Connected to Dishwasher Hoods:

a. Type 304, stainless-steel sheet.
b. Exposed to View: No. 4 finish.
c. Concealed: No. 2D finish.
d. Welded seams and flanged joints with watertight EPDM gaskets.
e. Pressure Class: Positive or negative 2-inch wg (500 Pa).
f. Minimum SMACNA Seal Class: Welded seams, joints, and penetrations.
g. SMACNA Leakage Class: 3.

5. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

D. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:

1. Ducts Connected to Fan Coil Units:

a. Pressure Class: Positive or negative 1-inch wg (250 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

2. Ducts Connected to Air-Handling Units:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

4. Ducts Connected to Equipment Not Listed Above:

a. Pressure Class: Positive or negative 2-inch wg (500 Pa).

b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts:

a. Exposed to Airstream: Match duct material.
b. Not Exposed to Airstream: Galvanized.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
2. Velocity 1000 fpm (5 m/s) or Lower:

a. Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
b. Mitered Type RE 4 without vanes.

3. Velocity 1000 to 1500 fpm (5 to 7.6 m/s):

a. Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

5. Velocity 1500 fpm (7.6 m/s) or Higher:

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

6. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

7. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
b. Velocity 1000 fpm (5 m/s) or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.

c. Velocity 1000 to 1500 fpm (5 to 7.6 m/s): 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
d. Velocity 1500 fpm (7.6 m/s) or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
e. Radius-to Diameter Ratio: 1.5.

7. Round Elbows, 12 Inches (305 mm) and Smaller in Diameter: Stamped or pleated.
8. Round Elbows, 14 Inches (356 mm) and Larger in Diameter: Standing seam.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.

2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.

a. Velocity 1000 fpm (5 m/s) or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm (5 to 7.6 m/s): Conical tap.
c. Velocity 1500 fpm (7.6 m/s) or Higher: 45-degree lateral.

**END OF SECTION**

# SECTION 23 33 00
# AIR DUCT ACCESSORIES

## PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Backdraft and pressure relief dampers.
2. Manual volume dampers.
3. Control dampers.
4. Fire dampers.
5. Smoke dampers.
6. Flange connectors.
7. Turning vanes.
8. Duct-mounted access doors.
9 Flexible connectors.
10. Flexible ducts.
11. Duct accessory hardware.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Control damper installations.
d. Fire-damper and smoke-damper installations, including sleeves; and duct-mounted access doors.
e. Wiring Diagrams: For power, signal, and control wiring.

C. Operation and maintenance data.

1.03 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with AMCA 500-D testing for damper rating.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G90 (Z275).
2. Exposed-Surface Finish: Mill phosphatized.

C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.

D. Extruded Aluminum: Comply with ASTM B 221 (ASTM B 221M), Alloy 6063, Temper T6.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.02 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Air Balance Inc.; a division of Mestek, Inc.
American Warming and Ventilating; a division of Mestek, Inc.
Cesco Products; a division of Mestek, Inc.
Duro Dyne Inc.
Greenheck Fan Corporation.
Lloyd Industries, Inc.
Nailor Industries Inc.
NCA Manufacturing, Inc.
Pottorff; a division of PCI Industries, Inc.
Ruskin Company.
SEMCO Incorporated.
Vent Products Company, Inc.

B. Description: Gravity balanced.

C. Maximum Air Velocity: 2000 fpm (10 m/s).

D. Maximum System Pressure: 2-inch wg (0.5 kPa).

E. Frame: 0.052-inch- (1.3-mm-) thick, galvanized sheet steel.

F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch (150-mm) width, 0.025-inch- (0.6-mm-) thick, roll-formed aluminum with sealed edges.

G. Blade Action: Parallel.

H. Blade Seals: Extruded vinyl, mechanically locked.

I. Blade Axles:
1. Material: Galvanized steel.
2. Diameter: 0.20 inch (5 mm).

J. Tie Bars and Brackets: Galvanized steel.

K. Return Spring: Adjustable tension.

L. Bearings: Steel ball or synthetic pivot bushings.

M. Accessories:

1. Adjustment device to permit setting for varying differential static pressure.
2. Counterweights and spring-assist kits for vertical airflow installations.
3. Electric actuators.
4. Chain pulls.
5. Screen Mounting: Front mounted in sleeve.

    a. Sleeve Thickness: 20-gage (1.0-mm) minimum.
    b. Sleeve Length: 6 inches (152 mm) minimum.

6. Screen Mounting: Rear mounted.
7. Screen Material: Aluminum.
8. Screen Type: Bird.
9. 90-degree stops.

2.03 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    Air Balance Inc.; a division of Mestek, Inc.
    American Warming and Ventilating; a division of Mestek, Inc.
    Flexmaster U.S.A., Inc.
    McGill AirFlow LLC.
    METALAIRE, Inc.
    Nailor Industries Inc.
    Pottorff; a division of PCI Industries, Inc.
    Ruskin Company.
    Trox USA Inc.
    Vent Products Company, Inc.

2. Standard leakage rating, with linkage outside airstream.
3. Suitable for horizontal or vertical applications.
4. Frames:

    a. Hat-shaped, galvanized-steel channels, 0.064-inch (1.62-mm) minimum thickness.
    b. Mitered and welded corners.
    c. Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:

    a. Multiple or single blade.
    b. Parallel- or opposed-blade design.
    c. Stiffen damper blades for stability.
    d. Galvanized-steel, 0.064 inch (1.62 mm) thick.

6. Blade Axles: Galvanized steel.
7. Bearings:

a. Oil-impregnated bronze.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Tie Bars and Brackets: Galvanized steel.

B. Jackshaft:

1. Size: 1-inch (25-mm) diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

2.04 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

American Warming and Ventilating; a division of Mestek, Inc.
Arrow United Industries; a division of Mestek, Inc.
Cesco Products; a division of Mestek, Inc.
Duro Dyne Inc.
Flexmaster U.S.A., Inc.
Greenheck Fan Corporation.
Lloyd Industries, Inc.
M&I Air Systems Engineering; Division of M&I Heat Transfer Products Ltd.
McGill AirFlow LLC.
METALAIRE, Inc.
Metal Form Manufacturing, Inc.
Nailor Industries Inc.
NCA Manufacturing, Inc.
Ruskin Company.
Vent Products Company, Inc.
Young Regulator Company.

B. Frames:

1. Hat U or Angle shaped.
2. Galvanized-steel channels, 0.064 inch (1.62 mm) thick.
3. Mitered and welded corners.

C. Blades:

1. Multiple blade with maximum blade width of 8 inches (200 mm).
2. Parallel- and opposed-blade design.
3. Galvanized steel.
4. 0.064 inch (1.62 mm) thick.
5. Blade Edging: Closed-cell neoprene edging.

6 Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.

D. Blade Axles: 1/2-inch- (13-mm-) diameter; galvanized steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.

1. Operating Temperature Range: From minus 40 to plus 200 deg F (minus 40 to plus 93 deg C).

E. Bearings:

1. Oil-impregnated bronze.
2. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
3. Thrust bearings at each end of every blade.

2.05 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Pottorff; a division of PCI Industries, Inc.
Greenheck Fan Corporation.
Nailor Industries Inc.
Ruskin Company.

B. Type: Static and dynamic; rated and labeled according to UL 555 and UL 555S by an NRTL.

C. Closing rating in ducts up to 4-inch wg (1-kPa) static pressure class and minimum 4000-fpm (20-m/s) velocity.

D. Fire Rating: 1-1/2 hours.

E. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- (0.85-mm-) thick galvanized steel; with mitered and interlocking corners.

F. Heat-Responsive Device: Replaceable, 165 deg F (74 deg C) rated, fusible links.

G. Smoke Detector: Integral, factory wired for single-point connection.

H. Blades: Roll-formed, horizontal, interlocking, 0.034-inch- (0.85-mm-) thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- (0.85-mm-) thick, galvanized-steel blade connectors.

I. Leakage: Class I.

J. Rated pressure and velocity to exceed design airflow conditions.

K. Mounting Sleeve: Factory-installed, 0.052-inch- (1.3-mm-) thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking.

L. Master control panel for use in dynamic smoke-management systems.

M. Damper Motors: Two-position action.

N. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 23 Section "Instrumentation and Control for HVAC."
3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 150 in. x lbf (17 N x m).
5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at 0 deg F.
6. Nonspring-Return Motors: For dampers larger than 25 sq. ft. (2.3 sq. m), size motor for running torque rating of 150 in. x lbf (17 N x m) and breakaway torque rating of 300 in. x lbf (34 N x m).
7. Electrical Connection: 115 V, single phase, 60 Hz.

O. Accessories:

1. Auxiliary switches for fan control.
2. Test and reset switches, damper mounted.

2.06 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Ductmate Industries, Inc.
Nexus PDQ; Division of Shilco Holdings Inc.
Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.

D. Gage and Shape: Match connecting ductwork.

2.07 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Ductmate Industries, Inc.
Duro Dyne Inc.
METALAIRE, Inc.
SEMCO Incorporated.
Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

E. Vane Construction: Single wall.

F. Vane Construction: Single wall for ducts up to 48 inches (1200 mm) wide and double wall for larger dimensions.

2.08 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

American Warming and Ventilating; a division of Mestek, Inc.
Cesco Products; a division of Mestek, Inc.
Ductmate Industries, Inc.
Flexmaster U.S.A., Inc.
Greenheck Fan Corporation.
McGill AirFlow LLC.
Nailor Industries Inc.
Pottorff; a division of PCI Industries, Inc.
Ventfabrics, Inc.
Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2 (7-2M), "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."

1. Door:

a. Double wall, rectangular.
b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
c. Vision panel.
d. Hinges and Latches: 1-by-1-inch (25-by-25-mm) butt or piano hinge and cam latches.
e. Fabricate doors airtight and suitable for duct pressure class.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

a. Access Doors Less Than 12 Inches (300 mm) Square: No hinges and two sash locks.
b. Access Doors up to 18 Inches (460 mm) Square: Two hinges and two sash locks.
c. Access Doors up to 24 by 48 Inches (600 by 1200 mm): Three hinges and two compression latches with outside and inside handles.
d. Access Doors Larger Than 24 by 48 Inches (600 by 1200 mm): Four hinges and two compression latches with outside and inside handles.

C. Pressure Relief Access Door:

1. Door and Frame Material: Galvanized sheet steel.

2. Door: Single wall with metal thickness applicable for duct pressure class.
3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
4. Factory set at 10-inch wg (2500 Pa).
5. Doors close when pressures are within set-point range.
6. Hinge: Continuous piano.
7. Latches: Cam.
8. Seal: Neoprene or foam rubber.
9. Insulation Fill: 1-inch- (25-mm-) thick, fibrous-glass or polystyrene-foam board.

2.09 DUCT ACCESS PANEL ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Ductmate Industries, Inc.
Flame Gard, Inc.
3M.

B. Labeled according to UL 1978 by an NRTL.

C. Panel and Frame: Minimum thickness 0.0528-inch (1.3-mm) carbon steel.

D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.

E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F (1093 deg C).

F. Minimum Pressure Rating: 10-inch wg (2500 Pa), positive or negative.

2.10 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Ductmate Industries, Inc.
Duro Dyne Inc.
Ventfabrics, Inc.
Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip [3-1/2 inches (89 mm)] [5-3/4 inches (146 mm)] wide attached to 2 strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd. (810 g/sq. m).
2. Tensile Strength: 530 lbf/inch (93 N/mm) in the warp and 440 lbf/inch (77 N/mm) in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F (Minus 45 to plus 121 deg C).

G. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch (6-mm) movement at start and stop.

2.11 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Flexmaster U.S.A., Inc.
McGill AirFlow LLC.
Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Noninsulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.
2. Maximum Air Velocity: 4000 fpm (20 m/s).
3. Temperature Range: Minus 10 to plus 160 deg F (Minus 23 to plus 71 deg C).

C. Noninsulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire.

1. Pressure Rating: 4-inch wg (1000 Pa) positive and 0.5-inch wg (125 Pa) negative.
2. Maximum Air Velocity: 4000 fpm (20 m/s).
3. Temperature Range: Minus 20 to plus 175 deg F (Minus 29 to plus 79 deg C).

D. Noninsulated, Flexible Duct: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.
2. Maximum Air Velocity: 4000 fpm (20 m/s).
3. Temperature Range: Minus 20 to plus 210 deg F (Minus 29 to plus 99 deg C).

E. Noninsulated, Flexible Duct: UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound, spring-steel wire.

1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.

2. Maximum Air Velocity: 4000 fpm (20 m/s).
3. Temperature Range: Minus 20 to plus 210 deg F (Minus 29 to plus 99 deg C).

F. Noninsulated, Flexible Duct: UL 181, Class 0, interlocking spiral of aluminum foil.

1. Pressure Rating: 8-inch wg (2280 Pa) positive or negative.
2. Maximum Air Velocity: 5000 fpm (25 m/s).
3. Temperature Range: Minus 100 to plus 435 deg F (Minus 73 to plus 224 deg C).

G. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.

1. Pressure Rating: 4-inch wg (1000 Pa) positive and 0.5-inch wg (125 Pa) negative.
2. Maximum Air Velocity: 4000 fpm (20 m/s).
3. Temperature Range: Minus 20 to plus 175 deg F (Minus 29 to plus 79 deg C).
4. Insulation R-Value: Title 24.

H. Flexible Duct Connectors:

1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches (75 through 460 mm), to suit duct size.
2 Non-Clamp Connectors: Adhesive plus sheet metal screws.

2.12 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft and/or control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Install fire and smoke dampers according to UL listing.

H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. On both sides of duct coils.
2. Upstream from duct filters.
3. At outdoor-air intakes and mixed-air plenums.
4. At drain pans and seals.
5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors; and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
7. At each change in direction and at maximum 50-foot (15-m) spacing.
8. Upstream from turning vanes.
9. Control devices requiring inspection.
10. Elsewhere as indicated.

I. Install access doors with swing against duct static pressure.

J. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
3. Head and Hand Access: 18 by 10 inches (460 by 250 mm).
4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
5. Body Access: 25 by 14 inches (635 by 355 mm).
6. Body plus Ladder Access: 25 by 17 inches (635 by 430 mm).

K. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

L. Install flexible connectors to connect ducts to equipment.

M. For fans developing static pressures of 5-inch wg (1250 Pa) and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

N. Connect diffusers or light troffer boots to ducts directly or with maximum 60-inch (1500-mm) lengths of flexible duct clamped or strapped in place.

O. Connect flexible ducts to metal ducts with liquid adhesive plus tape or adhesive plus sheet metal screws.

P. Install duct test holes where required for testing and balancing purposes.

Q. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch (6-mm) movement during start and stop of fans.

3.02 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.

**END OF SECTION**

## SECTION 23 34 23

## HVAC POWER VENTILATORS

### PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Utility set fans.
2. Ceiling mounted fans.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
4. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.

C. Operation and maintenance data.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

### PART 2 - PRODUCTS

2.01 UTILITY SET FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Greenheck Fan Corporation.
Loren Cook Company .
American Coolair Corporation.
Ammerman; Millennium Equipment.
Breidert Air Products.
Carnes Company.
Delhi Industries Inc.
Hartzell Fan Incorporated.
JencoFan.

B. Housing: Fabricated of galvanized steel with side sheets fastened with a deep lock seam or welded to scroll sheets.

1. Housing Discharge Arrangement: Adjustable to eight standard positions.

C. Fan Wheels: Single-width, single inlet; welded to cast-iron or cast-steel hub and spun-steel inlet cone, with hub keyed to shaft.

1. Blade Materials: Steel.
2. Blade Type: Backward inclined.

D. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.

E. Shaft Bearings: Prelubricated and sealed, self-aligning, pillow-block-type ball bearings with ABMA 9, $L_{50}$ of 200,000 hours.

1. Extend grease fitting to accessible location outside of unit.

F. Belt Drives:

1. Factory mounted, with final alignment and belt adjustment made after installation
2. Service Factor Based on Fan Motor Size: 1.5.
3. In "Motor Pulleys" Subparagraph below, the 5-hp limit is standard with many manufacturers but is a designer's choice.
4. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
5. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
6. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.

G. Accessories:

1. Inlet and Outlet: Flanged.
2. Companion Flanges: Rolled flanges for duct connections of same material as housing.
3. Backdraft Dampers: Gravity actuated with counterweight and interlocking aluminum blades with felt edges in steel frame installed on fan discharge.
4. Access Door: Gasketed door in scroll with latch-type handles.
5. Scroll Dampers: Single-blade damper installed at fan scroll top with adjustable linkage.
6. Inlet Screens: Removable wire mesh.
7. Drain Connections: NPS 3/4 threaded coupling drain connection installed at lowest point of housing.
8. Weather Hoods: Weather resistant with stamped vents over motor and drive compartment.
9. Discharge Dampers: Assembly with opposed blades constructed of two plates formed around and to shaft, channel frame, sealed ball bearings, with blades linked outside of airstream to single control lever of same material as housing.
10. Variable Inlet Vanes: With blades supported at both ends with two permanently lubricated bearings of same material as housing. Variable mechanism terminating in single control lever with control shaft for double-width fans.
11. Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.

H. Vibration Isolators:

1. Type: Spring isolators
2. Static Deflection: 2”

2.02 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

B. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:

Air King.
Broan-NuTone LLC; NuTone Inc.
Greenheck Fan Corporation.
Loren Cook Company.
PennBarry.

C. Housing: Steel, lined with acoustical insulation.

D. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

E. Grille: Plastic louvered grille with flange on intake and thumbscrew attachment to fan housing.

F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

G. Accessories:

1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
3. Isolation: Rubber-in-shear vibration isolators.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Secure roof-mounted fans to roof curbs with cadmium-plated hardware. See Division 07 Section "Roof Accessories" for installation of roof curbs.

B. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

C. Support suspended units from structure using threaded steel rods and spring hangers with vertical-limit stops having a static deflection of 1 inch (25 mm). Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

D. Install units with clearances for service and maintenance.

E. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

3.02 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.03 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
10. Shut unit down and reconnect automatic temperature-control operators.
11. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Prepare test and inspection reports.

3.04 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

**END OF SECTION**

## SECTION 23 37 13

## DIFFUSERS, REGISTERS, AND GRILLES

### PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Adjustable bar registers and grilles.
2. Fixed face registers and grilles.

B. Related Sections:

1. Division 08 Section "Louvers and Vents" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
2. Division 23 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

a. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.01 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following:

Titus.
Anemostat Products; a Mestek company.
Carnes.
Dayus Register & Grille Inc.
Hart & Cooley Inc.
Krueger.
METALAIRE, Inc.
Nailor Industries Inc.
Price Industries.
Tuttle & Bailey.

3. Material: Steel.
4. Finish: Baked enamel, color selected by Architect.
5. Face Blade Arrangement: Horizontal spaced 3/4 inch (19 mm) apart.

6. Core Construction: Integral.
7. Rear-Blade Arrangement: Vertical spaced 3/4 inch (19 mm) apart.
8. Frame: 1-1/4 inches (32 mm) wide.
9. Mounting: Countersunk screw Lay in.
10. Damper Type: Adjustable opposed blade.

B. Fixed Face Grille:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide one of the following:

Titus
Anemostat Products; a Mestek company.
Carnes.
Dayus Register & Grille Inc.
Hart & Cooley Inc.
Krueger.
Nailor Industries Inc.
Price Industries.
Tuttle & Bailey.

3. Material: Steel.
4. Finish: Baked enamel, color selected by Architect.
5. Face Arrangement: 1/2-by-1/2-by-1/2-inch (13-by-13-by-13-mm) grid core.
6. Core Construction: Integral.
7. Frame: 1-1/4 inches (32 mm) wide.
8. Mounting: Countersunk screw Lay in.

2.02 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.02 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION**

## SECTION 23 81 26

## SPLIT-SYSTEM AIR-CONDITIONERS

### PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes variable refrigerant flow split-system air-conditioning and heat-pump units for a heat recovery system consisting of separate evaporator-fan and compressor-condenser components.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

C. Field quality-control reports.

D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Sample of special warranty.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
LEED-NC Prerequisite EQ 1 requires compliance with requirements in ASHRAE 62.1-2004. In addition to establishing minimum ventilation rates, ASHRAE 62.1-2004 includes requirements for controls, surfaces in contact with the airstream, particulate and gaseous filtration, humidification and dehumidification, drain-pan construction and connection, finned-tube coil selection and cleaning, and equipment access. See "LEED Rating System" Article in the Evaluations for discussion on this prerequisite. Verify, with manufacturers, availability of units with components and features that comply with these requirements. ASHRAE 62.1-2007 is now the current version but LEED Version 2.2 explicitly refers to the 2004 edition without amendments.

3. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-Up." LEED-NC Prerequisite EA 2 requires minimum efficiency equal to requirements in ASHRAE/IESNA 90.1-2004. See "LEED Rating System" Article in the Evaluations for discussion on this prerequisite.

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004.

1.05 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. For Compressor: Five year(s) from date of Substantial Completion.
b. For Parts: One year(s) from date of Substantial Completion.
c. For Labor: One year(s) from date of Substantial Completion.

1.07 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set for each air-handling unit.
2. Gaskets: One set for each access door.
3. Fan Belts: One set for each air-handling unit fan.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Lennox
Carrier
First Co
Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
Panasonic Corporation of North America.
SANYO North America Corporation; SANYO Fisher Company.

2.02 INDOOR UNITS

A. Concealed Evaporator-Fan Components:

1. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
2. Insulation: Faced, glass-fiber duct liner.
3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 210/240.
4. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
5. Fan Motors:

    a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
    b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
    c. Wiring Terminations: Connect motor to chassis wiring with plug connection.

6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2013.
7. Filters: Disposable MERV-13.
8. Condensate Drain Pans:

    a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.

        1) Length: Extend drain pan downstream from leaving face.
        2) Depth: A minimum of 2 inches deep.

    b. Single-wall, galvanized-steel sheet.
    c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.

        1) Minimum Connection Size: 3/4”.

    d. Pan-Top Surface Coating: Asphaltic waterproofing compound.
    e. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

## 2.03 OUTDOOR UNITS

A. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing. Shall contain one double spiral subcooling heat exchanger per refrigerant port.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

    a. Compressor Type: Scroll.
    b. Inverter driven compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
    c. LEED Credit EA 4 awards a single point if all HVAC&R equipment has HCFC-free refrigerants. R-407C and R-410A are HCFC-free refrigerants.

d. Refrigerant Charge: R-410A.
e. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 210/240. Provide electronically controlled expansion valve.

3. Fan: Aluminum-propeller type, directly connected to motor.
4. Motor: Permanently lubricated, with integral thermal-overload protection.
5. Mounting Base: Polyethylene.

2.04 ACCESSORIES

A. Control equipment and sequence of operation are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."

B. Thermostat: Low voltage with subbase to control compressor and evaporator fan.

C. Automatic-reset timer to prevent rapid cycling of compressor.

D. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

E. Drain Hose: For condensate.

F. G. Additional Monitoring:
1. Monitor constant and variable motor loads.
2. Monitor cooling load.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install roof-mounted, compressor-condenser components on equipment supports specified in Division 07 Section "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.

D. Install seismic restraints.

E. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch (25 mm). See Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

F. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.02 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.04 STARTUP SERVICE

A. Engage a factory authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer’s written instructions.
2. Verify that refrigerant charge is sufficient and piping has been leak tested.

3.05 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain units.

**END OF SECTION**

# SECTION 260501

# GENERAL ELECTRICAL REQUIREMENTS

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the general requirements for Division 26 - Electrical.

1. Division 1 and the General Conditions apply to all work of this section.

2. Division 26 supplements the applicable requirements of other Divisions.

B. The Work includes all labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the drawings and/or specified herein.

1. Examine all divisions for related work required to be included as work under this division.

C. Owner-furnished items: Pick up Owner-furnished items and handle, deliver, install, and make all final connections.

1. Assume responsibility for the items when consigned at the storage facility in accord with requirements of the Contract Documents.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. NEC National Electrical Code (NFPA 70)
5. NEMA National Electrical Manufacturers Association
6. NFPA National Fire Protection Association
7. UL Underwriters Laboratories, Inc.

1.03 QUALITY ASSURANCE

A. Regulation: All the electrical equipment and materials, including their installation, shall conform to the following latest applicable codes and standards:

1. National Electrical Code (NEC).
2. California State Fire Marshal.
3. Occupational Safety and Health Act (OSHA).
4. Requirements of Serving Utility Companies.
5. Local Codes and Ordinances.
6. Requirements of the California Division of the State (DSA).

7. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.
8. California Administrative Code, Title 24.
9. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply.

B. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.

1.04 SUBMITTALS

A. Submit all of the items described in Paragraphs 1, 2, and 3 (below) as a single submittal. Partial submittals will not be accepted. Contractor shall review submittals for conformance with Contract Documents, and make necessary revisions. Contractor shall also verify dimensions of equipment and be satisfied as to fit and that they comply with all code requirements relating to adequacy and clear working space. Submit the following in accordance with Division 1, with the additional electrical systems-related document requirements and additional number of copy sets as specified below:

1. Detailed shop drawings and associated product data/material lists (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:

   a. Medium voltage switchgear
   b. Substations
   c. Switchboards
   d. Panelboards
   e. Engine generator systems
   f. Motor control centers
   g. Lighting control equipment
   h. Fire alarm system
   i. Public address/sound systems

2. Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following:

   a. Component Anchorage Requirements:

      1) All mechanical, plumbing, and electrical components shall be anchored and installed per the details on the DSA approved construction documents. Where no detail is indicated, the following components shall be anchored or braced to meet the force and displacement requirements prescribed in the 2010 CBC. Sections 1615A.1.12 through 1615A.1.22 and ASCE 7-05 Chapter 6 and 13:

         a) All permanent equipment and components.

         b) Temporary or movable equipment that is permanently attached (e.g. hard wired) to the building utility services such as electricity, gas or water.

         c) Movable equipment which is stationed in one place for more than 8 hours and heavier than 400 pounds are required to be anchored with temporary attachments.

      2) The attachments of the following mechanical and electrical components shall be positively attached to the structure but need not be detailed on

the plans. These components shall have flexible connections provided between the component and associated ductwork, piping and conduit:

a) Components weighing less than 400 pounds and have a center of mass located 4 feet or less above the adjacent floor or roof level that directly support the component.

b) Components weighing less than 20 pounds, or in the case of distributed systems, less than 5 pounds per foot which are suspended from a roof or floor or hung from a wall.

3) For those elements that do not require details on the approved drawings, the installation shall be subject to the approval of the Structural Engineer of Record and the DSA District Structural Engineer. The project inspector will verify that all components and equipment have been anchored in accordance with above requirements.

b. Piping, Ductwork, and Electrical Distribution System Bracing requirements:

1) Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-05 Section 13.3 as defined in ASCE 7-05 Section 13.6.8, 13.6.7, 13.6.5.6, and 2010 CBC, Section 1615A.1.20, 1615A.1.21 and 1615A.1.22.

2) The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the OSHPD Pre-Approvals (OPA #) as modified to satisfy anchorage requirements of ACI 318, Appendix D.

3) Copies of the manual shall be available on the jobsite prior to the start of hanging and bracing of the pipe, ductwork, and electrical distribution systems.

4) The Structural Engineer of Record shall verify the adequacy of the structure to support the hanger and brace loads.

3. Product data/material lists (also see applicable technical specification sections following for additional requirements), at least six submittal document sets, for:

a. Raceways
b. Cable trays
c. Underground duct and fittings
d. Precast concrete pullboxes
e. Building wire and cable
f. Medium voltage cable
g. Cabinets, boxes and fittings
h. Wiring devices
i. Grounding components
j. Supporting devices
k. Nameplates and identification markers/labels
l. Enclosed circuit breakers
m. Overcurrent protective devices
n. Enclosed switches
o. Enclosed transfer switches
p. Enclosed motor controllers
q. Transformers

r. Lighting fixtures and associated equipment
s. Lighting system control equipment and devices

4. Substitutions

Catalog numbers and specific brands or trade names followed by designation "or equal" are used in conjunction with material and equipment required by the Specifications to establish the standards of quality, utility, and appearance required. Substitutions which are equal in quality, safety, and appearance to those specified may be accepted, subject to the following provisions:

a. All substitutions must be submitted in writing to the Owner. Contractor shall submit to the Owner a typewritten list containing a description of each proposed substitute material or equipment.

b. The Owner will accept, in writing, proposed substitutions that are, in the Owner's opinion, equal in quality, utility and appearance to the material or equipment specified. Such acceptance shall not relieve Contractor from complying with the requirements of the Drawings and the Specifications.

c. Contractor shall be responsible for all costs of any changes resulting from Contractor's proposed substitutions which affect other parts of the Work or the work of separate Contractors.

1) Contractor also agrees to compensate the Owner for time and expenses spent reviewing substitutions.

d. The decision of the Owner shall be final.

5. Submit protective device coordination and short circuit calculations conducted and documented to demonstrate: (1) selective coordination, and (2) that electrical equipment and protective devices proposed provide adequate interrupting and withstand capability. The written calculation procedures and tabulated results shall be bound and submitted - six submittal document sets. Section 26 0573 "Protective Device Coordination and Short Circuit Study", is applicable as included in these Specifications.

6. Submit test results (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:

a. Transformers
b. Ground fault protection coordination
c. Engine generator system
d. Fire alarm system
e. Public address/sound system

7. Submit operating, maintenance and instructional data (also see applicable technical specification sections following for additional requirements), six submittal document sets, for:

a. Switchboards
b. Engine generators
c. Transfer switches
d. Fire alarm system
e. Public address/sound system

8. Instruction Materials (also see applicable technical specification sections following for

additional requirements), six submittal document sets, for:

a. Provide prior to the time of the personnel instruction period, instruction manuals associated with all systems listed above.

b. Include the following information, as a minimum, in each copy of the instruction manual:

1) Manufacturers' names and addresses.

2) Serial numbers of items furnished.

3) Catalog cuts, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and the intended use.

4) Recommended maintenance procedures.

B. Project record documents:

1. Mark Record Documents daily to indicate all changes made in the field.

a. In addition to general requirements of Record Documents, indicate on Project Record Drawings all changes of equipment locations and ratings, fuse sizes, trip sizes and settings on magnetic-only circuit breakers.

b. Alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one line diagrams, control diagrams and schedules.

2. Use green to indicate deletions and red to indicate additions.

a. Use the same symbols and follow as much as possible the same drafting procedures used on the Contract Drawings.

3. Locate conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.

1.05 OPERATING AND MAINTENANCE MANUALS

A. Prepare and submit Operating and Maintenance Manuals, six document sets. In addition to the requirements specified in Division 1 (also see technical specification sections following for additional requirements), include the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers and replacement parts.

2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and, as required, summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

4. Servicing instructions and lubrication charts and schedules.

1.06 QUALITY ASSURANCE

A. As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

B. Material and equipment substitution.

1. Equipment other than that specified will be accepted only when written approval is given by the Owner, in accordance with Division 1.

2. The Contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the Owner of equipment other than that specified does not relieve the Contractor of this responsibility.

1.07 OWNER'S INSTRUCTIONS

A. Prior to completion of the contract, and at the Owner's convenience, instruct verbally and demonstrate to the Owner's personnel, the operation of the systems as listed in Part 1 above.

1.08 SYSTEM STARTUP

A. Do not energize or place electrical equipment in service until all relevant parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the Owner, notify the Owner in writing when the equipment will be ready. Notify the Owner's Representative two weeks in advance of the date the various times of equipment will be complete.

**PART 2 - PRODUCTS Not Used**

**PART 3 - EXECUTION**

3.01 EXAMINATION

A. Site verification of conditions: Contractor shall survey the entire project site and become thoroughly familiar with actual existing conditions. The intent of the work is shown on the drawings and described hereinafter. By the act of participation in the pre-bid conference and site inspection tour specified in the applicable Division 1 section, the Contractor shall be deemed to have made such a study and examination and to accept all conditions present at the site. No request for additional payment shall be considered as valid, due to failure to allow for conditions which may exist.

B. Electrical work shown: Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Report immediately to the Owner any conflicts in the drawings and specifications with any code or between the electrical work and the work of other trades. No work shall be commenced where a conflict exists prior to receiving proper instructions. Any work or materials shown on the drawings and not mentioned in this division, or vice-versa, shall be executed the same as if specifically mentioned by both. Notify the Owner of any changes of location requirements prior to installation.

3.02 SEISMIC BRACING

A. Contractor shall be responsible for anchors and connections of electrical work to building structure to prevent damage as a result of earthquake, including manufactured equipment, the connection and integrity of shop-fabricated and field-fabricated materials and equipment. All

building equipment and connections therefore shall be designed to resist seismic forces in conformance with Title 24 of the California Administrative Code.

Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following requirements:

1. Electrical equipment: For requirements, see Part 1 above.

2. Raceway: All raceway shall be supported and braced per SMACNA “Guidelines for Seismic Restraint Systems and Plumbing Piping Systems.” (See Table 23-P of Title 24 for limitations.)

3.03 PENETRATION SEALING

A. Seal penetrations through exterior walls and fire rated walls, floors, and ceilings. Sealing methods used shall be in compliance with the requirements of the Authority Having Jurisdiction to maintain required fire ratings, and shall be in accordance with the applicable sections in Division 7 which prescribe applicable firestopping and weatherproofing of wall, floor, ceiling, and roof penetrations. Seal all conduit penetrations through roofs.

3.04 DEMOLITION, ALTERATION AND EXTENSION WORK

A. Provide and perform demolition, alteration, extension, preparatory and miscellaneous work as indicated.

B. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures equipment, wiring, etc. include all demolition, alteration and extension work in bid.

3.05 SERVICE INTERRUPTIONS AND UTILITY

A. Coordinate with the Owner any interruption of services necessary to accomplish the work.

B. Coordinate with the utility company all work associated with power and communications/ signal distribution systems and service entrance equipment.

3.06 FIELD QUALITY CONTROL

A. Site Tests:

1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and such other tests and adjustments as may be required for the proper completion and operation of the electrical system.

2. Test the input and output voltage of each transformer prior to operation under load, and adjust the output voltage by resetting taps, to achieve the specified values. After the system has been placed under load, test transformers under normal operation. Record the measurement of primary and secondary voltages. Reset taps to within 1/2% if necessary to adjust secondary voltage. Submit a report indicating the final result of such tests, and reporting specific current and voltage measurements to the Owner's Representative.

3. If, during the course of testing, it is found that system imbalance is in excess of 20%, rearrange single-pole branch circuits in lighting and receptacle panels to bring system

balance within 20% on all phases. Record all such changes on the panelboard schedule and submit a summary of changes to the Owner's Representative.

3.07 CLEANING

A. Clean exterior surfaces of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.

B. Clean-out cracks, corners and surfaces on equipment to be painted, remove grease and oil spots so that paint may be applied without further preparation.

C. Locate underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations, using building lines by indicating on the Project Record Drawings.

**END OF SECTION**

## SECTION 260519

## LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes wire and cable systems rated 600 volts and less:

1. Building wire and cable.
2. Underground feeder and branch circuit cable.
3. Service entrance cable.
4. Armored cable
5. Metal-Clad cable.
6. Nonmetallic-sheathed cable.
7. Wiring connectors and connection accessories.

B. Cabling requirements in this Section may be supplemented in other sections of these specifications.

C. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute

2. ASTM American Society for Testing and Materials.

3. Institute of Electrical and Electronics Engineers.

IEEE Standard 82 Test Procedures for Impulse Voltage Tests on Insulated Conductors.

4. NEC National Electrical Code (NFPA 70).
5. NECA National Electrical Contractors Association: "Standard of Installation."

6. National Electrical Manufacturers Association/Insulated Cable Engineers Association

NEMA/ICEA WC-5 Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
NEMA/ICEA WC-7 Cross-Linked Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
NEMA/ICEA WC-8 Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.

UL 4 Armored Cable
UL 62 Flexible Cord and Fixture Wire.
UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
UL 486B Wire Connectors for Use with Aluminum Conductors
UL 83 Thermoplastic-Insulated Wires and Cables.
UL 854 Service Entrance Cables.

1.03 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Samples: Provide samples upon specific request.

C. Product Data: Submit product data giving complete description for sizes employed, material types, and electrical ratings.

D. Certificates:

1. Labels of Underwriters' Laboratories, Inc., fixed to each item of material.

2. If materials are by manufacturers other than those specified submit certification that material meets applicable Underwriters' Laboratories, Inc. Standards.

3. Submit in accordance with Section 260501.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

C. Deliver wire and cable to the project in full unbroken cartons or reels marked with conductor size, insulation type, and Underwriters' Laboratories, Inc. label.

D. Handle wire and cable in a manner to prevent damage to conductor, insulation and identifying markings.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of wiring system prior to rough-in.

C. Wire and cable routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

Subject to compliance with requirements, provide products by the following, or equal:

A. Wire and cable:

Triangle
Anaconda
General Cable Corporation

B. Connectors:

AMP
Buchanan
Burndy
3M Company
O-Z/Gedney
Thomas & Betts

C. Insulating Tapes: 3M Company

D. Wire Ties:

Ideal
Thomas and Betts ("Ty-Rap")
Panduit

E. Pulling Compound: Ideal ("Yellow 77").

2.02 MATERIALS

A. General: Provide wire and cable suitable for the temperature, conditions, and location where installed, except as otherwise indicated.

1. Conductor: Copper. Provide solid conductor for No. 10 AWG and smaller. Provide stranded conductors for sizes No. 8 and larger.

a. Use stranded conductors:

1) At motors and other applications where subject to vibration.

2) For control circuits.

2. Minimum Size Conductor: No. 12 AWG, except as otherwise indicated.

a. Control circuits: No. 14 AWG.

3. Insulation voltage rating: 600 volts.

B. Building wire and cable:

1. Description: Single conductor insulated wire.

2. Insulation: ANSI/NFPA 70:

a. Type THHN/THWN, rated 75 degrees C.

b. Type XHHW, rated 90 degrees C.

C. Service entrance cable:

1. Description: ANSI/NFPA 70. Type USE.

2. Insulation: Type RHW.

D. Armored cable:

1. Description: ANSI/NFPA 70. Type AC.

2. Insulation: Thermoplastic, 75 degrees C.

E. Metal-Clad cable:

1. Description: ANSI/NFPA 70. Type MC.

2. Insulation: Thermoplastic, 75 degrees C.

3. Armor material: Steel.

4. Armor design: Interlocked metal tape.

5. Jacket: None.

F. Nonmetallic-sheathed cable: ANSI/NFPA 70. Type NM and NMC.

G. Flexible cord and cable: ANSI/NFPA 70. Type SO.

H. Connectors:

1. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

I. Pull Cord: 1/8" polypropylene or nylon.

**PART 3 - EXECUTION**

3.01 WIRING METHOD

A. General:

1. Use insulation types suitable for the temperature, moisture and elements to which exposed.

    a. Minimum 75°C temperature rated insulation on conductors, except as otherwise indicated.

        1) Use minimum 90°C temperature rated insulation on conductors in conduits exposed on roof, or where required due to ambient temperature.

2. Equipment grounding conductors:

    a. Provide where required by the National Electrical Code, and where indicated. Where conductor size is not indicated, provide size as required by the National Electrical Code.

    b. Provide for:

        1) All branch circuit wiring.

        2) All feeders and motor branch circuits

        3) All nonmetallic conduits.

        4) All flexible metal conduits exceeding 72 inches in length.

3. Use flexible cords and cables for connection of special equipment as indicated. Length not to exceed 72 inches.

B. Wire and cable connections:

1. Connector types:

    a. No. 10 AWG wire and smaller: Spring-type connectors. All terminations shall be made on device terminals or on terminal blocks.

        1) Maximum number of conductors in a connection: 3.

    b. No. 8 AWG wire and larger: Compression- or pressure-type solderless connectors and terminal lugs. Wrap connection with electrical insulating tape, half-lapped to produce a dielectric value equal to or greater than wire insulation.

2. Provide connector sealing packs for splices that require complete protection from dampness and water where indicated.

3. Splices in feeders and mains may only be made where designated on the drawings and where prior approval is obtained from Owner.

4. Location of splices and terminations shall be limited to accessible locations such as outlet boxes, pull boxes, junction boxes, panelboard boxes, and splice boxes.

5. Insulate taps and splices equal to insulation of adjoining conductor.

6. Splice or tap permitted only on conductors that are a component part of a single circuit properly protected by approved methods.

3.02 PREPARATION

A. Examine the system in which the wire is to be installed for defects in equipment and installation which may cause damage to the wire.

B. Examine wires to be jointed, tapped, spliced, terminated, and their connecting devices for defects which may affect the mechanical and electrical integrity of the connection.

C. Check conduit systems for damage and loose connections, replace damaged sections. Make sure that the inside of conduit is free of dirt and moisture.

1. Completely and thoroughly swab raceway before installing wire.

2. Pull mandrel, one size smaller than the conduit, through entire length of all underground conduits prior to conductor installation.

D. Do not start work until defects have been corrected and until authorization to proceed has been obtained from Owner's Representative.

3.03 INSTALLATION

A. Install wire, cable, and connectors in compliance with the NEC.

B. Install products in accordance with manufacturers instructions.

C. Install all wire in raceway.

D. When pulling conductors do not exceed manufacturer's recommended values.

E. Use polypropylene or nylon ropes for pulling conductors.

F. Do not bend wire less than the manufacturer's recommended minimum bending radius.

G. Coordinate cable installation with other work.

H. Protect exposed cable from damage.

I. Support cables above accessible ceiling, using spring metal clips or cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.

J. Use suitable cable fittings and connectors.

K. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound where necessary.

L. Use pulling means including fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Do not use rope hitches for pulling attachment to wire or cable.

M. Conceal all cable in finished spaces.

N. Install exposed cable parallel and perpendicular to surfaces or exposed structural members, and follow surface contours, where possible.

O. Keep conductor splices to a minimum.

P. Clean conductor surfaces before installing connectors.

Q. Tape uninsulated conductors and connectors with electrical insulating tape to 150 percent of

insulation rating of conductor.

R. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced.

S. Use splice and tap connectors which are compatible with conductor material.

T. Provide adequate length of conductors within electrical enclosures and neatly train the conductors to terminal points with no excess. Make terminations so there is no bare conductor at the terminal.

U. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

V. Circuits of multiple phases passing through enclosures shall have phases grouped (bundled together) to reduce the reactance effect.

W. Arrange conductors in switchboards, panelboards, gutters, boxes, control cabinets and terminal cabinets neatly and lace with black T & B "Ty-Raps" ties.

X. Connect control circuits as indicated and in accordance with the wiring diagrams furnished by the equipment manufacturer. Control conductors shall be color coded or identified with the provision of non-deteriorating type wire markers.

Y. Consistently color code wiring continuous throughout the work:

1. Color code secondary service, feeder, and branch circuit conductors with insulation/jacket (factory-applied) color for phase identification as follows:

| | -- System Voltage -- | |
|---|---|---|
| Phase | 208Y/120 | 480Y/277 |
| A | Black | Brown |
| B | Red | Orange |
| C | Blue | Yellow |
| Neutral | White | Gray |
| Ground | Green | Green |

2. Select consistent wiring color code for switch legs, travelers, and special systems.

3. For conductors No. 6 AWG or larger, permanent plastic colored tape may be used to mark conductor in lieu of color-coded insulation/jacket. Tape shall cover not less than 2 inches of conductor insulation within enclosures.

3.04 IDENTIFICATION

A. In addition to requirements in Section 260553, the following are applicable:

1. At all switchboard terminations, provide each feeder circuit with a permanent plastic name tag indicating the load fed.

2. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices and in pull boxes.

3. Branch Circuits: Identify with the corresponding circuit designation at the over-current device and at all splices and devices.

4. Control Wires: Identify with the indicated number and/or letter designation at all terminal points and connections.

5. Alarm and Detection Wires: Identify with the indicated wire and zone numbers at all connection, terminal points, and coiled conductors within cabinets.

6. Conductors Terminated by Others: Indicate location of opposite end of conductor, i.e., Pull Box-Room 101.

7. For identification of conductors use plastic coated self-sticking markers such as Thomas & Betts E-Z Code.

8. Circuit Designation is construed to mean panel designation and circuit number, i.e., LA-13.

3.05 FIELD QUALITY CONTROL

A. Prior to energizing:

1. Inspect wire and cable for physical damage and proper connection.

a. Confirm that field-connections made by others in equipment furnished by others are mechanically and electrically sound prior to energization.

2. Confirm electrical continuity and absence of short circuits for all wire and cable with the use of a megohm meter.

a. Obtain values for phase-to-phase, phase-to-neutral, and phase-to-ground.

3. Confirm required insulation resistance as follows:

a. Perform insulation resistance test for all 600 volt insulated conductors No. 8 AWG and larger.

b. Use a 500 volt megger.

c. Obtain and record values for insulation resistance to ground and for insulation resistance between each conductor and every other conductor in the same conduit.

d. Conductors not complying with the following minimum values of insulation resistance are to be replaced and retested until satisfactory.

| Conductor Rated Amperes: | Minimum Insulation Resistance, Ohms: |
|---|---|
| 31 through 50 | 500,000 |
| 51 through 100 | 250,000 |
| 101 through 200 | 100,000 |
| 201 through 400 | 50,000 |

e. Perform tests after conductors have been installed, but before terminal connections have been made. Take readings for each test after the voltage has been applied continuously for one minute.

f. Perform tests according to manufacturer's recommendations.

g. Test results shall be in accordance with manufacturer's recommendations.

h. Correct defects revealed by above tests.

B. Subsequent to wire and cable hook-ups:

1. Energize circuits and demonstrate proper functioning. Correct malfunctioning units, and retest to demonstrate compliance.

**END OF SECTION**

## SECTION 260526

## GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes basic materials and methods for grounding and bonding electrical systems and equipment. Grounding requirements specified in this Section may be supplemented in other sections of these Specifications.

1. Grounding electrodes and conductors.

2. Equipment grounding conductors.

3. Bonding.

B. System Requirements

1. Electrical continuity to ground metal raceways and enclosures which are isolated from the equipment ground due to use of conduit or fittings which are nonmetallic (non-conducting), shall be established by providing by a green insulated grounding conductor of approved size within each raceway which shall connect to the isolated metallic raceways or enclosures at supply side. (If bare grounding conductors were specified, connect to enclosure on raceway at both ends.)

2. Cold water or other utility piping systems alone not be used as grounding electrodes due to the use of insulating couplings and nonmetallic pipe in such installation. All grounding electrodes shall be "Made Electrodes" as specified herein.

3. Non-current-carrying metal parts of all high voltage, conduit systems, supports, cabinets and enclosures shall be permanently and effectively grounded.

4. Metallic or semi-conducting shields and lead sheaths of all cables operating at high voltage shall be permanently and effectively grounded at each splice and termination.

C. Related Sections

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. American National Standards Institute.

ANSI C2 National Electrical Safety Code.

2. American Society for Testing and Materials.

   ASTM B3 Soft or Annealed Copper Wire.
   ASTM 33 Standard Specification for Soft or Annealed Copper Wire for Electrical Purposes.
   ASTM B8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

3. Institute of Electrical and Electronics Engineers.

   IEEE 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

4. Lightning Protection Code (NFPA 78).

5. NEC National Electrical Code (NFPA 70).

6. NEMA National Electrical Manufacturers Association.

7. NFPA National Fire Protection Association

8. Underwriters Laboratories, Inc.

   UL 467 Electrical Grounding and Bonding Equipment.
   UL 486A Wire Connectors and Grounding Lugs for Use with Copper Conductors.
   UL 96 Lightning Protection Components.

1.03 SUBMITTALS

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product Data: Provide data for grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation. Include specific instructions for preparation and installation of exothermic connectors.

   1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

1.04 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer's instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.05 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of grounding electrodes.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

Subject to compliance with requirements, provide products by the following, or equal:

Anixter Brothers
Blackburn
Burndy
A.B. Chance Co.
Erico Products (CADWELD)
Joslyn
Kearney-National
O-Z/Gedney
Thomas & Betts

2.02 GROUNDING AND BONDING PRODUCTS

A. Products: Of types indicated and of sizes and ratings to comply with NEC. Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

B. Conductor Materials: Copper.

2.03 WIRE AND CABLE CONDUCTORS

A. General: Comply with the following, except as otherwise indicated:

B. Equipment Grounding Conductor: Green insulated copper.

C. Grounding Electrode Conductor: Stranded copper cable.

D. Bare Copper Conductors: Conform to the following:

1. Solid Conductors: ASTM B 3.

2. Assembly of Stranded Conductors: ASTM B 8.

3. Tinned Conductors: ASTM B 33.

2.04 MISCELLANEOUS CONDUCTORS

A. Ground Bus: Bare annealed copper bars of rectangular cross section, minimum 1/4 inch x 4 inch x 24 inch drilled and tapped every 2 inches on center for two hole lugs.

B. Braided Bonding Jumpers: Copper tape, braided No. 30 gauge bare copper wire, terminated with copper ferrules.

C. Bonding Strap Conductor/Connectors: Soft copper, 0.05 inch thick and 2 inches wide,

except as indicated.

2.05 CONNECTOR PRODUCTS

A. General: Listed and labeled as grounding connectors for the materials used.

B. Pressure Connectors: High-conductivity plated units.

C. Bolted Clamps: Heavy-duty units listed for the application.

D. Exothermic Welded Connections: Provided in kit form and selected for the specific types, sizes, and combinations of conductors and other items to be connected.

2.06 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel with high-strength steel core and electrolytic-grade copper outer sheath, molten-welded to core. Size: 3/4 inch in diameter by 10 feet in length.

B. Plate Electrodes: Copper plates, minimum 0.10 inch thick, size as indicated.

2.07 TEST (GROUND) WELLS

A. Precast concrete, 12" round x 18" deep open bottom valve box, with cast iron grate cover plate marked "GROUND."

**PART 3 - EXECUTION**

3.01 APPLICATION

A. Equipment Grounding Conductor Application:

Comply with NEC Article 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.

1. Install separate insulated equipment grounding conductors with circuit conductors for the following in addition to those locations where required by Code:

a. Feeders and branch circuits.

B. Underground conductors: Soft bare stranded copper, except as otherwise indicated.

1. Install minimum 4/0 AWG soft stranded copper buried ground loop cable as shown on drawings at least 3 feet below finished grade and minimum 3 feet from building.

C. Signal and Communications System: Provide #4 AWG minimum green insulated copper conductor in raceway from the grounding electrode system to each terminal cabinet or central equipment location.

D. Separately Derived Systems: Grounding shall be provided in accordance with the NEC, including Article 250.

E. Metal Poles Supporting Outdoor Lighting Fixtures: Ground pole to a grounding electrode as indicated in addition to separate equipment grounding conductor run with supply branch circuit.

F. Service Entrance:

1. Grounding Conductor: Shall be sized in accordance with National Electrical Code to connect these items to the building bus in the service main equipment.

2. Equipment Bonding Jumper: Shall be sized in accordance with the National Electrical Code and be conducted on the supply side of the service main equipment.

3. Grounding Electrode: Bond together the following items to establish the electric service grounding electrode, unless otherwise indicated:

a. Minimum 20 feet number 3/0 AWG copper conductor encased in concrete footing or grade beam to contact with earth in two opposite directions.

b. Building domestic water service entrance piping on house side of meter; provide bonding jumper across meter.

c. Structural steel building framework.

G. Flexible metal and liquid-tight conduit: Provide equipment grounding conductors.

H. Rigid nonmetallic conduit: Provide equipment grounding conductors

3.02 INSTALLATION

General: Ground electrical systems and equipment in accordance with NEC requirements except where the drawings or specifications exceed NEC requirements.

A. Ground Rods: Locate a minimum of one-rod length from each other and at least the same distance from any other grounding electrode. Interconnect ground rods with bare copper conductors buried at least 24 inches below grade. Connect bare copper cable ground conductors to ground rods by means of exothermic welds except as otherwise indicated. Make these connections without damaging the copper coating or exposing the steel. Use 3/4 inch diameter by 10 foot long ground rods except as otherwise indicated. Drive rods until tops are 6 inches below finished floor or final grade except as otherwise indicated.

B. Metallic Water Service Pipe: Provide insulated copper ground conductors, sized as indicated, in conduit from the building main service equipment, or the ground bus, to main metallic water service entrances to the building. Connect ground conductors to the main metallic water service pipes by means of ground clamps. Where a dielectric main water fitting is installed, connect the ground conductor to the street side of the fitting. Do not install a grounding jumper around dielectric fittings. Bond the ground conductor conduit to the conductor at each end.

C. Ufer System (Concrete-Encased Electrode) Ground: Fabricate with a 20 feet of bare copper conductor laid lengthwise in excavation for foundation or footings. Install so conductor is within 2 inches of the bottom of the concrete. Where base of foundation is less than 20 feet in length, coil excess conductor at base of foundation. Bond conductor to reinforcing steel at four locations, minimum. Extend conductor below grade and connect to building grounding grid or ground electrode.

D. Braided-Type Bonding Jumpers: Install to connect ground clamps on water meter piping to bypass water meters electrically. Use elsewhere for flexible bonding and grounding connections.

E. Route grounding conductors along the shortest and straightest paths possible without obstructing access or placing conductors where they may be subjected to strain, impact, or damage, except as indicated.

F. Test Wells: Locate as indicated, and fabricate in accordance with details indicated.

G. Fences and Gates: See grounding details on the construction drawing for building and fence grounding requirements and details.

1. Use flexible copper braid for bonding the gates of chain link fences.

H. Cable Shields: Ground shields of any shielded power cable or signal cable at each splice or termination in accordance with recommendations of the splice or termination manufacturer.

3.03 CONNECTIONS

A. General: Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible. Make connections with clean bare metal at points of contact.

B. Exothermic Welded Connections: Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Do not alter molds. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Terminate insulated equipment grounding conductors for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare copper grounding conductor to the ground bus in the housing. Bond electrically non-continuous conduits at both entrances and exits with grounding bushings and bare copper grounding conductors.

D. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values for connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with torque tightening values specified in UL 486A and UL 486B.

E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.

F. Compression-Type Connections: Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

G. Moisture Protection: Where insulated ground conductors are connected to ground rods or ground buses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

H. Ground Bus Assembly: Make connections to the ground bus assembly in the following manner:

1. Bond cable to two hole lug using exothermic welding process.

2. Bolt two hole lugs to ground bus assembly.

3.04 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING

A. Manholes and Handholes: Install a 3/4 inch diameter by 10 foot long driven ground rod close to the wall and set the rod depth such that 4 inches will extend above the finished floor. Where necessary, install ground rod before the manhole is placed and provide a #4/0 bare tinned-copper conductor from the ground rod into the manhole through a waterproof sleeve in the manhole wall. Protect ground rods passing through concrete floor with a double-wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below the concrete. Seal floor opening with waterproof nonshrink grout.

B. Connections at Manholes: Connect exposed metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole to the ground rod or ground conductor. Make connections with a minimum #2 AWG stranded hard-drawn copper wire. Train conductors plumb or level around corners and fasten to manhole walls. Connect to cable armor and cable shields by means of tinned terminals soldered to the armor or shield, or as recommended by manufacturer of splicing and termination kits.

C. Grounding System: Ground non-current-carrying metallic items associated with manholes, substations, and pad-mounted equipment by connecting them to bare underground copper cable and grounding electrodes arranged as indicated.

3.05 FIELD QUALITY CONTROL

A. Test all ground fault interrupter (GFI) receptacles and circuit breakers for proper connection and operation with methods and instruments prescribed by the manufacturer.

B. Tests: Subject the completed grounding system to a megger test at each location where a maximum ground resistance level is specified, at service disconnect enclosure ground terminal, and at ground test wells. Measure ground resistance without the soil being moistened by any other than natural precipitation or natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the two-point method in accordance with Section 9.03 of IEEE 81.

C. Ground/resistance maximum values shall be as follows:

1. Equipment rated 500 kVA and less: 10 Ohms.

2. Equipment rated 500 kVA to 1000 kVA: 5 Ohms.

3. Equipment rated over 1000 kVA: 3 Ohms.

4. Unfenced substations and pad-mounted equipment: 5 Ohms.

5. Manhole and handhole grounds: 10 Ohms.

6. Grounded secondary distribution system neutral and non-current carrying parts associated with distribution systems and grounds not otherwise covered: 25 ohms.

D. Deficiencies: Where ground resistances exceed specified values, and if directed, modify the grounding system to reduce resistance values. Where measures are directed that exceed those indicated, the provisions of the Contract covering the changes shall apply.

E. Report: Prepare test reports, certified by the testing organization, of the ground resistance and device function tests at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

1. Provide copies of reports of all grounding system tests for inclusion in Operation and Maintenance Manuals and for review by the Owner.

**END OF SECTION**

## SECTION 260529

## HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Hangers, straps, clamps, steel channel, and fastening hardware for supporting and anchoring electrical work.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute

2. ASTM American Society for Testing and Materials

3. IEEE Institute of Electrical and Electronics Engineers

4. NEC National Electrical Code (NFPA 70)

5. NEMA National Electrical Manufacturers Association

6. NFPA National Fire Protection Association

7. UL Underwriters Laboratories, Inc.

8. NECA National Electrical Contractors Association ("Standard of Installation")

9. SMACNA Sheet Metal Air Conditioning Contractors National Association

1.03 SUBMITTALS

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product Data: Provide manufacturer's catalog data for supporting devices and fastening systems.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instruction for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70, "National Electrical Code."

B. Furnish products listed and classified by Underwriter's Laboratories, Inc. as suitable for purpose specified and shown.

1.05 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.06 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.07 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

B. Verify supporting device requirements prior to rough-in.

C. Electrical work is shown on Drawings in approximate locations unless dimensioned. Provide supporting devices as required to complete the electrical work.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following, or equal:

1. Hangers, Straps and Beam Clamps:

Appleton
Raco, Inc.
Steel City
O.Z./Gedney Co.
Midland Ross

2. U-Channel Systems, Slotted Metal Angle, and Fittings:

B-Line
Unistrut

3. Anchors:

   Acherman-Johnson Corp.
   B-Line
   Hilti
   Phillips Drill Co.
   Rawl Products Co.

4. Conduit Sealing Bushings:

   O-Z/Gedney.

2.02 MATERIAL AND FABRICATION

A. Coatings: Supports, support hardware, and fasteners shall be protected with zinc coating. Products for use outdoors shall be hot-dip galvanized.

B. Manufactured supporting devices:

1. Raceway supports: Steel. Clevis hangers, riser clamps, pipe straps, threaded C-clamps with retainers, ceiling trapeze hangers, and wall brackets.

2. U-Channel systems: 12-gauge steel channels, with 9/16 inch diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacture.

3. Fasteners: Types, materials, and construction features as follows:

   a. Expansion anchors: Carbon steel wedge or sleeve type.

   b. Toggle bolts: All-steel springhead type.

   c. Powder-driven threaded studs: Heat-treated steel, designed specifically for the intended service.

4. Concrete Inserts: Steel, with hot-dipped galvanized finish.

5. Cable support for vertical conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for non-armored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes required to suit individual risers. Construct body of malleable-iron casting with hot-dip galvanized finish.

6. Conduit sealing bushings: Factory-fabricated watertight conduit sealing bushing assemblies suitable for sealing around conduit passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

C. Fabricated supporting devices:

1. General: Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

2. Steel brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

3. Pipe sleeves: Provide pipe sleeves of the following:

a. Sheet metal: Fabricate from galvanized sheet metal: round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gauge metal for sleeve diameter noted:

| | |
|---|---|
| 3-inch and smaller: | 20-gauge. |
| 4-inch to 6-inch: | 16-gauge. |
| Over 6-inch: | 14-gauge. |

b. Steel pipe: Fabricate from Schedule 40 galvanized steel pipe.

c. Plastic pipe: Fabricate from Schedule 80 PVC plastic pipe.

**PART 3 - EXECUTION**

3.01 INSTALLATION, GENERAL

A. Provide supporting devices to fasten electrical components securely and permanently to the building or structure in accordance with NEC requirements. Install products in accordance with manufacturer's instructions.

B. Coordinate with the building structural, mechanical, and other systems, and with other electrical installation.

C. Fastening: Fasten electrical items and their supporting hardware securely to the building structure. Electrical items include, but are not limited to: raceway, cables, cable tray, busway, transformers, panelboards, enclosed switches and motor controllers, control components, boxes, and cabinets.

1. Ensure that the load applied to any fastener does not exceed 25 percent of the proof test load. Use vibration- and shock-resistant fasteners for attachments to concrete slabs.

2. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams, or to a depth of more than 3/4 inch in concrete shall not cut reinforcing bars. Fill holes that are not used.

3. Fastening methods:

a. Wood: Wood screws.

b. Hollow masonry units: Toggle bolts.

c. Concrete or solid masonry: Concrete inserts or expansion bolts. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts.

d. Steel: Machine screws or welded steel studs.

D. Conductors in vertical raceways: Provide support for wire and cable in riser pull boxes in accordance with NEC Article 300.

E. Sleeves: Provide in concrete slabs and walls and all other fire-rated floors and walls for raceway and cable installations. For sleeves through fire-rated wall- or floor-construction, apply UL-listed firestopping sealant in gaps between sleeves and enclosed conduits and cables. Comply with the requirements of fire-resistant joint sealers in accordance the applicable Division 7 section.

1. Conduit seals: Install conduit seals for conduit penetrations of slabs on grade and exterior walls below grade as indicated. Tighten sleeve seal screws until sealing grommets have

expanded to form watertight seal.

3.02 INSTALLATION, ADDITIONAL REQUIREMENTS FOR RACEWAYS

A. General: Comply with the NEC and with the following requirements:

1. Conform to manufacturer's recommendations for selection and installation of supports.

2. The strength of the support, including attachment to the building or structure, shall be adequate to carry present and future load multiplied by a safety factor of at least four. Where this determination results in a safety allowance of less than 200 pounds, provide additional strength until there is a minimum of 200 pounds safety allowance in the strength of each support.

a. Raceway shall be supported and braced per SMACNA "Guidelines for Seismic Restraint Systems and Plumbing Piping Systems." (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)

3. Install pipe straps, individual and multiple (trapeze-type) raceway hangers and riser clamps as necessary to support raceways. Provide U-channel and associated pipe channel straps, bolts, clamps, attachments, fasteners, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

a. Raceway run on surface of structure:

1) For conduit run on building surface, use two-hole stamped steel pipe straps.

2) For conduit runs on steel beams, use malleable iron pipe beam clamp bolted to beam.

b. Raceway suspended from structure:

1) Support parallel runs of horizontal raceways together on trapeze-type hangers.

2) Support individual horizontal raceway by separate pipe hangers.

4. Support spacing: Maximum spacing shall be as allowed by the NEC.

a. Additional support required at unsupported boxes and access fittings: Support exposed and concealed raceway within 1 foot of an unsupported boxes and access fittings. In horizontal runs, this support may be omitted where box or access fitting is independently supported and raceway termination is not made with chase nipples or threadless box connectors.

b. Additional support required for vertical runs: Arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on the raceway terminals. Provide riser clamps for conduit at floor lines.

3.03 INSTALLATION, ADDITION REQUIREMENTS FOR EQUIPMENT AND ENCLOSURES

A. Component Anchorage Requirements:

1. All mechanical, plumbing, and electrical components shall be anchored and installed per the details on the DSA approved construction documents. Where no detail is indicated, the following components shall be anchored or braced to meet the force and

displacement requirements prescribed in the 2010 CBC. Sections 1615A.1.12 through 1615A.1.22 and ASCE 7-05 Chapter 6 and 13:

a. All permanent equipment and components.

b. Temporary or movable equipment that is permanently attached (e.g. hard wired) to the building utility services such as electricity, gas or water.

c. Movable equipment which is stationed in one place for more than 8 hours and heavier than 400 pounds are required to be anchored with temporary attachments.

2. The attachments of the following mechanical and electrical components shall be positively attached to the structure but need not be detailed on the plans. These components shall have flexible connections provided between the component and associated ductwork, piping and conduit:

a. Components weighing less than 400 pounds and have a center of mass located 4 feet or less above the adjacent floor or roof level that directly support the component.

b. Components weighing less than 20 pounds, or in the case of distributed systems, less than 5 pounds per foot which are suspended from a roof or floor or hung from a wall.

3. For those elements that do not require details on the approved drawings, the installation shall be subject to the approval of the Structural Engineer of Record and the DSA District Structural Engineer. The project inspector will verify that all components and equipment have been anchored in accordance with above requirements.

B. Piping, Ductwork, and Electrical Distribution System Bracing requirements:

1. Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-05 Section 13.3 as defined in ASCE 7-05 Section 13.6.8, 13.6.7, 13.6.5.6, and 2010 CBC, Section 1615A.1.20, 1615A.1.21 and 1615A.1.22.

2. The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the OSHPD Pre-Approvals (OPA #) as modified to satisfy anchorage requirements of ACI 318, Appendix D.

3. Copies of the manual shall be available on the jobsite prior to the start of hanging and bracing of the pipe, ductwork, and electrical distribution systems.

4. The Structural Engineer of Record shall verify the adequacy of the structure to support the hanger and brace loads.

3.04 FIELD QUALITY CONTROL

A. Preparation for tests: Provide all jacks, jigs, fixtures, and calibrated indicating scales required for accurate, reliable testing. Obtain the Owner's Representative and Structural Engineer's approval before transmitting loads to the structure.

1. Test to 90 percent of rated proof load for fasteners. If fastener fails test, revise all similar fastener installations and re-test until satisfactory results are achieved.

B. Tests: Test pull-out resistance of one of each type, size, and anchorage material for the following fastener types:

1. Expansion anchors.
2. Powder-driven threaded studs.
3. Toggle bolts.

3.05 CLEANING

A. Clean surfaces to be painted.

**END OF SECTION**

## SECTION 260533

## RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

1.01 SUMMARY

A. Section includes provision of a mechanically- and electrically-complete conduit system including:

1. Rigid metal conduit.
2. Intermediate metal conduit.
3. Electrical metallic tubing.
4. Rigid nonmetallic conduit.
5. Flexible metal conduit.
6. Liquidtight flexible conduit.
7. Wireways (and auxiliary gutters).
8. Surface raceway.
9. Fittings and conduit bodies; accessories.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

A. American National Standards Institute

| | |
|---|---|
| ANSI C80.1 | Specification for Rigid Steel Conduit, Zinc-Coated. |
| ANSI C80.3 | Specification for Electrical Metallic Tubing, Zinc-Coated. |
| ANSI C80.5 | Rigid Aluminum Conduit. |
| ANSI/NEMA FB 1 | Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies. |

B. American Society for Testing and Materials.

ASTM 123 Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

C. IEEE Institute of Electrical and Electronics Engineers.

D. NEC National Electrical Code (NFPA 70).

E. NECA National Electrical Contractors Association: "Standard of Installation."

F. National Electrical Manufacturers Association

NEMA RN 1 PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate

Metal Conduit.
NEMA TC 2 Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.
NEMA TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation.
NEMA TC 9 Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

G. NFPA National Fire Protection Association

H. Underwriters Laboratories, Inc.

UL 1 Flexible Metal Electrical Conduit
UL 6 Rigid Metal Electrical Conduit.
UL 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
UL 360 Liquidtight Flexible Steel Conduit, Electrical.
UL 514B Fittings for Conduit and Outlet Boxes.
UL 651 Rigid Nonmetallic Electrical Conduit.
UL 797 Electrical Metallic Tubing.
UL 1242 Intermediate Metal Conduit

1.03 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Product data: For all raceway products.

C. Contractor shall be responsible for anchors and connections of electrical work to building structure to prevent damage as a result of earthquake, including the connection and integrity of field-fabricated materials and equipment. All building connections therefore shall be designed to resist seismic forces in conformance with Title 24 of the California Administrative Code.

Contractor shall submit shop drawings sealed by a Structural Engineer registered in the State of California to demonstrate compliance with the following requirement:

All raceway shall be supported and braced per SMACNA "Guidelines for Seismic Restraint Systems and Plumbing Piping Systems." (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)

D. Samples: Provide samples upon specific request

E. Installation instructions: Manufacturer's written installation instructions for [wireway], [surface raceway][, and] [nonmetallic raceway] products. Include instructions for storage, handling, protection, examination, and preparation of Product.

F. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches.

G. Substitutions: If materials are by manufacturers other than those specified, submit product data giving complete description for sizes employed, material types, and installation methods.

H. Certificates:

1. Labels of Underwriters' Laboratories, Inc. affixed to each item of material.

2. If materials are by manufacturers other than those specified, submit certification what material meets applicable Underwriters' Laboratories, Inc. Standards.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation".

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, “General Electrical Requirements.”

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate with other Work:

1. Install conduits before concrete is placed, and in advance of masonry work.

2. Install conduits through roof in time to be flashed prior to roofing application.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

Subject to compliance with requirements, provide products by the following, or equal:

A. Conduit Bodies:

Adalet-PLM
Appleton Electric

Carlon
Crouse Hinds
Killark Manufacturing
OZ/Gedney
Spring City Electrical Mfg.

B. Wireway and Auxiliary Gutters:

Circle AW
Hoffman Engineering
Surface Metal Raceway:
Alrey-Thompson
B-Line
Isotrol
Square D
Wiremold

C. Surface Nonmetallic Raceway:

Carlon
Hubbell
Panduit
Wiremold

2.02 METAL CONDUIT AND TUBING

A. Rigid Metal Conduit: Steel, hot-dipped galvanized including the threads, with an outer coating of zinc bichromate, complete with one coupling and one end thread protector, manufactured in accordance with ANSI C80.1 and UL 6.

1. Threaded, hot-dipped galvanized fittings manufactured in accordance with ANSI C80.4.

2. Where indicated, provide galvanized rigid steel conduit and fittings with polyvinyl chloride (PVC) coating of nominal .020 inch (20 mil ) thickness conforming to NEMA Standard No. RN-1, Type A, Robroy Industries, or equal.

B. Intermediate Metal Conduit: Hot-dipped galvanized steel including the threads, manufactured in accordance with UL 1242.

C. Electrical Metallic Tubing: Welded, electro-galvanized thin wall steel tubing, manufactured in accordance with ANSI C80.3 and UL 797.

1. Maximum size shall be 2 inches.

2. Provide compression type fittings in all areas.

a. Gland compression type, zinc plated steel body, cadmium plated malleable iron nut, O-Z/Gedney

b. Indenter type or set screw fitting are not acceptable.

D. Flexible metal Conduit: Hot-dipped galvanized steel interlocking, single-strip type manufactured in accordance with UL1.

1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all

sizes and twist-in connectors for 1/2-inch and 3/4-inch flexible metal conduit.

2. Integral copper ground wire on sizes 1-1/4" and smaller.

E. Liquidtight Flexible Conduit: Hot-dipped galvanized steel strip core with extruded liquid-tight polyvinyl jacket. Use O-Z/Gedney Type UAG, or equal.

1. Liquid-tight fittings. ANSI/NEMA FB 1.

2. Connectors: Cadmium plated malleable iron body and nut, cadmium plated steel ferrule, insulated throat, integral cast external ground lug, O-Z/Gedney.

2.03 NONMETALLIC CONDUIT AND DUCTS

A. Rigid Nonmetallic Conduit: Polyvinyl chloride (PVC) heavy-wall conduit, with tapered sleeve couplings, rated and labeled for use with 90°C rated conductors, manufactured in accordance with ANSI C33.91.

1. Cemented type fittings of the same manufacturer as the conduit.

2. NEMA TC 2 and UL 651, Schedule 40.

B. PVC Conduit and Tubing Fittings

1. NEMA TC 3. Match to conduit or conduit/tubing type and material.

C. Underground PVC and ABS Plastic Utilities Duct

1. NEMA TC-6, Type I for encased burial in concrete, Type II for direct burial.

D. PVC and ABS Plastic Utilities Duct Fittings

1. NEMA TC 9-1. Match to duct type and material.

E. Liquidtight Flexible Nonmetallic Conduit and Fittings

1. UL 1660. Fittings shall be specifically approved for use with this raceway.

F. Conduit, Tubing, and Duct Accessories

1. Types, sizes, and materials complying with manufacturer’s published product information. Mate and match accessories with raceway.

2.04 CONDUIT BODIES

A. General

1. Types, shapes, and sizes as required to suit individual applications and NEC requirements. Provide matching gasketed covers secured with corrosion-resistant screws.

B. Metallic Conduit and Tubing

1. Use metallic conduit bodies. Use bodies with threaded hubs for threaded raceways.

2.05 WIREWAYS AND AUXILIARY GUTTERS

A. General: Electrical wireways shall be of types, sizes, and number of channels as indicated. Fittings and accessories including but not limited to couplings, offsets, elbows, expansion joints, adapters, hold-down straps, and end caps shall match and mate with wireway as required for complete system. Where features are not indicated, select for fulfill wiring requirements comply with applicable provisions of NEC.

B. Wireways covers shall be hinged type.

1. Use sheet steel wireways with screw-on covers and corrosion resistant hardware. For dry locations coat with rust inhibitor and finish with gray baked enamel. For wet locations use hot-dipped galvanized material finished with gray baked enamel, provide gaskets for covers.

2.06 SURFACE RACEWAY

A. General

1. Sizes and channels as indicated. Provide fittings that match and mate with raceway.

B. Surface Metal Raceway

1. Construct of galvanized steel with snap-on covers, with 1/8-inch mounting screw knockouts in base approximately 8 inches o.c. Finish with manufacturer's standard prime coating suitable for painting. Provide raceways of types suitable for each application required. Provided by Hoffman Engineering Co., The Wiremold Co., or approved equal.

C. Surface Nonmetallic Raceway

1. Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color. Raceway and system components shall meet UL 94 requirements for nonflammable, self-extinguishing characteristics. Provided by Hubbell, Inc., Panduit Corp., The Wiremold Co., or approved equal.

2.07 ACCESSORIES

A. General: Reducers, bushings, washers, etc., shall be cadmium plated malleable iron of the shape and dimension best suited for the application.

B. Seals for Walls and Floor Penetrations: Malleable iron body, oversize sleeve, sealing ring, pressure clamp and rings and sealing grommet, hex head cap screws, O-Z/Gedney Type FSK, or equal.

C. Fire Seals: Heat activated intumescent material, elastomeric sealing ring, socket head cap screws, steel pressure discs and flange, O-Z/Gedney Type CFSF, Nelson Flame Seal, or equal.

D. End bells: Hot-dipped galvanized, threaded malleable iron, O-Z/Gedney Type THS, or equal.

E. Bushings:

1. 1-1/4" and smaller: High-impact thermo-setting phenolic, 150°C, O-Z/Gedney Type "A", or equal.

2. 1-1/2" and larger: Hot-dipped galvanized with thermosetting phenolic insulation,

150°C, O-Z/Gedney Type "B", or equal.

F. Locknuts:

1. 1-1/2" and smaller: Zinc plated heavy stock steel, O-Z/Gedney, or equal.

2. 2" and larger: Cadmium plated malleable iron, O-Z/Gedney, or equal.

G. Hubs: Cadmium plated malleable iron, tapered threads, neoprene "O" ring, insulated throat, O-Z/Gedney, or equal.

H. Expansion Fittings: Hot-dipped galvanized malleable iron with bonding jumpers.

1. Linear: O-Z/Gedney Type AX and TX, or equal.

2. Linear, with deflection: O-Z/Gedney Type AXDX, or equal.

I. Escutcheons: Chrome plated sectional floor and ceiling plates, Crane No. 10, or equal.

**PART 3 - EXECUTION**

3.01 WIRING METHOD

A. General: The wiring method shall be as follows, except as otherwise noted.

B. Exterior:

1. Exposed: Rigid steel conduit.

2. Concealed: Rigid steel conduit.

a. In or under slab on grade: Nonmetallic conduit, Schedule 40 PVC. Conduit leaving the slab (including exposed conduit riser) shall be rigid steel conduit.

3. Underground, single run: Rigid nonmetallic conduit. Use Schedule 40 PVC. Provide concrete encasement as indicated.

4. Underground, grouped: Rigid nonmetallic conduit. Use Schedule 40 PVC. Provide concrete encasement as indicated.

5. Connection to vibrating equipment, including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment: Liquidtight flexible metal conduit, maximum length 18 inches.

C. Interior:

1. Exposed: Electrical metallic tubing.

a. Areas where exposed conduit may be subject to physical damage: Rigid metal conduit.

b. Damp or wet locations: Rigid metal conduit.

c. Classified locations: Rigid metal conduit.

2. Concealed: Electrical metallic tubing.

a. In or under slab on grade: Nonmetallic conduit, Schedule 40 PVC. Conduit leaving the slab (including exposed conduit riser) shall be rigid steel conduit.

b. In slab, above grade: Rigid nonmetallic conduit Schedule 40 PVC. Maximum size conduit in slab: 1 inch.

3. Connection to vibrating equipment, including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment: Flexible metal conduit, maximum length 18 inches.

a. For moist or humid locations or corrosive atmosphere, or where subject to water spray or dripping oil, grease, or water: Liquidtight flexible metal conduit.

4. Connection to lighting fixtures located in suspended acoustical or metal ceilings: Flexible metal conduit, maximum length 72 inches.

5. Final connections to lighting fixtures which have isolated junction boxes: Flexible metal conduit.

a. Damp locations: Liquidtight flexible conduit.

3.02 INSTALLATION

A. General Requirements:

1. Install electrical raceways in accordance with manufacturer's written installation instructions, applicable requirements of NEC, and as follows.

a. Minimum size: 3/4 inch unless otherwise indicated.

b. Size conduits as indicated on the drawings and as required by the NEC for the number and sizes of wires to be installed into the conduit.

c. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings. Remove burrs, and swab inside conduits before conductors are pulled in.

d. Make all conduit joints mechanically tight, electrically continuous, and watertight. Pitch conduits in a manner to avoid creating moisture traps.

e. Install minimum 3/16" polypropylene pull cords from end-to-end in all empty raceways, tagged with the identification of service intended and location of opposite end. Leave at least 24 inches of pull cord at each end.

f. Restore wall, ceiling, and floor penetrations to the requirements of the Authority Having Jurisdiction.

g. Provide supports for raceways as specified in Section 260529, Supporting Devices.

1) All raceway shall be supported and braced per SMACNA "Guidelines for Seismic Restraint Systems and Plumbing Piping Systems." (See Footnotes 12 and 13 of Table 23-P of Title 24 for limitations.)

h. Communications/Signal System Raceways 2-Inch Trade Size and Smaller: In

addition to the above requirements, install raceways 2-inch and smaller trade size in maximum lengths at 150 feet and with a maximum of two, 90-degree bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements.

i. Provide code sized green grounding conductor in all non-metallic conduit.

2. Perform excavating, trenching, backfillings, and compacting as shown, and as specified in the section in Division 2 which prescribes excavation, backfilling and compacting for utilities. Minimum cover for runs below finished grade outside buildings: 24 inches except where noted.

3. Complete installation of electrical raceways before starting installation of conductors within raceways.

   a. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose. Cap or plug conduits with standard manufactured accessories as soon as the conduits have been permanently installed in place.

4. Install all conduits at elevations and locations to avoid interference with grading or other work, the structure, finished ceilings, walls. Avoid causing cutting of masonry structural members.

   a. Do not place conduits in close proximity to equipment, systems, and service lines, such as hot water supply and return lines, which could be detrimental to the conduit and its contents. Maintain a minimum 3" separation, except in crossing, which shall be a minimum 1".

      1) Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.

      2) Elevation of Raceway: Where possible, install horizontal raceway runs above water and steam piping.

5. Conceal conduit, unless indicated otherwise, within finished walls, ceilings, and floors. Keep raceways at least six (6) inches away from parallel runs of flues and steam or hot water pipes. Install raceway level and square and at proper evaluations.

   a. To prevent displacement, securely support and hold in place all conduits installed in advance of other work and to be concealed in the building structure. Carefully lay out conduits run within the structure, such as floors, beams, walls, to avoid densities excessive for the construction. Relocate those conduits when excessive densities occur.

   b. Run conduits embedded in structural slabs in the middle of the slab below the top and above the bottom reinforcing steel. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab, but in no case less than 1-1/2" cover except where penetration is made. Do not install conduit larger than 1" in slabs. Tie raceways to reinforcing rods or otherwise secure them to prevent sagging or shifting during concrete placement. Space raceways laterally to prevent voids in the concrete. Where nonmetallic conduit is used, raceways must be converted to Schedule 80 or rigid steel conduit before rising above the floor.

c. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps. Expansion fittings installed in concrete shall be water tight - concrete tight deflection/expansion type.

d. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions except as otherwise indicated. This does not apply to conduits in crawl spaces.

6. Install and neatly rack exposed conduits parallel with and perpendicular to building walls. Do not install exposed diagonal conduit runs.

a. Run exposed, parallel, or banked raceways together. Make bends in parallel or banked runs from the same center line so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run such as from wall to ceiling and that the raceways be of the same size. In other cases provide field bends for parallel raceways.

b. Use blockouts for concentrations of conduits in a confined area.

c. Route and suspend conduits crossing expansion joints to permit expansion, contraction, and deflection utilizing approved fittings to prevent damage to the building, conduits, and supporting devices.

d. Install exposed raceways parallel and perpendicular to nearby surfaces of structural members and follow the surface contours as much as practical.

e. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.

7. Concrete Wall or Stab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.

a. Space sleeves and core drills to insure a minimum dimension of 3 times the nominal trade diameter of the largest adjacent conduit between sleeves or core drills.

b. Use blockouts for concentrations of conduits in a confined area.

8. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

9. Make bends and offsets so the inside diameter is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

a. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not

permitted.

b. Bends and offsets in 1" and smaller conduits may be done with approved bending devices. Do not install conduits which have had their walls crushed and deformed and their surface finish damaged due to bending.

c Run conduits parallel to and at right angles to building lines.

d. Where space conditions prohibit the use of standard ells, elbows, and conduits, use cast ferrous alloy fittings of such forms and dimensions as best required for application.

10. Surface Raceway:

a. Install a separate green ground conductor in raceway from the junction box supplying the raceway to receptacle of fixture ground terminals.

b. Select each surface raceway outlet box to which a lighting fixture is attached to be of sufficient diameter to provide a seat for the fixture canopy.

c. Where a surface raceway is used to supply a fluorescent lighting fixture having central stem suspension with a backplate and a canopy, with or without extension ring, the backplate and canopy will serve as the outlet box and no separate outlet box need be provided.

d. Provide surface raceway outlet box, in addition to the backplate and canopy, at the feed-in location of each fluorescent lighting fixture having end stem suspension.

e. Where a surface raceway extension is made from an existing outlet box on which a lighting fixture is installed, provide a backplate slightly smaller than the fixture canopy, and no additional surface mounted outlet box need be installed.

f. Surface raceways shall be securely fastened to the mounting surface. Use expansion type anchors in concrete.

11. Do not run conduits exposed on the roof unless approval is obtained from the Owner prior to installation.

B. Other Requirements:

1. Connect motors, equipment containing motors, equipment mounted on an isolated foundation, transformers, and other equipment and devices which are subject to vibration and which require adjustment with flexible metallic conduit from the device to the conduit serving it. Size the flexible conduit length more than 12 diameters, but less than 18 diameters. Rigidly support the points of attachment on each side of the connection. Use external bonding jumpers on sizes 1-1/2" and above.

2. Install escutcheons on all exposed conduits passing through interior floors, walls, or ceilings. Install fire seals on all conduits passing through fire rated partitions. Install wall and floor fire seals on all conduits passing through exterior walls and floors, or use standard galvanized steel pipe sleeves; diameters 12" greater than the outside diameter of the sleeved conduit and fill the annular space with mastic or caulk with lead.

3. Fire pump room: All wiring shall be installed in rigid metal, liquid-tight flexible metal

conduit.

4. Raceway for panelboards:

   a. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 270 degrees.

   b. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.

5. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.

6. Cap conduits indicated to be stubbed-out underground using glued on PVC caps intended for this purpose.

7. Install a coupling flush with the floor on all conduits stubbed-up through the floor slab.

8. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.

9. Terminations:

   a. Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.

   b. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

   c. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.

   d. Install insulated throat threaded hubs on conduits entering enclosures without threaded hubs.

   e. Install end bells on conduits stubbed through slabs and foundations into electrical enclosures.

10. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL- listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

    a. Where conduits enter or leave hazardous locations.

b. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.

c. Where required by the NEC.

11. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used six (6) inches above the floor. Where equipment connections are not made under this contract, install screwdriver-operated threaded flush plugs flush with floor.

a. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so that curved portion of bends is not visible above the finished slab.

12. Flexible Connections: Use short length (maximum of 6 feet) of flexible conduit for recessed and semi-recessed lighting fixtures, for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet locations. Install separate ground conductor across flexible connections.

13. PVC Coated Rigid Steel Conduit:

a. Do not store conduit in direct sunlight.

b. Use pipe straps, no pipe wrenches or channel wrenches, when tightening connections to avoid damaging PVC coating.

c. Patch all gouges or cuts in the PVC coating after installing conduit. Use manufacturer's recommended patching paste. Build up area to be patched to full mil thickness of coating and feather out paste on sides of damaged area a minimum of 1/2-inch to provide a completely bonded seal.

d. Field bend conduit with shoes for a mechanical bender sized for the next larger size conduit.

e. Bends used in or below concrete slabs shall be, rigid steel type elbows, use for all stub-ups with flush floor coupling at transitions.

14. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.

3.03 FIELD QUALITY CONTROL

A. Examine surfaces to which conduits are to be secured for:

1. Defects which will adversely affect the execution and quality of work.

2. Deviations from allowable tolerances for the building material.

B. Do not start work until defects and deviations are corrected.

3.04 CLEANING

A. Upon completion of installations of raceways, inspect interiors of raceways; clear all blockages and remove burrs, dirt, and construction debris.

3.05 PROTECTION OF FINISHED WORK

A. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.

B. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

**END OF SECTION**

## SECTION 260553

## IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:

1. Equipment labels and signs.
2. Identification labeling for raceways, cables, and conductors.
3. Buried electrical line warnings.
4. Warning and caution signs
5. Operational instruction signs.

B. Electrical identification requirements in this Section may be supplemented in other sections of these specifications.

C. Related Sections:

1. General electrical requirements: Section 260501.

a. Painting: Section 09900.

2. Color coding of conductors for phase identification: Section 2605019.

3. Refer to other Division 26 sections for additional specific electrical identification associated with specific items.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute.
2. ASTM American Society for Testing and Materials.
3. IEEE Institute of Electrical and Electronics Engineers.
4. NEC National Electrical Code (NFPA 70).
5. NEMA National Electrical Manufacturers Association.
6. NFPA National Fire Protection Association
7. UL Underwriters Laboratories, Inc.

1.03 SUBMITTALS

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.05 PROJECT RECORD DOCUMENTS

A. Accurately record actual labeling and identification of electrical equipment, components, and wiring.

1.06 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.07 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.08 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following:

1. Brady
2. Ideal Industries
3. Markal
4. Panduit
5. Thomas & Betts

2.02 ELECTRICAL IDENTIFICATION PRODUCTS

A. Adhesive Marking Labels for Raceway and Metal-clad Cable: Pre- printed, flexible, self-adhesive labels with legend indicating voltage and service (Emergency, Power, Lighting, Air Conditioning, Voice and Data Communications, Control, Fire Alarm and Detection, Public Address (Paging), Electronic Security).

B. Label Size, as follows:

1. Raceways 1-Inch and Smaller: 1-1/8 inches high by 4 inches long.

2. Raceways Larger than 1-Inch: 1-1/8 inches high by 8 inches long.

C. Color: Black legend on orange background.

D. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.

E. Pretensioned Flexible Wraparound Colored Plastic Sleeves for Raceway and Cable Identification: Flexible acrylic bands sized to suit the raceway diameter and arranged to stay in place by pre- tensioned gripping action when coiled around the raceway or cable.

F. Underground Line Marking Tape: Permanent, bright-colored, continuous-printed, plastic tape compounded for direct-burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.

G. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self- adhesive, wraparound, cable/conductor markers with Preprinted numbers and letter.

H. Aluminum, Wraparound, Cable Marker Bands: Bands cut from 0.014- inch thick, aluminum sheet, fitted with slots or ears for securing permanently around wire or cable jacket or around groups of conductors. Provide for legend application with stamped letters or numbers.

I. Plasticized Card Stock Tags: Vinyl cloth with preprinted and field-printed legends to suit the application. Orange background, except as otherwise indicated, with eyelet for fastener.

J. Aluminum-Faced Card Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inches thick, and laminated with moisture-resistant acrylic adhesive. Pre-print legend to suit the application, and punch for tie fastener.

K. Brass or Aluminum Tags: Metal tags with tamped legend, punched for fastener. Dimensions: 2 inches by 2 inches by 19 gauge.

L. Engraved, plastic-laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letter on black face and punched for mechanical fasteners.

M. Warning and caution signs for indoor use: Shall be minimum 18 gauge steel, white porcelain enamel finish, with red lettering, punched for fasteners, with colors, legend, and size appropriate to the location. Lettering to read, "DANGER - HIGH VOLTAGE - KEEP OUT," unless otherwise indicated.

N. Exterior Metal-Backed Butyrate Warning and Caution Signs: Weather-resistant, nonfading, preprinted cellulose acetate butyrate signs with 20-gauge, galvanized steel backing, with colors, legend, and size appropriate to the location. Provide 1/4-inch grommets in corners for mounting.

O. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless steel screws or number 10/32 stainless steel machine screws with nuts and flat and lock washers.

P. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self- locking nylon cable ties, 0.18-inch minimum width, 50-lb minimum tensile strength, and suitable for a temperature range from minus 50 deg F to 350 deg F. Provide ties in specified colors when used for color coding.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. General:

1. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by code.

2. Install identification devices in accordance with manufacturer's written instructions and requirements of NEC.

3. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after completion of finish work.

B. Identify electrical equipment and enclosures, including but not limited to the following:

1. General

a. Switchgear and switchboards
b. Panelboards
c. Enclosed switches
d. Transfer switches
e. Enclosed motor controllers
f. Control devices, such as pushbutton- or rotary-selection stations
g. Motor control centers
h. Substations and transformers
i. Contactors
j. Lighting system relay cabinets
k. Dimming controls
l. Power supplies, inverters, and rectifiers
m. Pull-, junction-, and splice-boxes
n. Terminal boxes and cabinets
o. Access doors and panels for concealed electrical items

C. Identify underground electrical lines:

D. Identify electrical circuits:

E. Identify conduit containing circuit wiring operating at over 600 volts:

1. State "DANGER - HIGH VOLTAGE" in black letters 2-inches high, stenciled at 10-foot intervals over a continuous-painted orange background.

2. In addition, the following areas shall be identified:

a. The entire floor area directly above conduits running beneath and within 12 inches of a basement or ground floor that is in contact with earth or is framed above an unexcavated space.

b. On wall surfaces directly external to conduits run concealed within wall.

c. On all accessible surfaces of concrete envelope around conduits in vertical shafts, exposed at ceilings, or concealed above suspended ceilings.

d. On entire surface of exposed conduits.

F. Identify Junction, Pull, and Connection Boxes: Code-required caution sign for boxes shall be pressure-sensitive, self-adhesive label indicating system voltage in black, preprinted on orange background. Install on outside of box cover. Also label box covers with identity of contained circuit. Use pressure-sensitive plastic labels at exposed location and similar labels or plasticized card stock tags at concealed boxes.

G. Underground Electrical Line Identification: During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple line installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

H. Conductor Color Coding: Provide color coding for secondary service, feeder, and branch circuit conductor throughout the project secondary electrical system as follows:

| 208/120 Volts | Phase | 480/277 Volts |
|---|---|---|
| Black | A | Yellow |
| Red | B | Brown |
| Blue | C | Orange |
| White | Neutral | Gray |
| Green | Ground | Green |

I. Use conductors with color factory-applied the entire length of the conductors except as follow:

1. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.

   a. Apply colored, pressure-sensitive plastic tape in half- lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two lap of tape with no tension to prevent possible unwinding. Use l-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.

   b. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and paced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.

J. Power Circuit Identification: Securely fasten identifying metal tags or aluminum wraparound marker bands to cables, feeders, and power circuit in vault, pull boxes, junction boxes, manhole, and switchboard rooms with 1/4-inch steel letter and number tamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-lb test monofilament line or one-piece self-locking nylon cable ties.

K. Tag or label conductors as follows:

1. Future Connections: Conductors indicated to be for future connection or connection under another contract with identification indicating source and circuit numbers.

2. Multiple Circuits: Where multiple branch circuits or control wiring or communications / signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home run) label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by means of coded color of conductor insulation. For control and communication / signal wiring, use color coding or wire / cable marking tape at termination and at intermediate location where conductors appear in wiring boxes, troughs, and control cabinet. Use consistent letter / number conductor designation

throughout on wire / cable marking tape.

3. Match identification markings with designations used in panelboards, shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installation.

L. Apply warning, caution, and instruction signs and stencils as follows:

1. Install warning, caution, or instruction signs where required by NEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved plastic laminated instruction signs with approved legend where instruction or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items.

a. In addition to the above:

1) Warning signs shall be included on door, or immediately above door, of all electrical equipment rooms, or closets containing equipment energized above 150 volts to ground.

2) Warning designations in 1-inch high red letters shall be painted by stencil, or applied with pre-printed adhesive labels, on each pullbox, cabinet, or 10-foot length of exposed raceway stating: "DANGER-KEEP OUT," and stating the voltage of the enclosed conductors (for example, "480 VOLTS"), for all systems of over 150 volts to ground.

2. Emergency Operating Signs: Install engraved laminate signs with white legend on red background with minimum 3/8-inch high lettering for emergency instruction on power transfer, load shedding, or other emergency operations.

3. Permanently mount signs with cadmium plated steel screws or nickel-plated brass bolts.

M. Install equipment/system circuit/device identification as follows:

1. Apply equipment identification labels of engraved plastic-laminate (fastened with self-tapping or threaded screws) on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with a minimum of 1/4-inch-high lettering on 1-1/2-inch-high label (2-inch-high where two lines are required), white lettering in black field. Adhesive letters are not acceptable. Text shall match terminology and numbering shown, if provided. For emergency systems, the background field shall be red and include the word, "EMERGENCY." Apply label for each unit of the following categories of electrical equipment:

a. Panelboards, electrical cabinets, and enclosures.

b. Access doors and panels for concealed electrical items.

c. Electrical switchgear and switchboards.

1) State rating, including voltage, continuous current, horsepower or maximum current switching.

2) For enclosed circuit breakers, state voltage, continuous current, maximum interrupting current and trip current.

3) If fused with current-limiting protective devices, include nameplate stating: "Fuses Must Be Replaced With Current Limiting Type of Identical Characteristics."

d. Electrical substations.

e. Motor control centers.

f. Motor controllers.

1) Include voltage, current, horsepower, and trip setting of motor running overcurrent protection.

g. Pushbutton stations.

h. Power transfer equipment.

1) For transfer switches, include voltage, current and interrupting or withstand current.

i. Contactors.

1) Include voltage, continuous current, horsepower or interrupting current, and whether "mechanically-held" or "electrically-held."

j. Remote-controlled switches.

k. Dimmers.

l. Control devices.

m. Transformers.

n. Inverters.

o. Rectifiers.

p. Lighting system relay cabinets.

q. Battery racks.

r. Power generating units.

s. Telephone switching equipment.

t. Clock/program master equipment.

u. Fire alarm master station or control panel, annunciators.

v. Security monitoring master station or control panel.

N. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm / signal components, where labeling is specified elsewhere. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

O. Install labels at locations indicated and at locations for best convenience of viewing without

interference with operation and maintenance of equipment.

**END OF SECTION**

## SECTION 260573

## PROTECTIVE DEVICE COORDINATION STUDY

### PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Short Circuit Studies, Protective Device Evaluation Studies, and Protective Device Coordination Studies shall be provided by the switchboard/switchgear manufacturer. The studies shall be submitted to the Engineer prior to receiving final approval of the distribution equipment shop drawings and / or prior to release of equipment for manufacture. If formal completion of the studies may cause delay in equipment manufacture, approval from the Engineer may be obtained for a preliminary submittal of sufficient study data to ensure that the selection of device ratings and characteristics will be satisfactory.

B. The studies shall include all portions of the electrical distribution system from the normal and emergency power source or sources down to and including the 12kV, 480V and 208V distribution system. Normal system connections and those which result in maximum fault conditions shall be adequately covered in the study.

C. The Short Circuit Study shall be in accordance with the latest revisions of ANSI C37.5, IEEE Std. 399 and IEEE Std. 141.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Submittals: Sections 260501 and 01300.

1.03 SHORT CIRCUIT STUDY

A. The study input data shall include the power company's short circuit contribution, resistance and reactance components of the branch impedances, the X/R ratios, base quantities selected, and other source impedances.

B. Short circuit momentary duty values and interrupting duty values shall be calculated on the basis of assumed three-phase bolted short circuits at each switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboards, pertinent branch circuit panel, and other significant locations through the system. The short circuit tabulations shall include symmetrical fault currents, and X/R ratios. For each fault locations, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio.

1.04 PROTECTIVE DEVICE EVALUATION STUDY

A. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, automatic transfer switches, and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault current. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Engineer's attention.

1.05 PROTECTIVE DEVICE COORDINATION STUDY

A. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse

ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, and low voltage breaker trip characteristics and settings. The objective of the study is to obtain optimum protective and coordination performance from these devices.

B. The coordination study shall include all medium and low voltage classes of equipment from the utility's incoming line protective device down to and including the largest rated device in the 480 volt MCC and panelboard. The phase and ground overcurrent protection shall be included, as well as settings of all other adjustable protective devices.

C. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, associated power company's relays or fuse characteristics, significant motor starting characteristics, complete parameters of transformers, complete operating banks of low voltage circuit breaker trip curves and fuses. The coordination plots shall indicate the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand parameters, cable thermal overcurrent withstand limits and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.

D. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connections, manufacturer and type, range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas, or inadequacies shall be promptly brought to the Engineer's attention.

1.06 STUDY REPORT

A. The results of the power system study shall be summarized in a final report. Five (5) bound copies of the final report shall be submitted.

B. The report shall include the following sections:

1. Description, purpose, basis and scope of the study and a single line diagram of that portion of the power system which is included within the scope of the study.

2. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties, and commentary regarding same.

3. Protective device time versus current coordination curves, tabulations of relay and circuit breakers trip settings, fuse selection, and commentary regarding same.

4. Fault current calculations including a definition of terms and guide for interpretation of computer printout.

1.07 PROTECTIVE DEVICE TESTING, CALIBRATION AND ADJUSTMENT

A. The equipment manufacturer shall provide the services of a qualified field engineer and necessary tools and equipment to test, calibrate and adjust the protective relays and circuit breaker trip devices as recommended in the power system study.

**END OF SECTION**

## SECTION 260943

## DIGITAL NETWORK CONTROL DEVICES

### PART 1 - GENERAL

1.1 SUMMARY

A. Installed system shall be comprised of stand-alone and networked control devices as indicated. System control devices shall include, but are not limited to:
   a. Digital Room Controllers
   b. UL924 Load Controller
   c. Fixture Control Modules
   d. Lighting Control Panels
   e. Sensors
   f. Wall Stations
   g. Network Area Controller
   h. Network Modules
   i. Network Accessories
   j. Software Interfaces
   k. Conductors and Cabling

1.2 SYSTEM DESCRIPTION

A. The contractor shall provide and install NX Lighting Controls System as shown on plans and specified herein. NX Lighting Controls System shall be designed and configured to send and receive control, monitoring, operating and maintenance signals and commands wired and or wirelessly to and from networked enabled room controllers, fixture modules, switch stations, occupancy and daylight sensors, lighting control panels and other controls devices.

1.3 SUBMITTALS

A. Prior to fabrication and shipment of lighting control components, manufacturer shall provide submittal documentation for approval.

B. Submittal documentation shall include:
   1. Bill of Material including a list of components to be supplied,
   2. Device specification sheets indicating device features, certifications, dimensions, construction specifications, electrical specifications, wiring diagrams, nomenclature, and related products,
   3. Component schedules: Indicating lighting control device types and locations
   4. Lighting panel schedules,
   5. Wiring diagrams,
   6. Control cable type and routing requirements,
   7. System riser drawings of sufficient detail to indicate relative placement of major system components and the required connections between each,
   8. Contractor Startup Request Form – to be completed prior to factory startup,
   9. Operating and maintenance instructions, manuals and/or videos.

1.4 QUALITY ASSURANCE

   1. Approval of Comparable Products: Submit the following at least 10 days prior to submission of a proposal package. Substitution submitted without the below shall be rejected.

a. Submit line-by-line comparison that describes differences, if any, between each lighting control device specified and those being proposed. Comparison shall include differences in size, quantity, quality, method of control, features and functions, control software functions, and installation requirements.
b. Product data, including certified independent test data indicating compliance with requirements.
c. Samples of each component.
d. Project references: Minimum of 3 installations not less than 3 years old, with Owner and Architect contact information.
e. Sample warranty.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.

`Factory Assembly: All system components shall arrive at the job site completely pre-wired and ready for installation, requiring only the connection of lighting circuits and network terminations. All connections shall be made to clearly and permanently labeled termination points or by connectorized cable. Systems that required field assembly shall not be acceptable.

B. Component Testing: All system components and assemblies shall be individually tested prior to assembly. Once assembled, all finished products shall be tested for proper operation of all control functions per specifications prior to shipment.

1.5 SYSTEM COMPLIANCE

A. Compliance: Where indicated, individual components shall comply with the following requirements:
1. NEC Compliance: All system components shall comply with all applicable sections of the National Electrical Code (NEC) NFPA 70 as required.
2. NEMA Compliance: All system components shall comply with all applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.
3. UL Approval: All applicable equipment shall be tested to and listed under UL standard 508, UL standard 916 or UL924 and shall bare labels to indicate compliance. Lighting control relays shall be tested to UL standard 508 for both safety and endurance. Systems listed under ETL or other UL sections shall provide documentation proving compliance with UL standards as listed above.
4. FCC Emissions: All applicable equipment shall comply with FCC emissions standards specified in Part 15, sub-part j for commercial and residential applications and shall bear labels indicating compliance testing. Equipment that does not meet these standards shall not be acceptable.

1.6 WARRANTY

A. Manufacturer shall warrant the lighting control system components to be free from defects in material and workmanship for a period of five (5) years from the date of the certificate of building occupancy or proof of installation, whichever occurs first (“Warranty Period”). If the certificate of building occupancy is not available or there is no proof of installation, the Warranty Period shall begin with the Product ship date.

B. Manufacturer’s warranty shall include the repair or replacement product(s) with the same or a functionally equivalent product(s) or component part(s).

C. Manufacturer shall provide telephone technical support and remote diagnostics where applicable during normal business hours excluding manufacturer holidays.

D. Upon request, Manufacturer shall provide quotation for manufacturer service contract option(s) which include on-site technician visits for service and repair.

## PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers
   1. Current

B. Basis-of-Design: NX Lighting Controls System manufactured by HLI Solutions, a division of Current, Greenville SC.

2.2 SYSTEM ARCHITECTURE

A. System shall consist of wired and/or wireless, distributed intelligent lighting control devices consisting of but not limited to control modules with ON/OFF, full range dimming and CCT control capabilities, and system input devices including but not limited to occupancy/vacancy sensors, daylight sensors and manual switch stations.

B. System shall provide for automatic self-configuration of system devices. Self-configuration shall be accomplished by the devices themselves and provide for control of lighting prior to system custom configuration and programming. Systems that require configuration prior to use shall be considered unacceptable.

C. To implement lighting control strategies, the system architecture shall facilitate the association of system input devices to control modules. The system shall use the Area/Zone/Group assignment strategy. The system shall support up to 128 Areas. Each area shall consist of up to 128 Zones and each zone shall consist of up to 16 Groups. Each device may be programmed to participate in one Area and Zone however may belong to one or more of the available 16 Groups within a Zone.

D. System shall provide time-of-day and astronomical clock scheduling. Each Area/Zone shall support up to 99 scheduled events for use in developing time-of-day or astronomical clock sunrise/sunset automated schedules. Each schedule shall have the ability to turn a group ON or OFF or activate a preset lighting scene at a scheduled time. Schedules shall be day-of-week selectable and may be programmed to activate on any combination of days of the week (Sunday through Saturday) or to activate on a specific date/holiday.

E. System shall support blink alerts. Relay outputs within the control modules shall be programmable to blink prior to being turned OFF. Blink alert duration time shall be adjustable. Control modules programmed for the blink alert function shall blink the controlled lighting prior to turning OFF to warn occupants of the upcoming OFF event. If an ON command is received during the blink alert time, relay output will be overridden and left ON for the override time. Override time shall be adjustable.

F. System input devices shall be deployed in a space to monitor and broadcast changes such as occupancy, daylight levels and manual switch input.

G. System customization and programming shall be performed from a mobile App and/or web-based configuration and system management tools.

H. System shall have an intuitive and easy to use Graphical User Interface (GUI) to configure, control, monitor and schedule individual devices or groups of devices.

I. System shall remain fully functional during the programming process. Lighting control systems that must be taken “OFFLINE” for programming are not acceptable. All programming changes shall take effect immediately as they are programmed.

J. System shall be capable of being accessed from a local network or remotely using any standard Internet browser. System shall not require any special client-side software. Systems which utilize special client-side software shall not be acceptable.

K. Systems devices shall be capable of communication with each over one or all of the below methods.
1. RS485 multidrop serial network
2. Wireless mesh network
3. Ethernet TCIP network

L. Wired – RS485/Ethernet
1. System shall provide an Ethernet communication backbone (NX Network) for the connection of control Zones.
2. System shall utilize the RS485 standard for connection of and communications between Zone Devices.
3. System shall utilize the RS485 standard for connection of and communications between SmartPORT™ devices (e.g., Sensors, Switches and Accessories) connected within a NX Zone.

M. Wireless – Coordinator-less, Self-Organizing/Self-Healing Mesh
1. System shall have a wireless architecture that utilizes wireless mesh radio technology to create a peer-to-peer, self-organizing and self-healing mesh network infrastructure.
2. System shall have no single point of failure. A master controller/coordinator or master node shall not be required for proper system operation. All nodes shall be capable of communicating with each other without the need of these types of single point of failure devices. Systems which utilize a master controller/coordinator shall not be acceptable.
3. System shall be self-organizing. The mesh network of devices shall self-organize automatically without the need to manually set device addresses via dials, DIP switches or other means.
4. System shall be self-healing. System devices within the mesh network shall automatically reroute messages around a failed device to ensure message delivery.
5. System architecture shall facilitate data transmission between wireless devices over the 2.4GHz ISM radio frequency (RF) band with a supported RF range of 100ft between wireless devices indoors and 300ft outdoors.
6. System shall use a wireless mesh radio communication protocol to transmit/receive and negotiate messaging among wireless devices.
7. System shall utilize spread spectrum frequency hopping to facilitate robust communication and prevent the unauthorized interception of messages over the air and to comply with FCC requirements.
8. System shall provide the ability to secure messages. When implemented, each device shall use the strong and secure AES-128 (Advanced Encryption Standard) security cipher to encrypt and decrypt messages. System shall also use the secure HTTPS/SSL protocol when users access the system using their Internet browser.

N. System devices shall be capable of having their firmware updated or upgraded over the air through the wireless mesh network.

## 2.3 DIGITAL ROOM CONTROLLERS

A. NX Room Controllers
1. Basis of Design Product: NX Lighting Controls System, NX Room Controllers.

2. As indicated and where shown on the plans, install NXRC series Room Controller(s) to control the quantity of lighting and plug loads required.
3. NX Room Controller(s) shall integrate the functionality of connected control components including wall switch stations, occupancy sensors and daylight sensors to provide the required sequence of operation for the space.
4. NX Room Controller(s) and associated room control components shall operate in a totally standalone mode and not require the use of a network, software, computer, or server for local control functions.
5. NX Room Controller(s) shall have an embedded Time Clock and be capable of storing and running up to 99 local schedules. Schedules shall run autonomously without the need of any coordinator, gateway, or master controller.
6. Construction:
    a. NX Room Controller housing shall be constructed of GSM UL rated 94 HB plastic approved for use in a return air plenum.
    b. The housing and shall include an integral 1/2" chase nipple for external mounting to standard junction box knockout.
    c. Two RJ45 FX Port connectors shall be accessible on the side of the enclosure for expansion of a Zone Segment to allow for an expanded number of Zone Segment devices (e.g., Room Controllers, In-Fixture Modules, and Digital Sensors). Up to 32 controllers and devices can be daisy-chained together.
    d. Two RJ45 SmartPORT™ connectors shall be accessible on the side of the enclosure for the connection of NX room level devices.
    e. Two recessed push buttons and associated LED indicators shall be accessible on the top of the enclosure to provide override, status, setup, and testing functions.
7. Electrical:
    a. NX Room Controller(s) shall have a single power feed and shall be capable of operation at voltages between 120/277/347 volts AC, 50/60 Hz.
    b. One or two output relays (model specific) shall provide for the following load types and ampacity (per relay):
        1) 20A, Tungsten,
        2) 20A, Magnetic Ballast,
        3) 16A, Electronic Ballast,
        4) 1 H.P. Motor @ 120V, ¾ H.P. @ 277V; ½ H.P. @ 347V
    c. Where indicated provide one or two independent 0-10 volt dimming channels (model specific) for full range dimming control of fixtures equipped with compatible dimmable ballast or driver.
    d. Each dimming output shall have a current sinking capacity of at least 30 mA.
    e. NX Room Controller(s) shall be capable of supplying 250 mA of Class 2 auxiliary DC power for use by wall switch stations, occupancy sensors, and daylight sensors connected to the room controller's two RJ45 SmartPORT connectors.
    f. NX Room Controller(s) shall be equipped with power monitoring circuitry capable of measuring and reporting the total connected load for each room controller.
8. Functional:
    a. Provide an integral pushbutton and LED indicator for each load for status and to allow operation of the relays and dimmers for testing and verification without requiring other control devices to be connected.
    b. NX Room Controller(s) shall have a default operation providing an automatic logical sequence of operation for each load as the room control devices are plugged into the SmartPORT connectors.
    c. Default operation for occupancy sensors shall be automatic on, automatic off for all loads.
    d. Upon connection of a switch, the operation shall automatically change to manual on, automatic off (vacancy) mode for all loads.
    e. Provide capability to convert each load independently to automatic on or vacancy mode using only the integral push buttons and LED indicators on the room controller.
    f. When in vacancy mode, provide a 30 second grace period after an off during which automatic on shall be temporarily enabled.

g. It shall be possible to connect up to thirty-two (32) room controllers together on the FX Ports using Cat5 patch cables to provide configurations up to 64 switched and dimmed loads operating as a single zone.
h. Provide the following set up and configuration functions without the need for additional devices or software:
1) Assign/reassign relays for control by wall switch station buttons,
2) Configure relays for occupancy or vacancy operation,
3) Assign/reassign dimmers to raise/lower switches,
4) Assign dimming channels for response to daylight sensor control,
5) Auto calibrate default daylight sensor sequence of operation,
6) Save preset scenes.

9. NX Room Controller(s) shall support the following specialty modes:
a. SpectraSync™ CCT Control
1) Dimmer channels can be set individually to control CCT via 0-10V.
2) Scheduling can be implemented to mimic the natural transition of light throughout the course of the day.
3) Room-based solutions can be implemented to allow occupants to tune color to task.
b. SpectraClean™
1) Ability to control SpectraClean enabled fixtures with three different modes for varying applications:
a) Constant On
b) Scheduled
c) Programmed Dosage

## 2.4 UL924 LOAD CONTROLLER

A. NX UL924 Load Controller
1. Basis of Design Product: NX Lighting Controls System, NX UL924 Load Controller.
2. As indicated and where shown on the plans, install NX UL924 Load Controller to control the quantity of emergency lighting loads required.
3. NX UL924 Load Controller shall meet NFPA Article 700 requirements for emergency lighting.
4. NX UL924 Load Controller and associated room control components shall operate in a totally standalone mode and not require the use of a network, software, computer, or server for local control functions.
5. NX UL924 Load Controller shall provide a remote test button or fire alarm interface.
6. NX UL924 Load Controller shall have an embedded Time Clock and be capable of storing and running up to 99 local schedules. Schedules shall run autonomously without the need of any coordinator, gateway, or master controller.
7. Construction:
a. NX UL924 Load Controller housing shall be constructed of GSM UL rated 94 HB plastic approved for use in a return air plenum.
b. The housing and shall include an integral 1/2" chase nipple for external mounting to standard junction box knockout.
c. Two RJ45 FX Port connectors shall be accessible on the side of the enclosure for expansion of a Zone Segment to allow for an expanded number of Zone Segment devices (e.g., Room Controllers, In-Fixture Modules, and Digital Sensors). Up to 32 controllers and devices can be daisy-chained together.
d. Two recessed push buttons and associated LED indicators shall be accessible on the top of the enclosure to provide override, status, setup, and testing functions.
8. Electrical:
a. NX UL924 Load Controller shall have a single power feed and shall be capable of operation at voltages between 120/277/347 volts AC, 50/60 Hz.
b. One relay output shall provide the following load types and ampacity:
1) 20A, Tungsten,

2) 20A, Magnetic Ballast,
3) 16A, Electronic Ballast,
4) 1 H.P. Motor @ 120V, ¾ H.P. @ 277V; ½ H.P. @ 347V.

c. NX UL924 Load Controller shall provide two independent 0-10 volt dimming channels for full range dimming control of fixtures equipped with compatible dimmable ballast or driver.

d. Each dimming output shall have a current sinking capacity of at least 30 mA.

e. NX UL924 Load Controller shall be equipped with power monitoring circuitry capable of measuring and reporting the total connected load for each room controller.

9. Functional:

a. SmartPORT Functionality:

1) NX UL924 Load Controller shall automatically recognize connected devices in the Zone Segment.
2) NX UL924 Load Controller shall function as a standard room controller.
3) NX UL924 Load Controller's RJ45 CAT5 connection shall be used as a sensing line to standard room controller only and does not support NX room devices.

b. Emergency Functionality:

1) NX UL924 Load Controller's RJ45 CAT5 connection shall be used as a sensing line to standard room controller on normal circuit.
2) Removal of 24VDC on CAT5 connection shall put NX UL924 Load Controller into emergency state.
3) NX UL924 Load Controller's default emergency state is ON with both dimming channels to 100%

c. Provide an integral pushbutton and LED indicator for controlled load for status and to allow operation of the relay and dimmers for testing and verification without requiring other control devices to be connected.

d. Provide the following set up and configuration functions without the need for additional devices or software:

1) Assign/reassign relays for control by wall switch station buttons,
2) Configure relays for occupancy or vacancy operation,
3) Assign/reassign dimmers to raise/lower switches,
4) Assign dimming channels for response to daylight sensor control,
5) Save preset scenes.

10. NX UL924 Load Controller shall support the following specialty modes:

a. SpectraSync™ CCT Control

1) Dimmer channels can be set individually to control CCT via 0-10V.
2) Scheduling can be implemented to mimic the natural transition of light throughout the course of the day.
3) Room-based solutions can be implemented to allow occupants to tune color to task.

b. SpectraClean™

1) Ability to control SpectraClean enabled fixtures with three different modes for varying applications:
a) Constant On
b) Scheduled
c) Programmed Dosage

## 2.5 FIXTURE MODULES

A. NX In-Fixture Modules

1. Basis of Design Product: NX Lighting Controls System, NX In-Fixture Modules.
2. As indicated in the specifications and as shown on the plans, install NXFM series Fixture Control Module enabled fixture(s).
3. NX In-Fixture Modules shall be designed to install inside the fixture they control.

4. NX In-Fixture Modules shall consist of a completely distributed intelligent lighting controller capable of functioning completely independently including time based and astronomical scheduling of On/Off and preset events without the need of any coordinator, gateway or master controller. Sensors and switches as well as other NX In-Fixture enabled fixtures shall be capable of being connected directly to the NX In-Fixture Module to create a fully functional lighting control system.
5. NX In-Fixture Module shall be provided with one SPST relay. Relay shall be supplied with "Zero Cross Switching" control to limit the effects of inrush on the relay contacts.
6. NX In-Fixture Module shall be compatible with incandescent, magnetic, and electronic lighting loads including LED drivers. NX In-Fixture Module shall include zero arc point switching circuitry and have the following max load ratings:
7. Construction:
    a. Housing: GSM UL Rated 94 HB Plastic
    b. Mounting: Mounts inside fixture
8. Electrical:
    a. Line Voltage Versions:
        1) Input: Universal 120-347VAC, 50-60Hz
        2) Output: One or two relay outputs (model specific) shall provide for the following load types and ampacity (per relay):
            a) 10A, 120VAC only Incandescent
            b) 10A, 120-347VAC, Magnetic Ballast
            c) 5A, 120-277VAC, Electronic Ballast
            d) 3A, 347VAC, Electronic Ballast
        3) Surge Withstand: 2000V
        4) Peak Inrush: 160A for 2 ms Max
    b. Low Voltage Versions:
        1) Input: 12-24VDC
    c. NX In-Fixture Modules shall be provided with two 0-10VDC control interfaces for full range dimming control of dimming ballasts and LED drivers. Interface shall be designed to continuously sink 30mA of current.
    d. NX In-Fixture Module 0-10VDC control interfaces shall be configurable for 0-10VDC dimming, dim to off or color temperature control.
9. Functional:
    a. NX In-Fixture Modules shall be designed to self-configure, automatically to meet energy code requirements as NX sensors and other NX devices are connected.
    b. NX In-Fixture Module shall be designed such that self-configuration takes place automatically without user intervention or commissioning of any kind.
    c. NX In-Fixture Modules shall be rated and tested for an operating temperature range of -40° to 185°F [-40° to 85°C].
    d. NX In-Fixture Module shall be equipped with a Real Time Clock and integral backup for schedule information. Each module shall support up to 99 schedules. Schedules shall be loaded to the module via the network or locally using the NX Lighting Controls App. Once loaded, schedules shall run autonomously without the need of any coordinator, gateway, or master controller.
    e. NX In-Fixture Module shall be capable of having its device firmware updated wirelessly over the air when connected to a NX sensor of via the NX SmartPORT.
    f. NX In-Fixture Modules shall be supplied with one momentary pushbutton with LED for manual control and testing. Through the use of this switch, it shall be possible to test the On/Off and dimming functionality of the NX In-Fixture module or completely reset the NX In-Fixture Module to factory defaults without the need to connect any other device or testing equipment.
    g. NX In-Fixture Module shall include non-volatile memory for retaining device settings during power outages.
10. NX In-Fixture Module shall be UL Listed to UL916 and Certified to CAN/CSA C22.2 NO 205-M1983.
11. NX In-Fixture Module shall be FCC certified.

B. NX On-Fixture Modules
1. Basis of Design Product: NX Lighting Controls System, NX On-Fixture Module.
2. As indicated in the specifications and as shown on the plans, install NXOFM series wireless On-Fixture Control Module(s).
3. NX On-Fixture modules shall consist of a completely self-contained distributed intelligent wireless lighting controller capable of functioning completely independently including time based and astronomical scheduling of On/Off and preset events without the need of any coordinator, gateway or master controller.
4. NX On-Fixture Module shall be configurable remotely over the air utilizing built in Bluetooth radio an iOS or Android handheld device with the NX Lighting Controls App installed or via NX Wireless Network.
5. NX On-Fixture Module shall be capable of having its device firmware updated wirelessly over utilizing it's built in Bluetooth radio and iOS or Android handheld device with the NX Lighting Controls App installed or via NX Wireless Network.
6. On-Fixture Module shall respond to scheduled events, occupancy/vacancy sensor events and manual switch station events.
7. On-Fixture Module shall monitor and measure energy consumption.
8. On-Fixture Module shall include non-volatile memory for retaining device settings during power outages.
9. NX On-Fixture Modules shall be rated and tested for an operating temperature range of -40° to 185°F [-40° to 85°C].
10. NX On-Fixture Module shall include one SPST relay for On/Off control.
11. NX On-Fixture Modules relay shall be supplied with "Zero Cross Switching" control to limit the effects of inrush on the relay contact.
12. NX On-Fixture Module shall be compatible with incandescent, magnetic, and electronic lighting loads including LED drivers.
13. Construction:
    a. Housing: GSM UL Rated 94 HB Plastic
    b. Mounting: Standard C136-41 (2013) with 5 or 7 pin twist-lock connector. Compatible with C136-10 sockets.
14. Electrical:
    a. Input: 120-480VAC, 50-60Hz
    b. Output: Relay output shall provide for the following load types and ampacity:
        1) 5A@120-347VAC,
        2) 3A@480V
    c. Surge Withstand: 2000V
    d. Peak Inrush: 160A for 2 ms Max
    e. Standby Power (W):
        1) 120VAC: 1.2
        2) 277VAC: 1.5
        3) 347VAC: 1.5
        4) 480VAC: 1.3
15. Functional:
    a. On-Fixture Module shall include an integrated daylight sensor with a foot candle range as shown below:
        1) On level: 1FC to 5FC (Default: 5FC)
        2) Off level: 4FC to 15FC (Default: 8FC)
    b. NX On-Fixture Modules shall communicate with other NX enabled fixtures and devices via NX Wireless Network with the following characteristics:
        1) Robust & reliable IEEE 802.15.4 2.4GHz wireless self-organizing and self-healing mesh network
        2) Radio Range: Outdoor: ~1000 ft. (~300m) Note: Range based on clear line of site.
        3) Security: AES-128 (Advanced Encryption Standard)
16. NX On-Fixture Module shall include non-volatile memory for retaining device settings during power outages.

17. NX On-Fixture Module shall UL Listed to UL916 and Certified to CAN/CSA C22.2 NO 205-M1983.
18. NX On-Fixture Module shall be FCC certified.

## 2.6 LIGHTING CONTROL PANELS

A. NX Lighting Control Panels
1. Basis of Design Product: NX Lighting Controls System, NX Lighting Control Panels.
2. As indicated and where shown on the plans, install NX Lighting Control Panels V2 (NXP2 Series).
3. Panel shall be a fully distributed intelligent lighting controller with the ability to function as a stand-alone lighting control panel or as part of an NX networked system.
4. Panel shall provide standard capacities for 8, 16, 24, 32, or 48 relays in each panel with matching number of 0-10v dimming channels.
5. Panel shall be available in custom configurations. Configuration options shall include: panel shipment type (enclosure/interior shipped together, enclosure/interior shipped separately, enclosure only, and interior only), panel size, number of single pole/double pole relays, emergency control option, input voltage and enclosure mount (surface mount or flush mount).
6. Panels shall be factory assembled and tested. No field assembly shall be required.
7. Construction:
   a. Panel shall be surface or flush wall mounted in a NEMA1 rated enclosure, based on panel configuration.
   b. Panel shall be capable of being shipped with enclosure/interior together, enclosure/interior separately, enclosure only, and interior only in appropriately designed packaging. When enclosure is shipped separately, enclosure shall enable rough-in of all electrical connections prior to receipt of the panel interior.
   c. Panel enclosure shall have standard electrical conduit knockouts on the top, the bottom and both sides of the enclosure to allow installation flexibility. Field drilling and cutting for pipe and wire shall not be required.
   d. Panel shall provide keyhole mounting holes in the rear of the enclosure.
   e. Panel enclosure shall include 6” spacing running the width of the panel at the bottom of the panel to allow for line voltage accessories such as contactors or to provide a “gutter”. Space shall be separated from the low voltage area utilizing a removable metal barrier. No knockouts added to the bottom plate of the inner high voltage divider. Exterior enclosure will maintain knockouts on bottom.
   f. Panel venting shall conform to NEMA 1 enclosure specifications to contain any local explosion and to protect the working environment.
   g. Panel enclosure shall feature removable metal barriers that separate all high-voltage components and wiring (Class 1) from all low-voltage (Class 2) components and wiring.
   h. Panel enclosure shall be of welded construction primed and painted with a powder coat finish. Unpainted or galvanized enclosures are not acceptable.
   i. Panel cover shall attach to the enclosure with #10-32 x ½” truss head machine screws.
   j. Panel cover shall employ “keyhole” style openings for the top two mounting screws to allow the panel’s cover to be temporarily hung during installation eliminating the need to completely remove all the mounting screws along with contributing to safety ensuring the cover does not swing if all screws were removed.
      1) 8 Relay panel cover – 4 mounting holes: 2 keyhole style slots, 2 slotted style slots
      2) 16/32 Relay panel cover – 6 mounting holes: 2 keyhole style slots, 4 slotted style slots
      3) 48 Relay panel cover – 8 mounting holes: 2 keyhole style slots, 6 slotted style slots
   k. Panel cover shall be sized for either surface or recess mounting of the panel.

l. Panel cover shall have hinged locking door to expose only the low voltage wiring section of the panel.
m. Panel door hinges shall be located on the left side.
n. Panel shall be provided with a factory or field installable panel interior. Panel interior shall contain all controller electronics, power supplies, relays, and other required components. Panel shall arrive at the project site completely pre-wired and requiring only the connection of lighting circuits and network cable. Systems that require field assembly of controllers or chassis inserts are not acceptable
o. Panel interior components shall reside on a framed skeleton. When disconnected from the load circuits and necessary mounting connections, the framed skeleton can be removed taking all the electrical components intact.
p. Panel interior components shall be designed to not become dislodged during shipment.
q. Panel spacing between panel relays shall be suitable for separating any two relays in the panel to meet the NEC requirements for normal and emergency power when a metal divider is installed between relays. A metal plate barrier shall be available to separate relays - two plates per application.
r. Panel relays shall be of the snap-in type and be individually field replaceable.

8. Electrical:
a. Panel shall be supplied with either a 120V/277V, 347V or 480V power supply.
b. Panel power supply shall provide the required capacity for the operation of the panel, relays, controllers, NX Network, SmartPORTs, user interfaces and the maximum number of low voltage and/or data devices that can be connected to each panel.
c. Panel wire connections shall be made to labeled terminal blocks.
d. Panel shall have LED status/failure indicators.
e. Panel shall provide support for Bluetooth programming using the NX Lighting Controls App and the NX Bluetooth Radio Bridge with Clock or a SmartPORT connected NX sensor.
f. Panel shall include two (2) Ethernet ports for connection to the NX Network.
g. Panel shall include four (4) RJ45 NX SmartPORTs for the connection of all NX sensors and switches. SmartPORTs shall be capable of supplying 250 mA of Class 2 auxiliary DC power for use by wall switch stations, occupancy sensors, and daylight sensors connected to the SmartPORT connectors
h. Panel shall have four (4) 3-wire low voltage dry contact inputs. Removable terminal blocks shall be provided to support momentary or maintained closures from building automation systems, fire systems, demand response and security systems as well as other systems or devices including occupancy sensors, daylight sensors, and low voltage switches. Each input shall be individually programmable and provide the ability to initiate any NX switch compatible function or command. (on, off, raise, lower, preset, timed on/off). Each input will provide a connection for sourcing 24V, a common, control and pilot light functionality for low voltage switch stations.
i. Panel shall have two (2) SPDT (NO/NC) dry contact outputs, with removable terminal blocks, to provide a contact closure to signal out to another system that is capable of receiving a NO or NC closure to signal building automation, security or alarm system based on a schedule or a command from an input device (e.g. occupancy sensor, daylight sensor, wall switch station, etc.). Each output will have a contact rating of 24VDC@50mA minimum.
j. Panel shall have an easily accessible, removable coin size battery for maintaining system time during a power loss.
k. Panel shall, after a power loss, retain time for a minimum of 72 hours.
l. Panel time shall be updated when connected to a device utilizing the NX Lighting Controls App or from an NX network time server.
m. Panel shall feature a power sensing circuit and transformer for UL924 operation. Upon detection of loss of power, the panel shall force all relays closed and all dimming channels to full bright. Panel shall maintain this state until normal power is restored. Connected devices will not be powered.

n. Panel shall have a test button on the optional UL924 board to test the UL924 operation.
o. Panel shall have a low voltage remote test switch input on the optional UL924 to test the UL924 operation.
p. Panel shall provide relay/dimmer boards to expand panel capacity from 8 to 48 relay outputs in groups of 8. Relay/dimmer boards shall be completely self-configuring and shall not require manual settings to configure for use within the panel.
q. Panel relay/dimmer boards shall confirm relay presence and status.
r. Panel relay/dimmer boards shall have (8) 0-10V integrated dimming channels, each capable of sinking 50mA.
s. Panel dimming channels shall be software assignable.
t. Panel shall be capable of containing 1 to 48 robust and reliable mechanically latching lighting control relays as indicated on the drawings and schedules as specified herein. Electrically held or non-mechanically latching relays shall not be considered.
u. Panel relays shall be individually UL and CUL listed and shall bear labels indicating compliance. Lighting control relays shall be tested to UL standard 508 for both safety and endurances and bare labels signifying compliance.
v. Panel relays shall have the following load ratings:
    1) Single Pole Relays:
        a) General Use: 30A @ 300VAC
        b) Tungsten: 2400W @ 120VAC
        c) Standard Ballast: 20A @ 300VAC
        d) Motor Starting: 1HP @ 110-125VAC; 1½ HP @ 220-277VAC
    2) Double Pole Relays:
        a) General Use: 20A @ 480VAC
        b) Tungsten: 2400W @ 120VAC
        c) Standard Ballast: 20A @ 480VAC
        d) Motor Starting: 1HP @ 110-125VAC; 1½ HP at 220-277VAC
w. Panel relays shall be rated for minimum cycle life of 120,000+ operations (60,000+ cycles).
x. Panel relays shall have a Short Circuit Current Rating (SCCR) of 18,000A @ 277VAC.
y. Panel relays shall have a built-in manual override lever & ON/OFF indicator.
z. Panel relays shall be capable of manual activation On or Off with or without power.

9. Functional:
a. Panel shall be of the distributed intelligence type and shall not be dependent on a network connection to execute schedules or perform programmed functions.
b. Panel shall be programmed using the optional NXBTC Bluetooth® radio module with clock and NX Lighting Controls App. When networked, panel configurations shall be performed utilizing the NX Area Controller's web-browser based Graphical User Interface.
c. Panel shall provide the ability to update panel firmware. Firmware update process shall ensure that the complete and correct firmware (e.g. via CRC check) has been downloaded before the panel is flashed with the new firmware.
d. Panel set up and configuration functions shall include (but are not limited to):
    1) Assign/reassign relays for control by wall switch station buttons,
    2) Configure relays for occupancy or vacancy operation,
    3) Assign/reassign dimmers to raise/lower switches,
    4) Assign dimming channels for response to daylight sensor control,
    5) Assign names to relays/dimmers,
    6) Auto calibrate default daylight sensor sequence of operation,
    7) Create and save preset scenes,
    8) Configure wall switch button types. At a minimum, button types shall include toggle on/off with pilot, preset, on only and off only,
    9) Configure up to six zones of daylight harvesting per room with independent set points and time delays,

10) Include or exclude loads from occupancy sensor control,
11) Configure up to 16 load groups per zone,
12) Configure up to 16 preset scenes per zone with independent fade times,
13) Set independent power up conditions for relays and dimmers,
14) Set independent occupied and unoccupied conditions for each relay and dimmer,
15) Adjust dimmer high and low trim points,
16) Manually control lighting loads

e. Panel shall provide the ability to create up to ninety-nine (99) schedules per zone. Each schedule will consist of the following:
1) Event Time – Shall be configured as a specific set “Normal” time (hh:mm am/pm) or as an offset based on one of the following: Before Sunrise, After Sunrise, Before Sunset, After Sunset, Before Open, After Open, Before Close or After Close.
2) Action – Task to be performed: None, Group State, or activation of a Preset.
3) None – No action to perform
4) Group State – The specific relay / dim level / color temp range settings, that the select group(s) of actuators should implement.
5) Presets – The specific preset that should be activated.

f. Panel shall provide the ability to disable a schedule
g. Panel shall provide the ability to delete a schedule

## 2.7 CONTROLLED RECEPTACLES

A. HCS Controlled Receptacle
1. Basis of Design Product: NX Lighting Controls System, HCSREC Series Controlled Receptacle.
2. Controlled Receptacle shall be capable of controlling other receptacles downstream in the branch circuit.
3. Controlled Receptacle shall be automatically controlled by a low voltage signal from an occupancy sensor or any other type of control capable of performing this task, e.g., time-of-day control device.
4. Controlled Receptacle shall be available in split or fully controlled 15A or 20A models.
5. Controlled Receptacle shall feature permanent NEC 406.3 (E) markings.
6. Controlled Receptacle shall be UL498B SA Listed Receptacles with integral switching that complies with Supplement SA.

## 2.8 SENSORS AND MODULES

A. NX Smart Sensor Module Passive Infrared, Wireless Occupancy & Daylight Sensor
1. Basis of Design Product: NX Lighting Controls System, NX Smart Sensor Modules.
2. As indicated in the specifications and as shown on the plans, install NXSMP series sensor module enabled fixture(s).
3. NX Smart Sensor Module shall be designed to install directly into or on the fixture housing or lens.
4. NX Smart Sensor Module shall integrate seamlessly into the NX Network.
5. NX Smart Sensor Module shall have an RF frequency of 2.4GHz.
6. NX Smart Sensor Module shall include Bluetooth and provide connection to the NX Network using the NX Lighting Controls App.
7. NX Smart Sensor Module Occupancy/Vacancy sensor shall provide automatic or vacancy switching of lighting load(s) within an area/zone based on the presence of human activity.
8. NX Smart Sensor Module Occupancy/Vacancy sensor shall be microprocessor controlled and utilize IntelliSCOPE™ technology to provide real-time graphical occupancy data.
9. NX Smart Sensor Module Occupancy/Vacancy sensor shall not require any adjustments of any kind at the time of installation or during operation.

10. NX Smart Sensor Module Occupancy/Vacancy sensor shall be powered by SmartPORT™ using plenum rated SmartPORT plug and play cables.
11. NX Smart Sensor Module Occupancy/Vacancy sensor shall have a timer that can be adjusted manually from 1 second to 20 minutes.
12. NX Smart Sensor Module Occupancy/Vacancy sensor sensitivity shall be adjustable from 1 to 10.
13. NX Smart Sensor Module Occupancy/Vacancy sensor shall include non-volatile memory for retaining device settings during power outages.
14. NX Smart Sensor Module Occupancy/Vacancy sensor shall have RED real time motion indicator LED visible from the front of the unit.
15. NX Smart Sensor Module Occupancy/Vacancy sensor may be programmed for active and inactive times.
16. NX Smart Sensor Module Occupancy/Vacancy sensor shall be available with the following 360° coverage patterns:
    a. SMI/LMI – 1:1 (mounting height to radius) up to 14 feet
    b. OMNI – 1:1.5 (mounting height to radius) up to 14 feet
    c. LMO – 1:3 (mounting height to radius) up to 16 feet
    d. HMO – 1:1.4 (mounting height to radius) up to 45 feet indoors / 32 feet outdoors
17. NX Smart Sensor Module daylight sensor shall continually measure the amount of visible light under the lighting fixture to provide continuous On/Off and full range dimming control of fixture or group under its control.
18. NX Smart Sensor Module daylight sensor shall utilize a closed loop daylight harvesting algorithm to maintain the required light level in response to changes in daylight.
19. NX Smart Sensor Module daylight sensor shall have independently programmable ramp up and ramp down times to allow the sensor to respond quickly to decrease in daylight and respond more slowly to increase in daylight to minimize the effect of sudden changes in daylight.
20. NX Smart Sensor Module daylight sensor shall be capable of being programmed for active and inactive times.
21. NX Smart Sensor Module daylight sensor shall include non-volatile memory for retaining device settings during power outages.

B. NX Smart Sensor Module Passive Infrared, Wireless Occupancy & Daylight Wall Switch Sensor
1. Basis of Design Product: NX Lighting Controls System, NX Smart Sensor Modules.
2. As indicated in the specifications and as shown on the plans, install NXSMP series sensor modules.
3. NX Smart Sensor Module shall be designed for indoor use only and to mount directly in single-gang NEMA-style switch box (standard switch box – max mounting height: 48”).
4. NX Smart Sensor Module shall integrate seamlessly into the NX Network.
5. NX Smart Sensor Module shall have an RF frequency of 2.4GHz.
6. NX Smart Sensor Module shall include Bluetooth and provide connection to the NX Network using the NX Lighting Controls App.
7. NX Smart Sensor Module Occupancy/Vacancy sensor shall provide automatic or vacancy switching of lighting load(s) within an area/zone based on the presence of human activity.
8. NX Smart Sensor Module Occupancy/Vacancy sensor shall be microprocessor controlled and shall have Passive Infrared (PIR) detection technology.
9. NX Smart Sensor Module Occupancy/Vacancy sensor shall utilize IntelliSCOPE™ technology to enable fine-tuning of the motion detection technologies using real-time Passive Infrared (PIR) graphical occupancy data.
10. NX Smart Sensor Module Occupancy/Vacancy sensor shall be powered by SmartPORT™ using plenum rated SmartPORT plug and play cables.
11. NX Smart Sensor Module Occupancy/Vacancy sensor shall have a timer that can be adjusted manually from 1 second to 20 minutes.
12. NX Smart Sensor Module Occupancy/Vacancy sensor sensitivity shall be adjustable from 1 to 10.
13. NX Smart Sensor Module Occupancy/Vacancy sensor shall include non-volatile memory for retaining device settings during power outages.

14. NX Smart Sensor Module Occupancy/Vacancy sensor shall have a Red Passive Infrared (PIR) real time motion indicator LED visible from the front of the unit.
15. NX Smart Sensor Module Occupancy/Vacancy sensor may be programmed for active and inactive times.
16. NX Smart Sensor Module Occupancy/Vacancy sensor shall have the following coverage:
    a. Coverage: Adjustable up to 1,000 square feet
    b. Max Mounting Height: 48”
17. NX Smart Sensor Module daylight sensor shall continually measure the amount of visible light under the lighting fixture to provide continuous On/Off and full range dimming control of fixture or group under its control.
18. NX Smart Sensor Module daylight sensor shall utilize a closed loop daylight harvesting algorithm to maintain the required light level in response to changes in daylight.
19. NX Smart Sensor Module daylight sensor shall have independently programmable ramp up and ramp down times to allow the sensor to respond quickly to decrease in daylight and respond more slowly to increase in daylight to minimize the effect of sudden changes in daylight.
20. NX Smart Sensor Module daylight sensor shall include non-volatile memory for retaining device settings during power outages.
21. NX Smart Sensor Module shall have fully configurable switch type functionality.
22. NX Smart Sensor Module shall have a programmable lightbar with multiple modes: Location Indicator, Group Status, and Occupancy.
23. NX Smart Sensor Module shall be available in White, Black, Gray, Ivory, Light Almond and Red colors.

C. NX Smart Sensor Module Dual Technology, Wireless Occupancy & Daylight Wall Switch Sensor
1. Basis of Design Product: NX Lighting Controls System, NX Smart Sensor Modules.
2. As indicated in the specifications and as shown on the plans, install NXSMDT series sensor modules.
3. NX Smart Sensor Module DT shall be designed for indoor use only and to mount directly in single-gang NEMA-style switch box (standard switch box – max mounting height: 48”).
4. NX Smart Sensor Module DT shall integrate seamlessly into the NX Network.
5. NX Smart Sensor Module DT shall have an RF frequency of 2.4GHz.
6. NX Smart Sensor Module shall include Bluetooth and provide connection to the NX Network using the NX Lighting Controls App.
7. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall provide automatic or vacancy switching of lighting load(s) within an area/zone based on the presence of human activity.
8. NX Smart Sensor Module Occupancy/Vacancy sensor shall be microprocessor controlled and shall have adjustable technology detection modes including Dual Technology (Passive Infrared (PIR) and Ultrasonic (US)), Passive Infrared (PIR) only, and Ultrasonic (US) only.
9. NX Smart Sensor Module Occupancy/Vacancy sensor shall utilize IntelliSCOPE™ technology to enable fine-tuning of the motion detection technologies using real-time Passive Infrared (PIR) and Ultrasonic (US) graphical occupancy data.
10. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall be powered by SmartPORT™ using plenum rated SmartPORT plug and play cables.
11. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have a timer that can be adjusted manually from 1 second to 20 minutes.
12. NX Smart Sensor Module DT Occupancy/Vacancy sensor sensitivity shall be adjustable from 1 to 10.
13. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall include non-volatile memory for retaining device settings during power outages.
14. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have a Red Passive Infrared (PIR) and Green Ultrasonic (US) real time motion indicator LEDs visible from the front of the unit.
15. NX Smart Sensor Module DT Occupancy/Vacancy sensor may be programmed for active and inactive times.

16. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have the following coverage:
    a. Coverage: Adjustable up to 1,000 square feet
    b. Max Mounting Height: 48”
17. NX Smart Sensor Module DT daylight sensor shall continually measure the amount of visible light under the lighting fixture to provide continuous On/Off and full range dimming control of fixture or group under its control.
18. NX Smart Sensor Module DT daylight sensor shall utilize a closed loop daylight harvesting algorithm to maintain the required light level in response to changes in daylight.
19. NX Smart Sensor Module DT daylight sensor shall have independently programmable ramp up and ramp down times to allow the sensor to respond quickly to decrease in daylight and respond more slowly to increase in daylight to minimize the effect of sudden changes in daylight.
20. NX Smart Sensor Module DT daylight sensor shall include non-volatile memory for retaining device settings during power outages.
21. NX Smart Sensor Module DT shall have fully configurable switch type functionality.
22. NX Smart Sensor Module DT shall have a programmable lightbar with multiple modes: Location Indicator, Group Status, and Occupancy.
23. NX Smart Sensor Module DT shall be available in White, Black, Gray, Ivory, Light Almond and Red colors.

D. NX Smart Sensor Module Dual Technology, Wireless Occupancy & Daylight Ceiling Mount Sensor
    1. Basis of Design Product: NX Lighting Controls System, NX Smart Sensor Modules.
    2. As indicated in the specifications and as shown on the plans, install NXSMDT series sensor modules.
    3. NX Smart Sensor Module DT shall be designed for indoor use only and to mount directly to ceilings.
    4. NX Smart Sensor Module DT shall integrate seamlessly into the NX Network.
    5. NX Smart Sensor Module DT shall have an RF frequency of 2.4GHz.
    6. NX Smart Sensor Module shall include Bluetooth and provide connection to the NX Network using the NX Lighting Controls App.
    7. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall provide automatic or vacancy switching of lighting load(s) within an area/zone based on the presence of human activity.
    8. NX Smart Sensor Module Occupancy/Vacancy sensor shall be microprocessor controlled and shall have adjustable technology detection modes including Dual Technology (Passive Infrared (PIR) and Ultrasonic (US)), Passive Infrared (PIR) only, and Ultrasonic (US) only.
    9. NX Smart Sensor Module Occupancy/Vacancy sensor shall utilize IntelliSCOPE™ technology to enable fine-tuning of the motion detection technologies using real-time Passive Infrared (PIR) and Ultrasonic (US) graphical occupancy data.
    10. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall be powered by SmartPORT™ using plenum rated SmartPORT plug and play cables.
    11. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have a timer that can be adjusted manually from 1 second to 20 minutes.
    12. NX Smart Sensor Module DT Occupancy/Vacancy sensor sensitivity shall be adjustable from 1 to 10.
    13. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall include non-volatile memory for retaining device settings during power outages.
    14. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have a Red Passive Infrared (PIR) and Green Ultrasonic (US) real time motion indicator LEDs visible from the front of the unit.
    15. NX Smart Sensor Module DT Occupancy/Vacancy sensor may be programmed for active and inactive times.
    16. NX Smart Sensor Module DT Occupancy/Vacancy sensor shall have the following coverage:
        a. 1:2.75 Coverage pattern (mounting height to coverage radius)

b. Coverage: Adjustable up to 2,000 square feet
c. Recommended Mounting Height: 8ft (2.44m) with a max mounting height: 12ft (3.66m)

17. NX Smart Sensor Module DT daylight sensor shall continually measure the amount of visible light under the lighting fixture to provide continuous On/Off and full range dimming control of fixture or group under its control.
18. NX Smart Sensor Module DT daylight sensor shall utilize a closed loop daylight harvesting algorithm to maintain the required light level in response to changes in daylight.
19. NX Smart Sensor Module DT daylight sensor shall have independently programmable ramp up and ramp down times to allow the sensor to respond quickly to decrease in daylight and respond more slowly to increase in daylight to minimize the effect of sudden changes in daylight.
20. NX Smart Sensor Module DT daylight sensor shall include non-volatile memory for retaining device settings during power outages.
21. NX Smart Sensor Module DT shall be available in White, Black and Gray colors.

E. NX Occupancy Sensors, Wired
1. Basis of Design Product: NX Lighting Controls System, NX Occupancy Sensors.
2. NX Occupancy Sensors shall be ceiling or wall mounted and use dual technology (ultrasonic and passive infrared), ultrasonic and/or passive infrared (model specific) sensing technology as indicated.
3. NX Occupancy Sensors shall be Class 2 and connect to any room controller SmartPORT using a wiring adaptor and standard Cat5 patch cable.
4. NX Occupancy Sensors shall be microprocessor controlled and utilize IntelliDAPT® technology to optimize sensor behavior to adapt to space conditions and occupant usage patterns and adjust sensitivity and time delay to maximize energy savings and minimize false On and Off events
5. NX Occupancy Sensors shall be self-adaptive and not require manual calibration after installation. Digital circuitry and logic shall automatically adjust the sensitivity and time delay based on learned occupancy patterns and the environment in which the sensor is installed.
6. NX Occupancy Sensors using both ultrasonic and passive infrared (dual technology) shall operate such that detection by both technologies is required to initiate occupancy and continued detection by either technology will maintain occupancy.
7. Up to four NX Occupancy Sensors may be connected to one room controller.

F. NX Occupancy Output Interface
1. Basis of Design Product: NX Lighting Controls System, NXRO Series Occupancy Output Interface Module.
2. NX Occupancy Output Interface shall communicate the occupancy state of an NX control zone to HVAC or other building systems using a contact closure.
3. NX Occupancy Output Interface shall connect to a SmartPORT™ and provide the aggregate occupancy state of the zone as reported by one or more occupancy sensors.
4. NX Occupancy Output Interface shall mount to a standard 4 11/16” junction box.
5. NX Occupancy Output Interface shall have a removable terminal block for input connection.
6. NX Occupancy Output Interface shall be powered by NX SmartPORT.
7. NX Occupancy Output Interface shall support multiple occupancy sensors in a zone.
8. NX Occupancy Output Interface shall feature a low voltage Form-C relay for Normally Closed / Normally Open operation.
9. NX Occupancy Output Interface shall be a low voltage device: 24VDC.

G. NX Daylight Sensor, Wired
1. Basis of Design Product: NX Lighting Controls System, NXDS Series Daylight Sensor.
2. NX Daylight Sensor shall provide ambient light level information to the room controller allowing daylight responsive lighting control.

3. The system shall operate in an open loop sequence of operation reducing the amount of electric light as the quantity of daylight entering the room increases.
4. It shall be possible to configure up to six daylight zones in a room. Each zone shall be programmable to proportionally respond to the light level provided by the daylight sensor.
5. NX Daylight Sensor shall be mounted vertically or horizontally and positioned to provide an unobstructed view of the windows per the manufacturer's directions.
6. NX Daylight Sensor shall be available in indoor and outdoor models.
7. NX Daylight Sensor shall have an architecturally attractive design.
8. NX Daylight Sensor shall have a foot-candle range: 3-6,000FC

H. NX Wall Partition Sensor
1. Basis of Design Product: NX Lighting Controls System, NXWPS Series Wall Partition Sensor.
2. NX Wall Partition Sensor shall automatically signal the NX Lighting Controls System when a moveable partition has been opened or closed. This allows the two adjacent rooms to be combined or separated into individual rooms.
    a. NX controls shall automatically reconfigure to operate in unison when rooms are combined.
    b. NX controls shall automatically reconfigure to operate independently when the rooms are separated.
    c. NX system shall allow for room combine scenarios with up to 16 combinable rooms.
3. NX Wall Partition Sensor shall be a low voltage device: 24VDC.

I. NX Dry Contact Closure Interface
1. Basis of Design Product: NX Lighting Controls System, NXCI Series Contact Closure Interface.
2. NX Dry Contact Closure Interface shall enable third-party devices to provide dry contact inputs to the NX Lighting Controls System.
3. NX Dry Contact Closure Interface shall provide switch activation using contact closures from external devices such as key switches, AV systems, photo-eye sensors or other low voltage Class 2 devices.
4. NX Dry Contact Closure Interface shall default to On/Off operation and can be programmed to perform alternate functions including:
    a. Toggle On/Off
    b. Preset
    c. Raise
    d. Lower
    e. Timed On
5. NX Dry Contact Closure Interface shall feature a removable terminal block for input connection.
6. NX Dry Contact Closure Interface shall feature pilot light output terminals.
7. NX Dry Contact Closure Interface shall be a low voltage device: 24VDC.

J. NX Dry Contact Output Module
1. Basis of Design Product: NX Lighting Controls System, NXDCO Series Dry Contact Output Module.
2. NX Dry Contact Output Module shall provide a low voltage dry contact interface for the control of third-party devices and systems such as HVAC, shades/draperies, as well as other non-NX Lighting or other control systems.
3. NX Dry Contact Output Module shall connect to an NX FX or SP (SmartPORT) port.
4. NX Dry Contact Output Module shall feature a low voltage Form C relay that supports normally closed (NC) or normally open (NO) operation.
5. NX Dry Contact Output Module shall feature a removable terminal block for output connection.
6. NX Dry Contact Output Module shall support two different mode options:
    a. Relay Mode

b. Dimming (0-10V/CCT) Mode

7. NX Dry Contact Output Module shall include an integral timeclock to run scheduled events.
8. NX Dry Contact Output Module shall be constructed as follows:
   a. Housing: Rugged injection molded plastic, PC-FR UL 94-5VA flame class rating
   b. UL2043 Plenum Rated
   c. Color: Blue
   d. Weight: 1.59oz (45g)
   e. Dimensions: 0.98” (24.89mm) H x 1.53” (38.86mm) W x 2.61 » (66.29mm) D
9. NX Dry Contact Output Module shall include multiple mounting options:
   a. DIN Rail Mount
   b. Direct Screw Mount
   c. Single Tie Wrap
10. NX Dry Contact Output Module shall have the following electrical ratings:
   a. Input:
      1) Input Voltage: 12-24VDC supplied by FX or SmartPORT Bus
      2) Power Consumption: 24mA (3 NX PBUs)
   b. Output:
      1) Max 500mA @ 24VDC/VAC Load (Relay Mode)
      2) Max 50mA Sink Current (0-10VDC/CCT Mode)
11. NX Dry Contact Output Module shall support the following operating environments:
   a. Indoor use only
   b. Operating Temperature: 32° to 104°F (0°C to +40°C)
   c. Relative Humidity (non-condensing) 0% to 90%
12. NX Dry Contact Output Module shall be configured for one of the following operating modes:
   a. Relay Mode
      1) Maintained On/Off
      2) Momentary (with configurable pulse duration): 500-60,000ms (0.5 to 60 seconds) in 100ms steps
   b. Dimming Mode
      1) 0-10VDC Dimming with Dim to Off Shunt
      2) 0-10VDC CCT Control
13. NX Dry Contact Output Module shall provide a momentary pushbutton with a blue LED to facilitate test and manual override of the control module. Functions of the button/LED are as follows:
   a. Relay Mode – Single momentary press:
      1) Device will turn relay On/Off
      2) LED will turn On for On, and Off for Off
      3) If button is held for 10+ seconds, device will factory reset and blink once
   b. Dimming Mode – Maintained press (10 seconds)
      1) Device will turn On and raise 0-10VDC level to 100%
      2) LED will blink On/Off while raising dimming level, and will stay On when at 100%
      3) Repeat maintained press to lower dimming level back down to 0%
         a) Device will remain in this state until the button is depressed for 10 seconds, which will return it to normal operation
         b) If device is left untouched for 5min or has experienced a power cycle, the device will return to normal operation
      4) If button is held for more than 10 seconds, device will factory reset and blink once

## 2.9 WALL STATIONS

A. NX SimpleTouch™ Graphic Wall Station
   1. Basis of Design Product: NX Lighting Controls System, NX SimpleTouch Graphic Wall Station.

2. Graphic Wall Station shall employ a 3.5” resistive LCD-TFT, full-color touch screen with 320x480 screen resolution in portrait orientation.
3. Graphic Wall Station shall mount to a standard single gang switch box.
4. Graphic Wall Station shall utilize standard Cat5 cabling for connection to system SmartPORT. Provide two RJ45 ports to allow daisy chain connection with other NX Smart Switches.
5. Graphic Wall Station shall operate seamlessly with other NX Smart Switches.
6. Graphic Wall Station shall provide a 4GB microSD card for storing user preferences that include the quantity of controls per screen, function names, screen navigation, home screen selection, and custom screen saver graphic image.
7. Graphic Wall Station screens can be configured to meet project requirements for control of up to 16 groups, each with provision for On/Off and dimming, up to 16 preset scenes, or CCT color control.
8. Graphic Wall Station shall be capable of local control within a single space or configured for master control across spaces or building wide.
9. Graphic Wall Station shall have an optional password access control that will require a secure PIN to access the station.
10. Graphic Wall Station shall have adjustable screensaver timeout and backlight brightness.
11. Graphic Wall Station shall be supplied with a white bezel. Optional color change kit shall allow for Ivory, Grey, Light Almond, or Black.

B. NX Smart Switches (Wired)
1. Basis of Design Product: NX Lighting Controls System, NXSW Series Smart Switches (Wired).
2. NX Smart Switches (Wired) shall be of the programmable type using standard Cat5 cabling for connection to system SmartPORT™.
3. NX Smart Switches (Wired) shall have one, two, three, four, five, six or eight buttons and provide lighting control functions as called out and shown on the plans. A key switch version shall also be available.
4. NX Smart Switches (Wired) shall be available with the following specialty versions:
    a. OO: On/Off
    b. ORLO: On/Raise/Lower/Off
    c. RL: Raise/Lower
    d. TO: Timed-On
    e. SS: Scene
5. Construction:
    a. Housing: Rugged, high impact, injection molded plastic
    b. Mounting: Switches shall be capable of being mounted to single-gang and multi-gang wall boxes and shall be compatible with standard decorator style wall plates.
6. Electrical:
    a. Class 2 Low Voltage 24VDC
    b. Connection via two (2) RJ-45 SmartPORTs to allow for daisy chain connection of up to eight switches to each SmartPORT.
7. NX Smart Switches (Wired) shall be available in White, Ivory, Light Almond, Gray, Black, and Red.

C. NX Smart Switches (Wireless)
1. Basis of Design Product: NX Lighting Controls System, NXSW Series Smart Switches (Wireless).
2. NX Smart Switches (Wireless) shall be of the programmable type using the NX Lighting Controls App.
3. NX Smart Switches (Wireless) shall have a single rocker switch with two momentary switches and provide lighting control functions as called out and shown on the plans.
4. NX Smart Switches (Wireless) shall be programmable with the following switch functions:
    a. On/Off
    b. On/Raise

c. Off/Lower
d. Raise
e. Lower
f. Timed-On
g. Scene

5. Construction:
   a. Housing: Rugged, high impact, injection molded plastic
   b. Mounting: Switches shall be capable of being mounted directly to wall surfaces using provided 3M Command™ Strip, and to single-gang and multi-gang wall boxes and shall be compatible with standard decorator style wall plates (not included).
   c. Switches shall include a built-in level to ensure device is mounted properly.
6. Electrical:
   a. Class 2 Low Voltage 24VDC
   b. 3VDC, 5.4mA
   c. Powered using CR2032 battery only
7. NX Smart Switches (Wireless) shall be available in White.

D. NX Audio Visual Interface Module
1. Basis of Design Product: NX Lighting Controls System, NXAVM Series Audio Visual Interface Module.
2. NX Audio Visual Interface Module shall enable third-party systems to digitally interface with an NX Lighting Controls System.
3. NX Audio Visual Interface Module shall provide an ASCII based command set to interface with third-party systems such as Audio-Visual systems to send commands to and receive query status from an NX system.
4. NX Audio Visual Interface Module shall feature a DB9 connector and support RS232 serial communication, providing control and status for a single zone.
5. NX Audio Visual Interface Module shall mount to a standard 4 11/16” junction box.

## 2.10 NETWORK AREA CONTROLLER

A. NX Area Controller
1. Basis of Design Product: NX Lighting Controls System, NX Area Controller V2 (NXAC2 Series).
2. NX Area Controller shall connect to the NX Network providing communication with the NX Room Controllers, NX Lighting Control Panels, NX SmartPORT™ Modules and other wired NX system components.
3. NX Area Controller shall have the ability to communicate by means of TCP/IP over Ethernet allowing enterprise connectivity between the NX Lighting Controls System and external LAN or WAN networks.
4. NX Area Controller shall be capable of communicating with Building Automation System via an embedded BACnet™ client using the BACnet IP protocol.
5. NX Area Controller shall enable the connection of multiple users simultaneously.
6. NX Area Controller shall enable secure remote connections over a cellular network.
7. NX Area Controller shall have a physical modem switch that can turn off remote cellular and Wi-Fi radios.
8. NX Area Controller shall feature user account/password management.
9. Construction:
   a. Design: Solid State – No moving parts
   b. 7.32” W x 2.6” H x 4.9” D (186mm x 66mm x 126mm)
   c. 2.9 LB (1.21 KG)
   d. Mounting: Wall or DIN rail mounting
   e. Housing Color: Black
10. Electrical:
   a. 100-240VAC, 50/60 Hz (AC Adapter included)
   b. Ethernet 10 base-T via NX Network cable, integral 2-port ethernet hub.

11. Functional:
    a. NX Area Controller shall function as a web server allowing the user interface to be accessible through a standard web browser.
    b. The installation of software shall not be required. At a minimum, the user interface shall provide the following functions:
        1) Automatic discovery of NX system devices
        2) Commissioning of devices into logical Areas and Zones, provide a minimum of 128 areas each with 128 zones
        3) Display the entire system in a logical navigation tree view
        4) Allow the user to name Zones, Groups, Presets, Schedules and individual loads
        5) Set up control functions for system inputs and outputs
        6) Monitor status and override individual relays and dimmers
        7) Set up and download schedules to panels and room controllers
        8) Monitor real-time power use at each room controller

## 2.11 NETWORK MODULES

A. NX Network Bridge Module
1. Basis of Design Product: NX Lighting Controls System, NX Network Bridge Module.
2. NX Network Bridge Module shall allow multiple room controller zones to be networked with other NX system devices for whole building administration of lighting control functions.
3. NX Network Bridge Module housing shall measure 5.75" X 3.85" X 1.3"and be constructed of GSM UL rated 94 HB plastic approved for use in a return air plenum.
4. NX Network Bridge Module shall connect to and be powered from a room controller SmartPORT via a standard Cat5 cable.
5. NX Network Bridge Module shall provide RJ-45 ports for in and out connection points for an Ethernet based network.
6. NX Network Bridge Module shall provide a communication link between the room control devices and the NX system Area Controller via an Ethernet based network. At a minimum, the network link shall provide the following functionality through a web browser user interface:
    a. Report the current occupancy status for each lighting control zone
    b. Indicate the status of each relay and dimming channel
    c. Allow reconfiguration of system device input and output parameters
    d. Report the real time power consumption for each Room Controller
    e. Set up daylight harvesting for zones equipped with photocells
    f. Configure and download schedules to panels and Room Controllers

B. NX Network Radio Module
1. Basis of Design Product: NX Lighting Controls System, NXRM2 Series Radio Module.
2. NX Network Radio Module shall allow a luminaire equipped with the NXFM In-Fixture Module to be promoted wirelessly from standalone operation to full network participation.
3. NX Network Radio Module shall plug into the SmartPORT™ connector on the NXFM In-Fixture Module and is mounted through a 1.25” aperture in the luminaire housing.
4. NX Network Radio Module shall feature a low-profile housing for minimal visual impact.
5. NX Network Radio Module shall feature an O-ring gasket to provide watertight seal to luminaire housing.
6. NX Network Radio Module shall have an integrated and compact PCB F antenna and shall not require an external antenna.
7. NX Network Radio Module shall integrate seamlessly into the NX Network.
8. NX Network Radio Module shall have an RF frequency of 2.4GHz.
9. NX Network Radio Module shall include Bluetooth and provide connection to the NX Network using the NX Lighting Controls App.

C. NX Network Interface Module:

1. Basis of Design Product: NX Lighting Controls System, NXHDI Series Device Network Interface Module.
2. NX Network Interface Module shall provide network connection and power to accessory components including NX Dry Contact Interface and NX SmartPORT Modules.
3. NX Network Interface Module shall be discoverable by the NX Area Controller and controllable through web browser interface.
4. NX Network Interface Module shall repeat network communication signal to extend network length.
5. NX Network Interface Module shall feature integral link indicators confirming network segment status.
6. NX Network Interface Module shall feature a power LED indicator confirming presence of accessory DC power on NX Network segment.
7. NX Network Interface Module shall feature dual RJ45 NX Network input and output jacks to enable module to be inserted anywhere along the NX Network as needed.
8. Construction:
    a. Extruded and sheet aluminum
    b. Weight: 6 oz (170.1g)
    c. Mounting: 1.38” (35mm) DIN rail
9. Electrical:
    a. Input: 24VDC, 800mA max current via NX Network cable
    b. Output: 24VDC power supplied to connected accessory modules
10. NX Network Interface Module shall be Title 24 Compliant.

D. NX SmartPORT Module
1. Basis of Design Product: NX Lighting Controls System, NX SmartPORT Module.
2. NX SmartPORT Module shall provide the ability to easily connect smart switch stations, motion detectors, and daylight sensors into the NX network system.
3. NX SmartPORT Module shall have (4) SmartPORTs each with (2) RJ45 connectors for convenient connection of multiple devices.
4. Devices connected to the SmartPORT module shall be network visible and configurable to operate with panels and room controllers via the web browser user interface.
5. NX SmartPORT Module shall be compatible with all NX Smart Switch Stations, NX Occupancy Sensors and NX Daylight Sensor.
6. NX SmartPORT Module shall feature DIN rail mounting.
7. NX SmartPORT Module shall be a low voltage device: 24VDC.

E. NX Dry Contact Interface Module
1. Basis of Design Product: NX Lighting Controls System, NXDCIO Series Dry Contact Interface Module.
2. NX Dry Contact Interface Module shall provide a simple way to incorporate standard dry contact inputs and outputs into the NX Lighting Controls System.
3. NX Dry Contact Interface Module shall accommodate dry contact input closures from building automation, fire, security, and many other types of systems.
4. NX Dry Contact Interface Module shall be programmable from the NX Area Controller.
5. NX Dry Contact Interface Module shall feature (6) individually programmable dry contact inputs with or without pilots.
6. NX Dry Contact Interface Module shall accommodate 2 and 3 wire inputs (momentary or maintained).
7. NX Dry Contact Interface Module shall feature (6) individually programmable Form-C dry contact outputs.
8. NX Dry Contact Interface Module shall have removable terminal blocks for easy connections.
9. NX Dry Contact Interface Module shall feature DIN rail mounting.
10. NX Dry Contact Interface Module shall be a low voltage device: 24VDC.

## 2.12 NETWORK ACCESSORIES

A. NX Bluetooth® Radio Bridge with Real Time Clock
   1. Basis of Design Product: NX Lighting Controls System, NXBTC Series Bluetooth Radio Controller.
   2. NX Bluetooth Radio Bridge with Real Time Clock shall provide a wireless communication bridge for communications via iOS® or Android™ smart device apps.
   3. NX Bluetooth Radio Bridge with Real Time Clock shall connect to and be powered by an NX SmartPORT™.
   4. NX Bluetooth Radio Bridge with Real Time Clock shall use Bluetooth technology allowing the radio to easily pair with a smart phone or tablet.
   5. NX Bluetooth Radio Bridge with Real Time Clock shall communicate with the NX system for setup and control from a smart device.
   6. NX Bluetooth Radio Bridge with Real Time Clock shall feature a real time clock and allow schedules to be downloaded and run in stand-alone NX Room Controller applications without a network.
   7. NX Bluetooth Radio Bridge with Real Time Clock shall provide password protections for user access preventing unauthorized Bluetooth connection of a smart device.
   8. NX Bluetooth Radio Bridge with Real Time Clock shall use Bluetooth Version 4.1.
   9. NX Bluetooth Radio Bridge with Real Time Clock shall feature an LED status indicator for successful connections.
   10. NX Bluetooth Radio Bridge with Real Time Clock shall have a RJ45 plug-in connection to NX SmartPORT.
   11. NX Bluetooth Radio Bridge with Real Time Clock shall be a low voltage 24VDC device.
   12. NX Bluetooth Radio Bridge with Real Time Clock shall be rated for return air plenum

B. NX Media Converter
   1. Basis of Design Product: NX Lighting Controls System, NXEOF Series Media Converter.
   2. NX Media Converter shall allow a transition from copper based ethernet to fiber.
   3. NX Media Converter shall support 10BASE-T, 100BASE-TX, 100BASE-FX and IEEE 802.3 specifications.
   4. NX Media Converter shall be a multimode converter and support up to 5km distance.
   5. NX Media Converter shall include and RJ45 port that supports full/half-duplex auto-negotiation and MDI/MDIX auto-crossover.
   6. NX Media Converter shall include LED indicators for RJ45 and fiber port status.
   7. NX Media Converter shall include a wall mounting kit.

C. NX Network PoE Switch
   1. Basis of Design Product: NX Lighting Controls System, NXPOE Series PoE Switch/Power Injector.
   2. NX Network PoE Switch shall provide the splitting of the Network network from the NX Area Controller into multiple segments.
   3. NX Network PoE Switch shall provide seven powered RJ45 ports for connection of NX network devices.
   4. NX Network PoE Switch shall provide multiple dimming options including DMX to less than 0.1%.
   5. NX Network PoE Switch shall expand the capacity of the NX Area Controller to 448 bridges suitable for large commercial and architectural interiors.

D. NX Forward and Reverse Phase Dimming Converter
   1. Basis of Design Product: NX Lighting Controls System, NX Forward and Reverse Phase Dimmer Converter.
   2. NX Forward and Reverse Phase Dimmer shall auto-sense forward and reverse phase dimming.
   3. NX Forward and Reverse Phase Dimmer shall dim standard 120V or 277V lighting loads.
   4. NX Forward and Reverse Phase Dimmer shall support up to 1300W max load.

5. NX Forward and Reverse Phase Dimmer shall provide dual 0-10V input and output ports.
6. NX Forward and Reverse Phase Dimmer shall provide an integrated 6.5ft flexible conduit.
7. NX Forward and Reverse Phase Dimmer shall be compatible with NX Room Controllers, NX Lighting Control Panels and Low Voltage Dimming Switches.
8. Construction:
    a. Housing: Anodized aluminum
    b. Size: 4.01” L x 5.52” W x 1.88” H
    c. Complies with requirements for use in a plenum area
    d. Mounting: Surface mount with screws
9. Electrical:
    a. Input: 120/277VAC, 60Hz – Single feed input connection
    b. Output: 120/277VAC, 60Hz – Single feed output connection
    c. Low Voltage: Class 2, 0-10V Input and output
    d. Max Load Rating:
        1) 120VAC: 700W
        2) 277VAC – 1300W
    e. Min Load Rating: 24W
    f. Standby Power:
        1) 120VAC: 0.75W
        2) 277VAC: 1.87W
    g. Dimming:
        1) Class 2 / Class 1 (NOTE: Installation as Class 1 requires 600 volt insulation on dimming conductors sharing a conduit with line voltage conductors)

## 2.13 SOFTWARE INTERFACES

A. NX Site Manager Graphical User Interface (GUI):
1. NX Site Manager GUI shall serve as a primary interface for the networked lighting system, providing communication with lighting control panels, room controllers, fixture modules, and other wired system components and through wireless access point to wireless room controllers and fixture modules.
2. NX Site Manager GUI shall be accessible via conventional PC/Tablet web browser through the Site Manager’s built-in web server.
3. NX Site Manager GUI shall enable users to program, monitor, and administer the NX Lighting Controls System from any location without additional software.
4. NX Site Manager GUI shall enable users to configure general client information including client name, address, phone, email and a custom image.
5. NX Site Manager GUI shall enable users to select from a list of standard United States holidays and to configure custom holidays.
6. NX Site Manager GUI shall enable users to create one or more buildings and configure building information include building name, address, latitude/longitude, phone, electricity cost per kilowatt, custom image, hours of operation and open/close times.
7. NX Site Manager GUI shall enable users to import license files to unlock separately licensable features of Site Manager.
8. NX Site Manager GUI shall enable users to reset forgotten passwords based on a set of password-reset questions.
9. NX Site Manager GUI shall enable system administrators to configure an interactive user session timeout
10. NX Site Manager GUI shall enable system administrators to select a self-signed or trusted certificate security mode and specify domain name, certificate, certificate key and certificate chain.
11. NX Site Manager GUI shall enable system administrators to create user roles (e.g., system admin, facility manager, general user), specify role permissions, and assign areas of responsibility. Role permissions shall be configurable for application management, client management, device management and building operation and shall include the ability to edit, view-only, or none.

12. NX Site Manager GUI shall enable system administrators to perform user management tasks including adding users, assigning roles & permissions, activating & locking user accounts, and deleting user accounts.
13. NX Site Manager GUI shall enable users to modify their user profile information including name, email, phone, address, password, and password-reset security questions.
14. NX Site Manager GUI shall enable users to configure NX Site Manager Adapters which manage the NX Network. Each NX Site Manager Server shall include an embedded Site Manager Adapter. Adding additional NX Site Manager Adapter devices to the NX Network provides the ability to expand the NX Network. Each NX Site Manager Adapter will be assigned to a specific Site Manager building and will communicate with the Site Manager Server over an IP (Ethernet) network.
15. NX Site Manager GUI shall enable users to configure system settings including network IP information, general data management, software updates, log files, scheduled jobs, and diagnostics.
16. NX Site Manager GUI shall include an embedded BACnet IP client that is field configurable, enabling integration of the NX Lighting Controls System and a building automation system.
17. NX Site Manager GUI shall enable users to discover networked devices, devices by MAC address or all devices for each Site Manager Adapter. Discovered devices shall appear in a tree showing the physical connections of devices.
18. NX Site Manager GUI shall enable users to create up to 128 Areas and 128 Zones per Area.
19. NX Site Manager GUI shall enable users to assign devices to Zones by dragging and dropping the selected device into a zone, or by using the drop-down selection tool.
20. NX Site Manager GUI shall enable users to create up to 16 Groups per Zone. Users shall be able to assign/select devices for each group and test the group by turning the group on/off and adjusting the dimmer and CCT levels.
21. NX Site Manager GUI shall enable users to create up to 99 Presets per Zone. Users shall be able to include/exclude actuators, configure actuator settings and test the preset by activating it.
22. NX Site Manager GUI shall enable users to create up to 99 Schedules per Zone. Users shall be able to name each schedule, specify the schedule type and occurrence, and specify the action that will take place for the selected group or preset. NX Site Manager GUI shall also enable the user to assign a color to the schedule.
23. NX Site Manager GUI shall enable users to select a device and configure that device's general information and device settings.
24. NX Site Manager GUI shall enable users to copy a device's settings, wink a device, resync a device, swap devices, specify active/inactive times, and decommission devices.
25. NX Site Manager GUI shall enable users to generate and export (.csv) reports including:
    a. Zone Summary
    b. CCT Summary
    c. Dimmer Summary
    d. In-Fixture Module Summary
    e. Occupancy Sensor Summary
    f. Photocell Sensor Summary
    g. Relay Summary
    h. Switch Station Summary
    i. Power Input
    j. Firmware
26. NX Site Manager GUI shall enable users to perform firmware updates by device type.
27. NX Site Manager GUI shall enable users to define up to 10 Demand Response levels per Zone. Users shall be able to select a Demand Response level and configure all actuator types to the same demand response setting or specify individual actuator demand response settings.
28. NX Site Manager GUI shall enable users to add a floor plan image to an Area. Image file types supported shall include .SVG, .JPG, and .PNG. Max image size supported shall be 10MB.

29. NX Site Manager GUI shall enable users to select a Zone and draw the selected zone's boundaries on the floor plan image. Zones that have floor plan zone boundaries created, shall display an indicator next to the Zone name.
30. NX Site Manager GUI shall enable users to modify/delete the floor plan zone boundaries.
31. NX Site Manager GUI shall enable users to zoom in / zoom out the floor plan image.
32. NX Site Manager GUI shall enable users to select a zone on the floor plan image and have the Zone name selected and highlighted in the navigational tree. Users shall also be able to select a Zone name in the navigational tree and have the zone selected and highlighted on the floor plan image.
33. NX Site Manager GUI shall enable users to delete a floor plan image assigned to an Area.
34. NX Site Manager GUI shall have an operational mode for users to view the status of Zones on a floor plan image. Status information shall be color coded and include on/off states and occupied/unoccupied states. Zones with no occupancy sensors shall be identified as having "No Occupancy Sensors". NX Site Manager GUI shall enable users with achromatopsia ("color blindness") to identify zone status with easy to differentiate status borders around each zone.
35. NX Site Manager GUI shall enable users to control a zone by selecting a Zone from the navigational tree or from the floor plan image. Once selected, the Zone Controller window shall appear enabling the user to turn the Zone on/off, change light and/or color tuning levels for all groups within the Zone or specific groups. The Zone Controller window shall also enable users to see the occupancy status of the Zone and the schedules associated with the Zone.
36. NX Site Manager GUI shall have an operational mode for users to view a site's energy usage and cost in an easy to read dashboard. Users shall be able to see energy usage for selected areas and zones. NX Site Manager GUI shall enable users to select a daily, weekly, monthly, yearly or custom date range view of the energy data. Users shall be able to hover over the graphs to view actual data values and view data over a specific date range. NX Site Manager GUI shall enable users to export energy data to a .CSV (Comma Separated Variable) file.
37. NX Site Manager GUI shall have an operational mode for users to view/modify Zone schedules. All Zone schedules shall be displayed in an easy to use calendar that supports multiple viewing modes including by day, week or month. Users shall be able to select and modify a schedule by selecting the Zone in the navigational tree or by selecting the schedule from the calendar.

B. NX Area Controller Graphical User Interface (GUI):
1. NX Area Controller GUI shall serve as a primary interface for the networked lighting system, providing communication with lighting control panels, room controllers, fixture modules, and other wired system components and through wireless access point to wireless room controllers and fixture modules.
2. NX Area Controller GUI shall be accessible via conventional PC web browser through the NXAC Series Area Controller's built-in web server.
3. NX Area Controller GUI shall enable users to program, monitor, and administer the NX Lighting Controls System from any location without additional software.
4. NX Area Controller GUI shall include an embedded BACnet IP client that is field configurable, enabling integration of the NX Lighting Controls System and a building automation system.

C. NX Lighting Controls App
1. NX Lighting Controls App shall provide Bluetooth® wireless setup and configuration of NX system devices and luminaires equipped with an NX In-Fixture Module and smart sensor.
2. NX Lighting Controls App shall be available in Android and iOS versions for free download from Google Play™ or Apple® App Store.
3. NX Lighting Controls App shall connect to NX devices via NXBTR/NXBTC modules, NXSMP/NXSMP2 sensors and radio modules via Bluetooth BLE.

4. NX Lighting Controls App shall enable easy setup and configuration of NX room devices and NX panels.
5. NX Lighting Controls App shall enable users to create custom schedules and presets.
6. NX Lighting Controls App shall be able to configure SpectraSync™ or SpectraClean™ enabled luminaires.
7. NX Lighting Controls App shall globally discover wireless enabled luminaires and devices.
8. NX Lighting Controls App shall include the IntelliSCOPE™ visual diagnostic tool for real-time calibration and testing of NX digital smart sensors.

2.14 CONDUCTORS AND CABLING

A. Power Supply Side of Remote-Control Power Sources: Comply with network manufacturer's requirements and requirements of Division 26 Section "Low-Voltage Electrical Power Conductors."

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Prior to installation, contractor shall examine work area to verify measurements, all wire type and routing requirements, and that commencing installation complies with manufacturer's requirements.

B. Where variations from the general specifications or drawings exist, the contractor shall request a clarification prior to rough in or installation

3.2 INSTALLATION

A. Lighting controls shall be installed in accordance with manufacturer’s instructions, guidelines and submittal documents provided by the lighting control manufacturer.

B. Lighting control system components shall only be installed in spaces that meet the following environmental conditions:

1. Temperature: 32 – 104 deg F (0 - 40 deg C).
2. Relative Humidity: 10 – 90 percent, noncondensing.

C. All stored and installed lighting control system components shall be adequately protected from dust and dirt.

3.3 SYSTEM STARTUP

A. The system manufacturer shall provide a factory authorized field engineer to the project site after installation has been completed and prior to system energization for the purpose of testing and adjustment of the system.

B. Factory field engineer shall test and verify all system functions and ensure proper operation of the system components in accordance with the specifications and on-site conditions. The installing contractor shall notify the system manufacturer in writing that the system is completely wired and ready to be energized and tested 2 weeks prior to scheduling a field engineer for start-up of the system. Should the field engineer arrive on the job site and find the installation incomplete, the installing contractor shall pay the cost of any future visits by the field engineer required to complete the system start-up.

C. Factory field engineer shall provide a written report of test and outcomes.

3.4 DEMONSTRATION AND TRAINING

A. Factory field engineer shall instruct owner's staff on how to adjust, operate and maintain lighting systems; and provide instruction using the system software.
   1. Allow for up to 4 hours of on-site training on the use and maintenance of the lighting control system to be scheduled at the completion of startup and programming of the system.

3.5 TECHNICAL SUPPORT

A. Manufacturer shall provide reasonable access to factory direct telephone technical support during normal business hours.

**END OF SECTION**

SECTION 262213

LOW-VOLTAGE DISTRIBUTION TRANSFORMERS

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Dry type transformers.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 16.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. American National Standards Institute

ANSI/IEEE C57.12.80 Terminology for Power and Distribution Transformers

2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. NEC National Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association "Standard of Installation"
6. National Electrical Manufacturers Association

NEMA ST 1 Specialty Transformers
NEMA ST 20 Dry Type Transformers for General Applications
NEMA TP 1 Guide for Determining Energy Efficiency for Distribution Transformers
NEMA TP 2 Standard Test Method for Measuring the Energy Consumption of Distribution Transformers

7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.

UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
UL 486B Wire Connectors for Use with Aluminum Conductors

1.03 SUBMITTALS

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings and Product Data: Submit for each type of product specified. Include outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and

impedance ratings and characteristics, tap and winding configurations, sound level characteristics, insulation system type, and rated temperature rise.

1. Submit test reports with loss data, efficiency at 25/50/75/100 percent rated load, and sound level.

C. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

D. Certificates:

1. Labels of UL listing, fixed to each item of material.

2. Product test reports, including certified copies of manufacturer's design and routine (production) factory tests required by the referenced standards.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation".

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer's instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

**PART 2 - PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. General Electric Co.
B. International Transformer Co.
C. Square "D".
D. Cutler-Hammer.
E. Siemens

2.02 MATERIALS

A. Description: ANSI/NEMA ST 20; factory-assembled, air-cooled dry type energy efficient transformers; ratings as shown on Drawings. Transformer shall be low loss type with minimum efficiencies per NEMA TP1 when operated at 35% of full load capacity. Efficiency shall be tested in accordance with NEMA TP2. Transformer shall be marked with the Energy Star label.

| SINGLE PHASE | | THREE PHASE | |
|---|---|---|---|
| KVA | Efficiency | KVA | Efficiency |
| 15 | 97.7% | 15 | 97.0% |
| 25 | 98.0% | 30 | 97.5% |
| 37.5 | 98.2% | 45 | 97.7% |
| 50 | 98.3% | 75 | 98.0% |
| 75 | 98.5% | 112.5 | 98.2% |
| 100 | 98.6% | 150 | 98.3% |
| 167 | 98.7% | 225 | 98.5% |
| 250 | 98.8% | 300 | 98.6% |
| 333 | 98.9% | 500 | 98.7% |
| 750 | 98.8% | | |

B. Insulation system and average winding temperature rise for rated kVA as follows:

1. 1-15 kVA: NEMA Class 185 with 115 degrees C rise.

2. 16-500 kVA: NEMA Class 220 with 150 degrees C rise.

C. Case temperature: Do not exceed 40 degrees C (maximum) and 30 degrees C (average) rise above ambient at warmest point at full load.

D. Winding Tape:

1. Transformers less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.

2. Transformer 15 kVA and larger; four 2-1/2 percent FCBN tapes and 2 above.

E. Sound Levels: Maximum sound levels are as follows:

| KVA Rating | Sound Level |
|---|---|
| 15 | 45db |
| 30 | 45db |
| 45 | 45db |
| 75 | 50db |
| 112.5 | 50db |
| 150 | 50db |
| 225 | 55db |
| 300 | 55db |
| 500 | 60db |

F. Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30kV for transformers 300 kVA and larger.

G. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

H. Mounting:
   1. 1-15 kVA: Suitable for wall mounting.
   2. 16-75 kVA: Suitable for wall, floor, or trapeze mounting.
   3. Larger than 75 kVA: Suitable for floor, or trapeze mounting.

I. Coil Conductors: Continuous aluminum (unless otherwise shown) windings with termination brazed or welded.

J. Enclosure: NEMA ST 20, Type 1 or 3R, ventilated, as indicated on the Drawings. Provide lifting eyes or brackets.

K. Isolate core and coil from enclosure using vibrating-absorbing mounts.

L. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

**PART 3 - EXECUTION**

3.01 INSTALLATION

A. Secure floor mounted transformers to floor with bolts.

B. Set transformers plumb and level.

C. Install transformer ventilation openings not closer than 6 inches from any wall surface, or as indicated in the manufacturer's installation manual when greater distances are required.

3.02 VOLTAGE ADJUSTMENT

A. When final connection has been made, check secondary voltage at dry type transformers and make tap adjustments required to obtain correct voltage.

3.03 VIBRATION ISOLATION

A. Provide isolation procedures described below in addition to those provided by the transformer manufacturer:

   1. For floor or roof transformer installation, use pad type vibration isolators, Korfund Elasto-Grip, waffle, or equal, sized to load 50 pounds per square inch. Install one at each corner of the transformer.

   2. For wall hung transformer installations, use pad type vibration isolators, Korfund Elasto-Grip, waffle, or equal, sized to load 50 pounds per square inch. Locate pads between hanger and wall.

      NOTE: Normally, use above isolation. However, on critical projects, springs-type isolation as described below may be required.

   3. Use steel spring type Korfund Series "P", sized for 1/2" deflection with consideration to the weight of the transformer, installed at each corner.

   4. Install spring type isolators on both floor mounted transformers and transformers hung from structure such that vibration is not transmitted to the building structure.

3.04 CONNECTIONS

A. Provide solderless lug bonding connection on the inside of the transformer enclosure in

accordance with NEC.

B. Make primary and secondary connections with liquid tight flexible metal conduit to prevent transformer vibration from being transferred to the building structure of conduit system.

END OF SECTION

**SECTION 262416**

**PANELBOARDS**

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Branch circuit and distribution panelboards, both circuit breaker- and fused switch-type, rated 600 volts and below.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. NEC National Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association "Standard of Installation"
6. National Electrical Manufacturers Association

NEMA AB 1 Molded Case Circuit Breakers
NEMA ICS 2 Industrial Control Devices, Controllers, and Assemblies
NEMA PB 1 Panelboards
NEMA PB 1.1 Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less

7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.

UL 50 Cabinets and Boxes
UL 67 Panelboards

1.03 SUBMITTALS

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings: Include layouts showing cabinet dimensions, conduit entrances, electrical ratings, bussing connections, single line diagrams, device locations and ratings, and cable termination provisions.

C. Product Data: Submit for each type of product specified.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates:

1. Labels of UL listing, fixed to each item of material.

a. Label of UL listing for service entrance use, where applicable, affixed to material.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer's instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

**PART 2 - PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. Siemens
B. General Electric
C. Square D
D. Cutler-Hammer

2.02 MATERIALS

A. Branch circuit panelboards:

1. Provide factory assembled, enclosed panelboards in dead front cabinets, with doors, surfaced mounted or recessed as indicated, not less than 20" wide and 5-3/4" deep. Height will depend on the number of breakers and spaces.

2. Where a control compartment is indicated, provide an integral compartment with a separate hinged lockable door held with captive screws.

3. Provide feeder terminal lugs for both main lugs only and main breakers rated for use with copper or aluminum conductors.

4. Provide three phase, 4 wire, solid neutral design with sequence bussing, full capacity neutral and full length copper bussing including areas indicated as space only. Bussing shall be braced for maximum available fault.

5. Provide copper neutral bus where neutral bus is indicated. Neutral bus shall be sized for minimum twice the current carrying capacity of line bus.

6. Key all door locks alike. Provide a type written directory of circuit index card holder mounted behind the door in framed card slot with plastic see through window.

7. Provide full size copper equipment ground bus.

8. All breakers shall be bolt-on type molded case. No tie handle is accepted for multi-pole breaker.

9. Provide pad lock off devices on all breakers serving appliances, motor operated equipment, HVAC equipment and other circuit as indicated on panel schedules.

10. 120/208V, 3 Phase, 4 Wire Panelboards: General Electric Co. type NLAB, Square D Co. type NQOB, or Cutler-Hammer type POW-R-LINE1.

11. 277/480V, 3 Phase, 4 Wire Panelboards: General Electric Co. type NHB, Square D Co. type NEHB, ITE, Inc. type NHB, Sylvania Co. type NH1B or Cutler-Hammer type POW-R-LINE2.

12. All equipment shall be listed to meet or exceed the available fault current indicated on drawings.

13. Provide main lugs only unless scheduled otherwise.

14. Construct in accordance with U.L. and NEMA Standards.

B. Distribution Panelboards:

1. Provide circuit breaker type distribution panelboards with fully rated copper bus, lockable molded case breakers for mains and feeders. Provide nameplates for all circuit breakers.

2. Busing shall be braced to withstand maximum available fault current indicated on drawings.

3. Provide copper neutral bus where indicated. Neutral bus shall be sized for minimum twice the current carrying capacity of line bus.

4. Provide full size copper ground bus adequate for number of grounded circuits.

5. General Electric Co. type NCP and type CCB, or Square D Co. types HCN and HCM, or Cutler-Hammer type POW-R-LINE3 and POW-R-LINE4B.

C. Circuit breakers:

1. Resettable, quick-make, quick-break, bolt-in place type, trip-free, with separate trip

position from on and off positions.

2. Multiple pole breakers with common trip and one operation handle.

3. Do not provide handle ties.

4. Wire with sequence phasing.

5. Circuit breakers shall be rated to meet or exceed the available fault current indicated on drawings.

**PART 3 - EXECUTION**

3.01 PREPARATION

A. Carefully measure and lay out exact locations of panelboards in conference with Owner.

B. Assure that panelboards may be installed without adversely affecting the integrity and appearance of the building structure and with the clearances required by the National Electrical Code.

3.02 INSTALLATION

A. Provide panelboards of the types and ratings scheduled where indicated.

B. Provide flush or surface mounted types where indicated and scheduled.

1. Provide multi-section cabinets as required and scheduled.

2. Provide 2 keys for each panelboard.

C. Provide supports to the building structure, independent of raceways.

D. Install tops of cabinets at 6 feet 6 inches above finished floor.

E. Install panelboards in cabinets, centered in door openings.

F. Secure panelboards to building structure to withstand wire pulling strains.

G. Secure surface mounted panelboards to wood studs or channel material spanning metal studs.

H. Do not use toggle bolts.

I. Provide identification:

1. For panelboards: Engraved, lamacoid plastic nameplate, white with black letters, giving panelboard designation, voltage, phase, wire and ampacity.

2. For branch circuit panelboards: Neatly typewritten circuit directory in cardholder inside panelboard door. Identify rooms served using room numbers corresponding to those finally established at the project.

3. All nameplates to be stainless steel screw on types, no cement.

3.03 FIELD QUALITY CONTROL

A. Perform manufacturer's recommended field test prior to energization.

B. Provide copies of test results to Owner.

**END OF SECTION**

**SECTION 262716**

**ELECTRICAL CABINETS AND ENCLOSURES**

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:

1. Outlet and device boxes.
2. Pull and junction boxes.
3. Floor boxes and service fittings.
4. Boxes and fittings for hazardous locations.
5. Cabinets.
6. Hinged door enclosures.

B. Related Sections:

1. General electrical requirements: Section 260501.

C. The following related items are specified in Section 260533 - Raceways: conduit-body-type electrical enclosures and wiring fittings, wireways, and auxiliary gutters.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute.

2. American Society for Testing and Materials.

ASTM 123 Specification for Zinc (Hot-Galvanized) Coatings on Products `Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

ASTM 167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

3. IEEE Institute of Electrical and Electronics Engineers.

4. NEC National Electrical Code (NFPA 70).

5. National Electrical Manufacturers Association.

NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
NEMA ICS6 Enclosures for Industrial Controls and Systems.
NEMA OS1 Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
NEMA OS2 Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

6. NFPA National Fire Protection Association

7. Underwriters Laboratories, Inc.

| | |
|---|---|
| UL 50 | Electrical Cabinets and Boxes. |
| UL 514A | Electrical Metallic Outlet Boxes. |
| UL 514B | Fittings for Conduit and Outlet Boxes. |
| UL 514C | Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers. |
| UL 886 | Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations. |

1.03 SUBMITTALS

A. In addition to this Section, the submittal requirements of Section 260501, "General Electrical Requirements" are applicable.

B. Product data: Boxes, cabinets, and fittings.

C. Shop drawings: Provide for boxes, cabinets, and enclosures that are to be shop fabricated (non-stock items). For shop fabricated junction and pull boxes, show accurately scaled views and spatial relationships to adjacent equipment. Show box types, dimensions and finishes. For cabinets and hinged enclosures, drawings shall include dimensions, knockout sizes and locations, material types and gauges, finishes, and installation method.

D. Certificates shall include labels of Underwriters' Laboratories, Inc., and National Electrical Manufacturer's Association affixed to each item.

E. Record actual locations and mounting heights of outlet-, pull-, and junction-boxes, and cabinets and hinged door enclosures, on project record documents.

1.04 DEFINITIONS

A. Cabinet: An enclosure designed either for surface or for flush mounting and having a frame, or trim in which a door or doors may be mounted.

B. Device Box: An outlet box designed to house a receptacle device or a wiring box designed to house a switch.

C. Enclosure: A box, case, or cabinet, or housing for electrical wiring or components.

D. Hinged Door Enclosure: An enclosure designed for surface mounting and having swinging doors or covers secured directly to and telescoping with the walls of the box.

E. Outlet Box: A wiring enclosure where current is taken from a wiring system to supply utilization equipment.

F. Wiring Box: An enclosure designed to provide access to wiring systems or for the mounting of indicating devices or of switches for controlling electrical circuits.

1.05 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.06 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer's instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.07 PROJECT CONDITIONS AND SITE CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify locations of boxes, cabinets, and enclosures prior to rough-in.

C. Placement shown on Drawings in approximate locations unless dimensioned. Install as required to complete wiring system.

1.08 SEQUENCING

A. Install boxes, cabinets, and enclosures in coordination with other work, and at times required to prevent delays in the work and to avoid cutting of masonry units.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

Subject to compliance with requirements, provide products by the following, or equal:

A. General:

Appleton Electric Company
Hubbell
Steel City
O.Z./Gedney
Hoffman
Circle AW

B. Boxes and fittings for hazardous locations:

Crouse Hinds
Killark Electric Mfg.
Robroy Industries
Spring City Electrical Mfg.
Woodhead Industries

C. Floor Boxes:

Hubbell
Raco
Thomas & Betts
Walker
Wiremold

D. Cabinets:

Circle AW
Hoffman Engineering

Spring City Electrical Mfg.

2.02 GENERAL

Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

A. Materials and Finishes:

1. Sheet steel: Flat-rolled, code-gauge, galvanized steel.

2. Fasteners for general use: Corrosion-resistant screws and hardware, including cadmium and zinc-plated items.

3. Fasteners for wet or damp locations: Stainless steel screws and hardware.

4. Cast metal for boxes, enclosures and covers: Copper-free aluminum except as otherwise indicated.

5. Exterior finish: Gray-baked enamel for items exposed in finished locations except as otherwise indicated.

6. Painted interior finish: Where indicated, white baked enamel.

7. Fittings for boxes, cabinets, and enclosures: Conform to UL 514B. Malleable iron or zinc-plated steel for conduit hubs, bushings and box connectors.

2.03 METAL OUTLET, DEVICE, AND SMALL WIRING BOXES

A. General: Conform to UL 514A and UL 514B. Boxes shall be of type, shape, size, and depth to suit each location and application.

B. Steel Boxes: NEMA OS 1. Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.

C. Cast Aluminum Boxes: Copper-free aluminum with gasketed covers, threaded raceway entries, and features and accessories suitable for each location including mounting ears, threaded screw holes for devices and closure plugs.

D. Cast Iron Boxes: Iron alloy, waterproof, with gasketed covers and threaded raceway entries, and features and accessories suitable for each location including mounting ears, threaded screw holes for devices and closure plugs.

E. Floor Boxes:

1. Cast Iron Floor Boxes: Fully-adjustable, waterproof, with threaded raceway entrances, adjusting rings, gaskets, and brass floor plates. Where indicated, provide multi-section boxes with individual hinged section covers and provide for a duplex receptacle under one or more of the covers.

2. Steel Floor Boxes: Sheet steel, concrete tight, fully adjustable, with stamped knockouts, adjusting rings, and brass floor plates. Where indicated, provide multi-section boxes with concealed individual section covers under a common flush floor plate. Provide for a duplex receptacle in one of the concealed section covers and a one inch diameter bushed opening in the other.

3. Service Fittings for Floor Outlet Boxes: Surface mounted horizontal, cast aluminum type, three inches high, suitable for finished spaces and finished in stain aluminum, except where otherwise indicated. Provide duplex receptacle or one inch diameter bushed opening for telephone or other communications service as indicated. Equip fitting for attaching flat to floor box cover.

2.04 NONMETALLIC OUTLET, DEVICE, AND SMALL WIRING BOXES

A. General: Conform to NEMA OS 2, and UL 514B and 514C. Boxes shall be high-impact resistant molded PVC units with covers and integrally-molded raceway entrance hubs and removable mounting flanges. Boxes shall be equipped with threaded screw holes for device and cover plate mounting, be equipped with an integral ground lug, and be of the type, shape, size, and depth to suit location and application.

1. Boxes for Concealed Work: Mounting provisions and wiring entrances to suit installation conditions and wiring method used.

2. Boxes for Exposed Work: Ultraviolet-stabilized, non-conductive, high impact-resistant boxes with integrally-molded raceway entrance hubs and removable mounting flanges. Boxes shall be equipped with threaded screw holes for device and cover plate mounting. Each box shall have a molded cover of matching PVC material suitable for the application.

2.05 PULL AND JUNCTION BOXES

A. General: Conform to UL 50, for boxes over 100 cubic inches in volume. Boxes shall have bolted-on covers of material same as box, and shall be of the size and shape to suit the application.

B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.

C. Hot-Dip Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanize after fabrication. Cover shall be gasketed.

D. Stainless Steel Boxes: Fabricate of stainless steel conforming to Type 302 of ASTM A 167. Where necessary to provide a rigid assembly, construct with internal structural stainless steel bracing. Cover shall be gasketed.

E. Cast Iron Boxes: Molded of cast iron alloy with gasketed cover and integral threaded conduit entrances.

F. Cast Nonmetallic Boxes: Ultraviolet stabilized, non-conductive, high impact-resistant PVC boxes with gasketed cover and integral mounting flanges.

G. Boxes Approved for Classified Locations: UL 886. Cast metal or cast nonmetallic boxes, listed and labeled for use in the specific location classification, and with the specific hazardous material encountered. Conduit entrances shall be integral threaded type.

2.06 CABINETS

A. General: Conform to UL 50.

B. Construction: Sheet steel, NEMA 1 class except as otherwise indicated. Cabinet shall consist of a box and a front consisting of a one-piece frame and hinged door. Arrange door to close against a rabbet placed around the inside edge of the frame, with a uniformly close fit between door and frame. Provide concealed fasteners, not over 24 inches apart, to hold fronts to cabinet boxes and provide for adjustment. Provide flush or concealed door hinges

not over 24 inches apart and not over 6 inches from top and bottom of door. For flush cabinets, make the front approximately 3/4 inch larger than the box all around. For surface mounted cabinets make front same height and width as box.

C. Doors: Double doors for cabinets wider than 24 inches. Telephone cabinets wider than 48 inches may have sliding or removable doors.

D. Locks: Combination spring catch and key lock, with all locks for cabinets of the same system keyed alike. Locks shall be of a type to permit doors to latch closed without locking.

2.07 STEEL ENCLOSURES WITH HINGED DOORS

A. General: Conform to UL 50.

B. Construction: Sheet steel, 16 gauge minimum, with continuous welded seams. NEMA class as indicated, arranged for surface mounting.

C. Doors: Hinged directly to cabinet and removable, with approximately 3/4 inch flange around all edges, shaped to cover edge of box. Provide handle-operated key locking latch. Individual door width shall be no greater than 24 inches. Provide multiple doors where required.

D. Mounting Panel: Provide painted removable internal mounting panel for component installation.

E. Enclosure: NEMA 12, except as indicated. Where door gasketing is required, provide neoprene gasket attached to oil-resistant adhesive, and held in place with steel retaining strips. For all enclosures of class higher than NEMA 1, use hubbed raceway entrances.

2.08 CAST METAL ENCLOSURES WITH HINGED DOORS

A. Copper-free aluminum with bolted, hinged doors. Where used at classified locations, enclosures shall conform to UL and shall be listed and labeled for the classification of hazard involved.

2.09 MOLDED NONMETALLIC ENCLOSURES WITH HINGED DOOR

A. General: Molded, glass fiber reinforced high impact strength polyester with bolt or screw-secured doors and solid neoprene gaskets.

**PART 3 - EXECUTION**

3.01 APPLICATION

A. Outlet Boxes and Fittings: Install outlet and device boxes and associated covers and fittings of materials and NEMA types suitable for each locations and in conformance with the following requirements, except as otherwise indicated:

1. Interior dry locations: NEMA type 1, [sheet steel] [nonmetallic].

a. In dry walls for single and two gang outlets provide 4S and 4D boxes, for 3 or more outlets use masonry boxes.

b. In block and masonry walls provide masonry boxes of depths required for wall thickness.

c. In poured concrete and plastered walls provide 4S and 4D boxes for single gang outlets and 2G and 3G-5075 boxes for multiple ganged outlets.

d. In concrete ceilings provide OCR rings. In other ceilings provide 40 and 40D boxes. Omit covers if standard canopy and device plates entirely cover the ceiling opening.

2. Locations exposed to weather or dampness: [Cast metal] [Molded PVC], NEMA type 3R.

3. Wet locations: NEMA type 4 enclosures.

a. In exposed work, exterior of buildings, in wet location, and flush in non-waterproofed walls below grade provide FS and FD boxes.

4. Corrosive locations: NEMA type 4X enclosures.

5. Hazardous (Classified) locations: Cast metal, UL 886, NEMA type listed and labeled for the location and class of hazard indicated.

B. Pull and Junction Boxes: Install pull and junction boxes of materials and NEMA types as follows, except as otherwise indicated:

1. Interior dry locations: NEMA type 1, sheet steel.

2. Locations exposed to weather or dampness: NEMA type 3R, sheet steel.

3. Wet locations: NEMA type 4 enclosures.

4. Corrosive locations: NEMA type 4X enclosures.

5. Hazardous (Classified) locations: Cast metal, UL 886, NEMA type listed and labeled for the location and class of hazard indicated.

C. Floor Boxes: In slabs on grade and wet locations: Use NEMA type 4 boxes. At other locations in slabs, use concrete-tight NEMA 1 boxes.

1. Provide floor boxes with quantity of gangs as required for power, communication or control as indicated. Use boxes with barriers where required. Provide carpet flanges in carpeted areas.

D. Hinged Door Enclosures: NEMA type 12, except as indicated.

E. Hinged Door Enclosures Outdoors: NEMA type 3R, with drip hood, factory tailored to individual units.

F. Hinged Door Enclosures in Corrosive Locations: NEMA type 4X [metal] [nonmetallic] enclosure.

G. Cabinets: Flush mounted, NEMA enclosure type 1, except as otherwise indicated.

3.02 INSTALLATION, GENERAL

A. Locations: Install items where indicated and where required to suit code requirements and installation conditions.

B. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs. Provide standard manufactured plugs in unused openings of boxes.

C. Support and fasten items securely in accordance with Division 26 Section “Supporting Devices.”

D. Sizes shall be adequate to meet NEC volume requirements, but in no case smaller than sizes indicated.

E. Remove sharp edges where they may come in contact with wiring or personnel.

F. Do not provide through-the-wall and back-to-back boxes. Provide minimum 24" between outlet boxes on all fire-rated walls.

G. Provide boxes at the terminal of conduit runs to outlets and devices.

H. Center outlets in paneling and in other Architectural features.

I. Locate light fixture outlets in uniform relation with ceiling tiles.

J. Group outlets on circuits with homeruns as indicated on the drawings.

K. Provide plaster rings and covers where required by the building structure.

3.03 INSTALLATION OF OUTLET BOXES

A. Outlets at windows and doors: Locate close to window trim. For outlets indicated above doors, use 6 feet-9 inches mounting height above finished floor and center outlets above the door opening except as otherwise indicated.

B. Column and pilaster locations: Locate outlet boxes for switches and receptacles on columns or pilasters so the centers of the columns are clear for future installation of partitions.

C. Locations in special finish materials: For outlet boxes for receptacles and switches mounted in desks or furniture cabinets or in glazed tile, concrete block, marble, brick, stone or wood walls, use rectangular shaped boxes with square corners and straight sides. Install such boxes without plaster rings. Sawcut all recesses for outlet boxes in exposed masonry walls.

1. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.

2. Where boxes are concealed in exposed concrete unit masonry, use square cornered type boxes, or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of block or tile. Install box to insure that ring fits an opening sawed out of the masonry, so that no mortar is required to fill between ring and construction.

D. Gasketed boxes: At the following locations use cast metal, threaded hub-type boxes with gasketed weatherproof covers:

1. Exterior locations.

2. Where surface mounted on unfinished walls, columns or pilasters. (Cover gaskets may be omitted in dry locations.)

3. Where exposed to moisture-laden atmosphere.

4. At food preparation equipment within four feet of steam connections.

5. Where indicated.

E. Cast iron boxes: Iron alloy, waterproof, with threaded raceway entries and features and accessories suitable for each location, including mounting ears, threaded screw holes for devices and closure plugs.

F. Mounting: Mount outlet boxes for switches with the long axis vertical or as indicated. Mount boxes for receptacles either vertically or horizontally but consistently either way. Three or more gang boxes shall be mounted with the long axis horizontal. Locate box covers or device plates so they will not span different types of building finishes either vertically or horizontally. Locate boxes for switches near doors on the side opposite the hinges and close to door trim, even though electrical floor plans may show them on hinge side.

1. Provide 3/8 inch studs in ceiling- and wall-mounted lighting fixture outlet boxes where shop drawings of fixtures require and elsewhere as may be required for fixtures.

G. Ceiling outlets: For fixtures, where wiring is concealed, use octagonal outlet boxes, 4 inches by 2 inches deep, minimum.

H. Cover plates for surface boxes: Use plates sized to box front without overlap.

I. Protect outlet boxes to prevent entrance of plaster and debris. Thoroughly clean foreign material from boxes before conductors are installed.

J. Floor boxes: Install in concrete floor slabs so they are completely enveloped in concrete except for the top. Where normal slab thickness will not envelop box as specified above, provide increased thickness of the slab. Provide each compartment of each floor box with grounding terminal consisting of a washer-in-head machine screw, not smaller than No. 10-32, screwed into a tapped hole in the box. Adjust covers of floor boxes flush with finished floor.

3.04 INSTALLATION OF PULL AND JUNCTION BOXES

A. Pull boxes and junction boxes shall be securely mounted to the building structure.

1. Fastenings shall be made by means of not smaller than 3/16" diameter bolts, expansion bolts, or toggle bolts; not smaller than No. 9" x 1" wood screws; or by equivalent fastenings; where exposed to weather or moisture, shall be galvanized. Do not use nails, or wood or fiber inserts in masonry.

2. On masonry or concrete walls, columns or flooring, fastenings shall be made by means of lead expansion shields not smaller than size 3/8" diameter by 5/8" long for use with No. 10-24 round head machine screws. Machine screws shall be not less than 1-1/4" long for installation on ceiling and not less than 1" long elsewhere.

a. Holes for lead expansion shields shall be carefully and accurately drilled, using sharp drills to a depth which will afford the maximum practical engagement of threads (depth equal to screw length not less than 1-1/4" past plaster into solid concrete). Installation shall develop full strength of screw.

B. Pullboxes for concealed wiring shall be mounted flush in walls, partitions, and ceilings, unless otherwise indicated.

1. Use cast iron boxes flush in slab on grade.

C. Box Selection: For boxes in main feeder conduit runs, use sizes not smaller than 8-inches square by 4-inches deep. Do not exceed 6 entering and 6 leaving raceways in a single box.

D. Cable Supports: Install clamps, grids, or devices to which cables may be secured. Arrange cables so they may be readily identified. Support cable at least every 30 inches inside boxes.

E. Mount pull boxes in inaccessible ceilings with the covers flush with the finished ceiling.

F. Size: Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by NEC Article 370, or as indicated. Locate boxes strategically and provide shapes to permit easy pulling of future wires or cables of types

normal for such systems.

3.05 INSTALLATION OF CABINETS AND HINGED DOOR ENCLOSURES

A. Installations shall be secure and substantial; cabinets shall be attached to building walls or structure.

B. Mount with fronts, trim, and doors straight and plumb.

C. Install with tops 78 inches above finished floor.

D. Set cabinets in finished spaces flush with walls.

E. Identification: Provide identification nameplates on inside and outside of covers and doors on each cabinet and hinged enclosure, engraved bakelite with 1/4 inch minimum height letters, securely fastened with stainless steel screws. Text shall identify the function of the cabinet or enclosure, for example, “Dimming Panel,” unless otherwise indicated.

3.06 GROUNDING

A. Electrically ground metallic cabinets, boxes, and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box, or enclosure.

3.07 CLEANING AND FINISH REPAIR

A. Upon completion of installation, inspect components. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, abrasions and weld marks. Clean surfaces to be painted.

B. Galvanized finish: Repair damage using a zinc-rich paint recommended by the manufacturer.

C. Painted finish: Repair damage using matching corrosion-inhibiting touch-up coating.

**END OF SECTION**

**SECTION 262726**

**WIRING DEVICES**

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:

1. Receptacles.
2. Snap Switches.
3. Incandescent Lamp Dimmer-Switches.
4. Fluorescent Lamp Dimmer-Switches.
5 Wall Plates.
6. Floor Service Outlets.
7. Poke-Through Assemblies.
8 Telephone/Power Poles.

B Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. IEEE Institute of Electrical and Electronics Engineers
4. NEC National Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association: "Standard of Installation"
6. NEMA National Electrical Manufacturers Association
7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.

UL 20 General Use Snap Switches
UL 94.3 UL Standard for Safety Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
UL 498 Molded-Case Circuit Breakers and Circuit Breaker Enclosures
UL 1010 Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations
WD 1 General Requirements for Wiring Devices

1.03 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Product Data: Submit for each type of product specified.

C. Installation instructions: Manufacturer's written installation instructions for wiring devices. Include instructions for storage, handling, protection, examination, and preparation of Product.

D. Samples: Provide samples under specific request.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following:

Crouse-Hinds
Hubbell

Pass and Seymour
Square D
Walker

2.02 WIRING DEVICES

A. General: Provide wiring devices, in types, characteristics, grades, colors, and electrical ratings for applications indicated which are UL listed and which comply with NEMA WD 1 and other applicable UL and NEMA standards. Verify color of all device plates with Project Architect or Interior Designer prior to placing order.

B. Receptacles: UL 498 and NEMA WD 6. Straight blade, two-pole, three-wire grounding type, except as otherwise indicated below:

| RECEPTACLES: RATINGS AND TYPES [1] | | | | | |
|---|---|---|---|---|---|
| OUTLET TYPE | CURRENT RATING | VOLTAGE RATING | NEMA CONFIGURATION | UL GRADE | MANUFACTURER [5] |
| Duplex | 20 A | 125 V | 5-20R | Heavy Duty | Hubbell 5362 |
| Duplex, GFI [2] | 20 A | 125 V | 5-20R | Heavy Duty w/Integral GFI | Hubbell GF5362 |
| Duplex, Hospital | 20 A | 125 V | 5-20R | Hospital | Hubbell 8300 |
| Single | 20 A | 125 V | 5-20R | Heavy Duty | Hubbell 5361 |
| Single | 20 A | 250 V | 6-20R | Heavy Duty | Hubbell 5461 |
| Single, Locking [3] | 20 A | 125 V | L5-20R | Heavy Duty | Hubbell 2310 |
| Single, Locking [3] | 20 A | 250 V | L6-20R | Heavy Duty | Hubbell 2320 |
| Pin and Sleeve [4] | As Required | As Required | Not Applicable | 498-General; 1010-Classified Locations | Hubbell |

Notes:
1. Except as otherwise indicated.
2. GFI receptacles shall protect downstream receptacles on same circuit.
3. Provide locking receptacles with black nylon face, except as otherwise indicated.
4. Provide features indicated.
5. Verify color selection with Architect/Engineer. (As listed, each catalog number specifically indicates the color of the device - revision may be required.)

C. Switches: UL 20 and NEMA WD 1. Quiet toggle-type AC switch. Ratings and types, except as otherwise indicated:

| SWITCHES: RATINGS AND TYPES [1] | | | | |
|---|---|---|---|---|
| TYPE | LOAD RATING | VOLTAGE RATING | UL GRADE | MANUFACTURER [4] |
| Single Pole | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1221 |
| Double Pole | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1222 |
| Three Way | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1223 |
| Four Way | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1224 |
| Single Pole w/Pilot Light [2] | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1221-PL7 |
| Single Pole w/Key Switch | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1221-L |
| Momentary Contact Type [3] | 20 A | 120/277 V | Heavy Duty | Hubbell HBL 1557 |

Notes:
1. Except as otherwise indicated.
2. For switch with pilot light, the light is “ON” when the load is “ON”.
3. For momentary contact type switch, operation is three position - two circuit momentary contact and center off.
4. Verify color selection with Architect/Engineer. (As listed, each catalog number specifically indicates the color of the device - revision may be required.)

D. Dimmer Switches: Solid-state dimmer switches, mount in outlet boxes as indicated and in accordance with the following:

1. Incandescent Lamp Dimmer: Modular type,120-volts, 60-Hz, switch poles and wattage as indicated, with continuously-adjustable rotary knob or toggle, anodized aluminum face, with soft-tap or other quiet on-off switch. Equip with electromagnetic filter to eliminate noise, RF and TV interference, and 5-inch minimum wire connecting leads. Derate dimmer switch per manufacturer's recommendations where dimmers are ganged together.

2. Fluorescent Lamp Dimmer: Full-wave modular type AC dimmer for fluorescent fixtures; wattage and voltage ratings as indicated, and electromagnetic filter to eliminate noise, RF and TV interference. Construct with continuously-adjustable trim potentiometer with adjustment of low and dimming, anodized heat sinks, with quiet on-off switch and 5-inch minimum wire connecting leads. To ensure coordination with dimming type ballasts in fixtures, specific dimming device shall be approved for use in writing by the ballast manufacturer.

## 2.03 WIRING DEVICE ACCESSORIES

A. Wall Plates: Single and combination, of types, sizes, and with ganging and cutouts as indicated. Provide plates which mate and match with wiring devices to which they are attached, and are from the same manufacturer. Provide metal screws for securing plates to devices with screw heads colored to match finish of plates. Wall plate color shall be as selected by Architect / Engineer. Provide wall plate color to match wiring devices except as otherwise indicated. Provide wall plates with engraved legend where indicated. Conform to requirements of Section 260553, "Electrical Identification."

1. Interior Areas: Smooth, high-impact resistant plastic, of the same manufacturer as the device.

   a. Voice, data, or video communications system outlets: Same as for wiring devices except with 3/8 inch or 1 inch rubber grommets as required.

   b. Surface mounted outlet boxes: Zinc coated sheet steel rounded edges, same size as outlet box.

   c. Kitchen and food preparation areas: Polished stainless steel type, 0.40 inches thick.

2. Exterior areas: Weatherproof, corrosion-resistant type, die cast aluminum with self-closing gasketed cover. For duplex receptacles, use Hubbell 5206-WO or equal; for wall switches, use Hubbell 7420 or equal; for GFI receptacles, use manufacturer's listed plate.

B. Floor Service Outlets: Modular, above-floor service outlets and fittings of types and ratings indicated. Construct of die-cast aluminum, satin finish. Use design compatible with floor outlet wiring methods indicated. Provide 20-ampere, 125-volt, gray duplex receptacle. Provide with 3/4 inch or 1-inch NPT, 1-inch long, locking nipple for installation where compatible with wiring method.

C. Poke-Through Assembly Devices: Factory-fabricated poke-through assembly

devices with multi-channeled thru-floor raceway/firestop assembly and below-floor junction box assembly.

1. Above-floor service pedestal: Include service outlets in above-floor four-gang service fitting of die-cast satin-finish aluminum with one 20 ampere, 125 volt, gray NEMA 5-20R duplex receptacle and one duplex modular duplex voice/data communications jack, including separation barrier between line- and low-voltage section. Provide integral assembly UL listed as a total unit, with fire rating consistent with that of floor penetrated. Provide through-floor fitting: Hubbell Type PT7XC, plus a below-floor junction box; and service pedestal: Hubbell Type FR480.

2. Flush-floor service assembly: Include service outlets in flush-floor brass service fitting with one 20 ampere, 125 volt, NEMA 5-20R duplex receptacle and two openings for up to one 25-pair telephone cable per opening. Provide integral assembly UL listed as a total unit, with fire rating consistent with that of floor penetrated. Receptacle shall be protected when not in use with independent, spring-loaded lift covers. Provide one-piece through-floor fitting including carpet flange: Hubbell Type PT7FBRS2; and duplex receptacle: Hubbell Series 5352.

D. Telephone/Power Service Poles: Factory-assembled combination telephone/power poles of types, sizes, and ratings indicated; for use with telephone and power systems installed above suspended ceilings. Construct with provisions for one 50-pair telephone cable, and two-20 ampere, 125 volt, three-wire receptacles. Isolate power section from telephone compartment with separating metal barrier. Extend wiring from receptacles to junction box at top of pole where connections are made above suspended ceiling. Provide ceiling trim plate and pole foot with carpet pad. Where poles are located in accessible ceiling areas, provide bracing arranged for positive connection to ceiling supports. Provide finish treatment and color as selected by the Architect/Engineer.

## PART 3 - EXECUTION

3.01 INSTALLATION

A. Install wiring devices and accessories as indicated, in accordance with manufacturers written instructions, applicable requirements of the NEC, and in accordance with recognized industry practices to fulfill project requirements.

1. Mount switches and receptacles in vertical position in building interiors.

2. Mount receptacles with weatherproof plates in horizontal position.

3. Install receptacles mounted vertically so that the ground contact falls on the top position, and horizontally mounted receptacles with neutral pole in top position.

4. Individually Mounted Dimmers: Install in accordance with manufacturer's ventilation clearance requirements.

B. Coordinate with other Work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other Work.

C. Install wiring devices only in electrical boxes which are clean; free from building materials, dirt and debris.

D. Install wiring devices after wiring work is completed.

E. Install wallplates after painting work is completed.

F. Install telephone/power service poles - in accordance with final furnishings arrangement - plumb, true, and secure.

G. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturers' torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A. Use properly-scaled torque indicating hand tool.

3.02 INSPECTION

A. Inspect boxes into which wiring devices are to be installed for defects which affect the quality and execution of work.

B. Do not start work until defects are corrected.

3.03 PREPARATION

A. Determine where types of wiring devices are to be installed.

B. Verify devices are of correct size, capacity, type, and NEMA configuration.

3.04 ADJUSTMENT

A. Align device and cover plate vertically and horizontally assuring flush fitting.

3.05 PROTECTION

A. Protect installed components from damage. Replace damaged items prior to final acceptance.

3.06 FIELD QUALITY CONTROL

A. Testing: Prior to energizing circuits, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energizing, test wiring devices and demonstrate compliance with requirements, operating each operable device at least six times.

B. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.

END OF SECTION

**SECTION 262801**

**LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES**

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Circuit breakers and fuses rated 600 volts and below.

a. Also included: enclosed circuit breakers for independent mounting.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 6.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. Institute of Electrical and Electronics Engineers

IEEE 242 Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems

4. NEC National Electrical Code (NFPA 70)
5. NECA National Electrical Contractors Association "Standard of Installation"
6. National Electrical Manufacturers Association

NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA AB 1 Molded-Case Circuit Breakers
NEMA FU 1 Low Voltage Cartridge Fuses
NEMA KS 1 Enclosed Switches

7. NFPA National Fire Protection Association
8. UL Underwriters Laboratories, Inc.

UL 98 Enclosed and Dead-Front Switches
UL 198C High-Interrupting-Capacity Fuses, Current-Limiting Type Fuses
UL 198E Class R Fuses
UL 198F Plug Fuses
UL 486A Wire Connectors and Wiring Lugs for Use with Copper Conductors
UL 486B Wire Connectors for Use with Aluminum Conductors
UL 489 Molded-Case Circuit Breakers and Circuit Breaker Enclosures
UL 943 Ground-Fault Circuit Interrupters
UL 977 Fused Power-Circuit Devices

1.03 SUBMITTALS

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings: Submit shop drawings and or brochures to include but not limited to minimum melting and total clearing time charts for all fuses.

C. Product Data: Submit for each type of product specified. Include manufacturer's bulletins, and minimum melting and total clearing time charts for each type of fuse.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates:

1. Labels of UL listing, fixed to each item of material.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

1.07 COORDINATION

A. For equipment furnished by the Owner, or under other Divisions: Size fuses in accordance with the National Electrical Code.

1.08 EXTRA MATERIALS

A. Furnish 3 of each type and size of fuse installed.

**PART 2 - PRODUCTS**

2.01 MANUFACTURERS

A. Circuit Breakers:

1. General Electric Co.

2. Square D Co.

3. Cutler-Hammer

B. Fuses:

1. Bussmann only.

2.02 MATERIALS AND FABRICATION

A. Circuit Breakers:

1. Circuit Breakers: Molded case, quick-make, quick-break, thermal-magnetic, trip-free with individual inverse time tripping mechanism on each pole. Terminal lugs rated for copper and aluminum conductors. Minimum 10,000 amperes interrupting capacity, RMS symmetrical short circuit rating shall be required. All breakers shall meet or exceed the maximum available fault current as indicated on single line diagram.

a. Use magnetic-only circuit breakers for motor applications.

b. Provide Class A (5ma sensitivity) breakers where GFI type breakers are required.

c. Provide "HACR" type circuit breakers for HVAC loads. Ratings shall be as indicated on the drawings.

d. No tie handle on multi-pole circuit breaker is accepted.

e. Provide ambient compensated type breaker where the breaker is installed in the ambient in excess of 40 degrees C (104 degrees F).

B. Fuses:

1. Class RK1:

a. 250V; LPN-RK, Lowpeak

b. 600V; LPS-RK

2. Class L: KRP-C, Hi-Cap

3. Or as otherwise shown on the drawings.

**PART 3 - EXECUTION**

3.01 APPLICATION

A. Types: Mains, Feeders and Branch Circuits.

1. 600 Amps and Below: Dual-element construction (current limiting, time-delay and high interrupting capacity) providing thermal protection for both fuse and fuseholder. Interrupting rating shall be 300,000 amperes RMS symmetrical and peak let-thru current and energy let-thru values shall not exceed the values established by Underwriters' Laboratories Standard for Class RK-1 fuses. Fuses shall be Bussmann "Low Peak YellowTM" in color and shall be Bussmann Low-Peak Dual Element Fuses, types LPN-RK (250 volts) or LPS-RK (600 volts). The fuses shall have separate overload and short-circuit elements. The fuses shall incorporate a spring activated thermal overload element having a 284 degree Fahrenheit melting point alloy and shall be independent of the short-circuit clearing chamber. Fuses shall be "Low Peak YellowTM". CAUTION labels to alert the end user of the engineered level of protection of the electrical equipment, shall be field installed by the electrical contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure. These labels are available with the spare fuse cabinet (SFC) and are also available upon request from Bussmann.

2. Above 600 Amps: Time delay type; shall hold 500% of rated current for a minimum of 4 seconds and clear 20 times rated current in .01 seconds or less. Interrupting ratings shall be 200,000 amperes RMS symmetrical and peak let-thru current and energy let-thru values shall not exceed the values established by Underwriters' Laboratories for Class L fuses. Fuses shall be Bussmann "Low Peak YellowTM" in color and shall be Bussmann LOW PEAK type KRP-C. The fuses shall employ "O" rings as positive seals between the end bells and the glass melamine fuse barrel. The fuse links shall be pure silver links (99.9% pure), to limit the short circuit current let-through values to low levels and comply with NEC Sections requiring component protection. The terminals shall be penned. CAUTION labels to alert the end user of the engineered level of protection of the electrical equipment, shall be field installed by the electrical contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure. These labels are available with the spare fuse cabinet (SFC) and are also available upon request from Bussmann.

B. Motor Circuits - All individual motor circuits with full load amperes rating (FLA) of 480 amperes or less shall be protected by BUSSMANN LOW-PEAK Dual-Element, time delay to provide type 2 coordination for the controller, Fuses LPN-RK (250 volts) or LPS-RK (600 volts). The fuses for motors with a marked service factor not less than 1.15 or with a marked temperature rise not over 40 degrees Centigrade, shall be installed in ratings of approximately 125% of motor full load current except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to full speed quickly such as large fans. Under such conditions the fuse should be 150% to 175% of the motor full load current. Larger H.P. motors shall be protected by BUSSMANN Type KRP-C Low-Peak Time-Delay Fuses of the ratings shown on the drawings. All other motors, (such as 1.0 service factor motors) shall be protected by BUSSMANN LOW-PEAK Dual-Element Fuses LPN-RK (250 volts) or LPS-RK (600 volts) installed in ratings of approximately 115% of the motor full load current except as noted above. The fuses shall be U.L. Class RK1 Dual Element Time Delay or Class L. CAUTION labels to alert the end user of the engineered level of protection of the electrical equipment, shall be field installed by the electrical contractor. They shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure. These labels are available with the spare fuse cabinet (SFC) and are also available upon request from Bussmann.

C. Circuit breaker panels shall be protected by BUSSMANN LOW-PEAK Dual-Element Fuses LPN-RK (250 volts) or LPS-RK (600 volts) or BUSSMANN Low-Peak KRP-C Time Delay Fuses as shown on the drawings. The fuses shall be U.L. Class RK1 or Class L. Protection shall be based on the circuit breakers interrupting capacity, as outlined in the Bussmann Bulletin PMCB. CAUTION labels to alert the end user of the engineered level of protection of the electrical equipment, shall be field installed by the electrical contractor. they shall be marked with the proper fuse rating, per the specifications, and placed in a conspicuous location on the enclosure. These labels are available with the spare fuse cabinet (SFC) and are also available upon request from Bussmann.

D. Provide Class RK1 fuses for motors, feeder circuits, and other circuits not specified below 0-600 amps.

E. Provide Class RK1 fuses for lighting loads, 0-600 amps:

1. For fluorescent ballasts - Type GLR.

2. For other ballasts and control circuits - Type KTK.

F. Provide Class L fuses for all applications, 601 amps and larger.

G. Special Applications:

1. Fluorescent fixtures shall be protected by Bussmann fuses GLR or GMF with holder HLR. They shall have individual protection on the line side of the ballast. A fuse and holder shall be mounted within or as part of the fixture. Size and type of fuse to be recommended by the ballast manufacturer.

2. All other ballast-controlled lighting fixtures shall be protected by Bussmann fuses type KTK or FNQ with holders HEB, HPF, or HPS. They shall have individual protection on the line side of the ballast. Fuse and holder shall be mounted in a location convenient for changing fuses. Holder shall be mounted in protected location or be an in-line waterproof holder. Size and type of fuse to be recommended by the ballast manufacturer or as indicated on plans.

3.02 INSTALLATION

A. Set adjustable circuit breakers with trips as indicated.

B. Provide separate neutral conductors for circuits protected by GFI breakers.

C. Provide Class RK5 fuses for motors, feeder circuits, and other circuits not specified below 0-600 amps.

D. Provide Class RK1 fuses for lighting loads, 0-600 amps:

1. For fluorescent ballasts - Type GLR.

2. For other ballasts and control circuits - Type KTK.

E. Provide Class L fuses for all applications, 601 amps and larger.

F. Fuses shall be shipped separately. Any fuses shipped installed in equipment, shall be replaced by contractor with new fuses as specified above prior to energization at no additional expense to Owner. All fuses shall be stored in moisture free packaging at job site and shall be installed immediately prior to energization of the circuit in which it is applied.

3.03 LABELING AND IDENTIFICATION

A. Provide engraved plastic nameplates with 1/4-inch minimum height letters indicating:

1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards and motor control centers.

2. Circuit designation of panel or device controlled on circuit breakers, individually enclosed.

B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

3.04 SPARES

A. In addition to fuses consumed during testing, furnish 10%, but not less than three each of each size and type fuses used for the project and store where directed by Owner. Mount spare fuses in a NEMA 1 lockable cabinet with full plywood backboard.

**END OF SECTION**

## SECTION 262816

## ENCLOSED SWITCHES AND CIRCUIT BREAKERS

### PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Enclosed safety switches for use on feeders and branch circuits, and disconnect switches for motors and equipment.

B. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General- and Supplementary-Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials.
3. IEEE Institute of Electrical and Electronics Engineers.
4. NEC National Electrical Code (NFPA 70).
5. NECA National Electrical Contractors Association "Standard of Installation".
6. National Electrical Manufacturers Association

   NEMA KS 1 Enclosed Switches

7. NFPA National Fire Protection Association
8. Underwriters Laboratories, Inc.

   UL 98 Enclosed and Dead Front Switches
   UL 198C High-Interrupting Capacity Fuses; Current Limiting Type
   UL 198E Class R Fuses
   UL 977 Fused Power Circuit Devices

1.03 SUBMITTALS

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements".

B. Shop Drawings: Include enclosure dimensions, type, electrical ratings, fuse provision, installation instructions, and nameplate nomenclature.

C. Product Data: Submit for each type of product specified.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling,

examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates: Labels of UL listing, fixed to each item of material.

1.04 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

B. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

C. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation".

D. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements".

B. Store and protect product in accordance with manufacturer’s instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

1.07 COORDINATION

A. For equipment furnished by the Owner, or under other Divisions: Size fuses in accordance with the National Electrical Code.

1.08 EXTRA MATERIALS

A. Furnish 3 of each type and size of fuse installed.

**PART 2 - PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. Alley Bradley
B. Furnas
C. Cutler-Hammer
D. Siemens
E. General Electric

2.02 MATERIALS

A. For single phase motors under 2 horsepower Allen Bradley Bulletin 600 single phase manual switch, toggle type, with locking attachment, neon pilot light, heater elements sized per motor nameplate rating, NEMA 1 enclosure indoors, NEMA 4 enclosure exterior, in damp and wet locations, flush and surface as specified for outlet boxes.

B. For other 250 volt equipment: NEMA Type HD, General Electric Type TH, fusible and non-fusible as required by NEC, with cover interlocks, with cabinets, with threaded hubs. Refer: Section 262816.

C. Provide heavy duty type, quick-make, quick-break disconnects with cover interlocks.

D. Provide NEMA Type 1 enclosure for dry locations, provide the proper enclosure for other locations as indicated.

E. Provide motor rated toggle switches where indicated.

F. Provide Bryant #3003 disconnect for 3 phase motors up to 5 horsepower.

G. Provide fused disconnect for elevator drive motors.

H. Provide rejection clips on disconnects where rejection type fuses are to be installed.

**PART 3 - EXECUTION**

3.01 INSPECTION

A. Inspect building structure to which disconnects are to be secured for defects which affect the execution and quality of work.

B. Do not start work until defects are corrected.

3.02 PREPARATION

A. Carefully measure and lay out exact locations maintaining working clearances required by the National Electrical Code.

3.03 INSTALLATION

A. Provide disconnects where indicated and where required by the National Electrical Code.

B. Install within sight of equipment served.

C. Provide final connection to equipment served.

D. Provide nameplate secured to cabinet with designation of equipment served, operating voltage, and circuit designation.

E. The anchorage of motor and circuit disconnects required for elevator drives, emergency generator, emergency motor loads, fire pumps and emergency lighting shall be designed in accordance with Section 2313 of the Uniform Building Code for a lateral force based on a "Cp" value.

3.04 LABELING AND IDENTIFICATION

A. Provide engraved plastic nameplates with 1/4 inch minimum height letters indicating:

1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards and motor control center.

2. Circuit designation of panel for device controlled on disconnects which are individually enclosed.

B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

**END OF SECTION**

**SECTION 265110**

**INTERIOR LIGHTING**

## PART 1 - GENERAL

1.01 SUMMARY

A. This Section Includes:

1. Lighting fixtures (for interior applications).

2. Emergency lighting units.

3. Illuminated exit signs.

4. Lighting fixture components and accessories.

B. Lighting Fixtures - Required Types and Characteristics: Applicable information on the type and characteristics of lighting fixtures required are indicated herein, shown on the plans (including the use of lighting fixture schedules), and tabulated in other Sections of these Specifications.

C. Related Sections:

1. General electrical requirements: Section 260501.

1.02 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this and the other sections of Division 26.

B. In addition, the products covered in this Section, except as noted, shall be designed, manufactured, and tested in accordance with the latest revisions of the applicable standards of:

1. American National Standards Institute

| | |
|---|---|
| ANSI C78.379 | Electric Lamps - Incandescent and High-Intensity Discharge Reflector Lamps - Classification and Beam Patterns |
| ANSI C82.1 | Ballasts for Fluorescent Lamps - Specifications |
| ANSI C82.4 | Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type) |

2. ASTM American Society for Testing and Materials
3. Certified Ballasts Manufacturers Association

Lamp and ballast combinations safety and performance standards

4. IEEE Institute of Electrical and Electronics Engineers
5. NEC National Electrical Code (NFPA 70)
6. NECA National Electrical Contractors Association "Standard of Installation"
7. National Electrical Manufacturers Association

NEMA WD 6 Wiring Devices - Dimensional Requirements

8. NFPA National Fire Protection Association
9. National Life Safety Code (NFPA 101)
10. Underwriters Laboratories, Inc.

| | |
|---|---|
| UL 57 | Fixtures, Electric Lighting. |
| UL 924 | Emergency Lighting and Power Equipment |
| UL 1570 | Fixtures, Fluorescent Lighting. |
| UL 1752 | Fixtures, High Intensity Discharge Lighting. |
| UL 1571 | Fixtures, Incandescent Lighting. |
| UL 935 | Ballast, Fluorescent Lamps. |
| UL 1029 | Ballast, High Intensity Discharge Lighting. |

1.03 SUBMITTALS

A. General: Submit the following in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Shop Drawings: Details of assembly, component dimensions, wiring and interconnection, materials lists, finishes, and installation requirements.

C. Product Data: Submit for each type of product specified. Include manufacturer's product data giving materials, finishes, dimensions, coefficients of utilization, and lamp types for each fixture which is the product of one of the listed acceptable manufacturers.

D. Operating, Maintenance, and Instructional Data: Manufacturers' written operating, maintenance, and installation instructions, including directions for storage and protection, handling, examination, and preparation.

1. In addition, include copies of this data in Operating and Maintenance Manuals submitted, see Section 260501.

E. Samples: Provide samples upon specific request.

F. Certificates:

1. Labels of UL listing, fixed to each item of material.

2. Labels of Certified Ballasts Manufacturers and Electrical Testing Laboratories affixed to each item of material.

1.04 QUALITY ASSURANCE

A. Laboratory Testing: Photometric testing shall be by Independent Testing Laboratories, Inc., based on Illuminating Engineering Society published procedures, and shall include candlepower distribution tabulation and zonal cavity coefficient of utilization tabulation.

B. Electrical Component Standard: Components and installation shall comply with NFPA 70, "National Electrical Code."

C. NEMA and UL Compliance: Products shall comply with applicable requirements of NEMA and UL standards. Provide products and components listed and labeled by UL.

D. NECA Installation Standards: Perform work in accordance with NECA "Standard of Installation."

E. Source Quality Control: Quality control testing shall meet applicable Underwriters' Laboratories Inc. Standards.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver, store, protect, and handle products to site in accordance with the General- and Supplementary Conditions, Division 1 Specification Sections, and Section 260501, "General Electrical Requirements."

B. Store and protect product in accordance with manufacturer's instructions, and in a manner to prevent damage from the elements, personnel, equipment, and moisture.

1.06 PROJECT CONDITIONS OR SITE CONDITIONS

A. Verify that field measurements are as shown prior to commencing the work.

**PART 2 - PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

A. As indicated herein, and as shown on the Lighting Fixture Schedule.

2.02 ELECTRICAL LIGHTING FIXTURES

A. Work covered includes manufacturing, equipping, wiring, and assembling of all lighting fixtures. Provide lighting fixtures complete for each and every light outlet in the type, quality, and size of fixture indicated in lighting fixture schedule.

B. The lighting fixtures shown on fixture schedule are marked with the corresponding type of letter, indicating thereby the particular type of fixture to be installed on the respective outlets.

C. Include a lighting fixture on every light outlet shown, unless otherwise indicated to be omitted. If the type of lighting fixture is not specifically noted, provide without extra cost to the Owner, a lighting fixture of the same type called for under a similar condition elsewhere on the Contract Drawings.

D. Catalog No. on the lighting fixture schedule are for the purpose of indicating the general type, quality, and size of fixtures that will be required. The use of Catalog Nos. for a lighting fixture does not necessarily include all accessories that may be required for a complete and operational installation.

E. All luminaries and other lighting equipment delivered to the job complete, wired and including all supporting means, such as plaster frames, supports, hangers, canopies, sockets, holds, all current or voltage modifiers, such as ballasts, starters, all light control materials; specifically diffusers, louvers, lenses, reflectors and refractors.

F. All lighting fixtures constructed and installed in accordance with local building codes and directives by the NFPA and shall bear the label of approval of the U.L. All materials new and of best grade of approved manufacturing standards. Workmanship of highest order to assure trouble-free operation and durability of equipment. Lighting fixtures constructed by labor agreeable with that employed on the project.

G. Lighting fixtures to be designed for highest relative efficiency and service. Maintenance to be simple and re-lamping possible without use of special tools.

H. Provide all light-sources, lamps and other light-producing media called for and suitable for specified equipment and functions.

2.03 FLUORESCENT LIGHTING FIXTURES

A. Fluorescent luminaries to use not less than No. 16 gauge SF-2 wire. No splice or tap located within a fixture arm, stem or chain. Wire continuous from lamp socket, or from internally mounted ballast, to splice with building wire whether splice box is mounted on fixture or attached to building.

B. Fluorescent lampholders, white plaster, designed for spring loaded contacts or Bi-Pin contacts, as required, for specified lamp requirements.

C. Fluorescent lighting fixture body parts, comprising the lighting fixture housing, reflectors, wire channels, end plates, ballast housing, and similar body parts, to be made of extruded aluminum, galvanized stampings, or bonderized steel, as indicated in the lighting fixture schedule. Wire-ways to have adequate wiring space, accessible after fixture installation. Housing adequately ventilated where required. All screws and nuts have rust-proof finish.

D. All fluorescent lighting fixtures supplied with ballasts wired for the branch circuit wiring.

E. Where recessed fluorescent lighting fixtures are installed in ceiling finished with acoustical tile or grid system, the lighting fixture shall conform to the patterns indicated on the Architectural Reflected Ceiling Plan.

F. The final installation must present a symmetrical appearance, with all lighting fixtures free of any damage and thoroughly clean.

G. Provide all additional means necessary to support lighting fixtures that would put excessive stress on the ceiling system.

H. Lighting fixtures mounted end-to-end and used as a raceway to be mechanically bonded together to insure continuity of ground. Lighting fixtures used as "feed through" to have wireways of adequate size.

I. All plastic lens of shielding for fluorescent lighting fixtures to be made from 100% virgin acrylic unless otherwise specified.

J. Temperature around ballast and in fixture housing shall not exceed 90 degrees C. with ambient room temperature at 27 degrees C.

K. Fluorescent lighting fixtures exposed to outside temperatures supplied with 0 degree F. ballasts.

2.04 LIGHTING FIXTURE NOTES

A. Recessed lighting fixtures in plaster or drywall ceilings to be furnished with plaster frames.

B. Lighting fixtures recessed in furred ceiling installed so that they can be removed from below the ceiling without damage to the ceiling.

C. Recessed lighting fixtures to be installed with metal bar hangers for attaching to ceiling supports. Lighting fixtures not supported directly from ceiling, provide galvanized steel wire as required for supporting lighting fixture from structure. No wood or other combustible material to be used for supporting fixtures.

D. Provide stems with swivel joints and canopies for all suspended lighting fixtures. Finish of all exposed parts to match that of the associated fixture, unless otherwise noted. Design to conform to Drawings. Wiring to pendant fixtures contained within stems. Wire entry by means of heavy malleable iron hickeys.

E. A canopy to be furnished for each stem and all canopies to match for each fixture type, as shown.

F. Ascertain type of ceiling construction for each fixture and provide suitable frames and fixture accessories to suit. Furnish substantial mounting frames or plaster rings for all recessed and semi-recessed lighting fixtures indicated or required. All frames made of galvanized steel with extra cross members where required to insure maintenance or proper opening dimensions during installation.

2.05 LAMPS

A. Provide energy saving lamps for all fixtures as manufactured by Sylvania, Cutler-Hammer, or General Electric as specified in Fixture Schedule.

2.06 BALLASTS

A. Electronic ballasts shall be Magnetek "Triad" series or equal by Advance, E.B.T. or Motorola. Electronic ballasts shall be high-frequency, full-output, U.L. listed and ETL certified, class "P" high power factor, with an "A" sound rating or better. All electronic ballasts shall have less than 10% total harmonic distortion, shall have a maximum lamp current crest factor of 1.7, and shall be warranted for parts and replacement labor for one full year from the date of installation. Ballasts for 1-, 2-, 3-, or 4- lamp combinations shall be used as specified in the lighting fixture schedule.

1. Electronic dimming ballasts shall have dimming range from 100% to 1% for T-12 and T-8 lamps, 100% to 5% for T-5 and T-4 lamps, and shall be approved for application by the dimming system manufacturer. Electronic dimming ballasts shall internally limit inrush current and preheat lamp cathodes before applying arc voltage to ensure rated lamp life is not diminished. Electronic dimming ballasts shall be available in 1-, 2-, or 3- lamp combinations as specified in lighting fixture schedule. Lead length from electronic dimming ballast to lamp socket shall not exceed seven feet for T-8 or three feet for T-5 lamps. Lamps operated by electronic dimming ballast shall be burned in at 100% light for 100 hours before being dimmed. Electronic dimming ballasts shall be Lutron Hi-Lume FDB Series, or equal.

B. Magnetic fluorescent ballast shall be energy saving type General Electric Maxi-Miser II or equal Universal, Advance.

C. Ballast for fixtures installed outdoors, shall be exterior type for 0 degrees F starting.

D. Ballast for H.I.D. fixtures shall be high power factor type (minimum 0.9). Starting amount shall not exceed operating current.

E. Rapid-start fluorescent fixtures shall be furnished with ETL and U.L. approved high power factor "P" rated ballasts complete with automatic reset thermal protection. All ballasts shall be acoustically rated "A".

F. Temperature rise of the ballasts in fixtures not to exceed 45 degrees C on test and mounted in the fixture housing and secured in place by means of bolts, screws, lock washers and nuts.

G. Ballasts for magnetic fluorescent lamps shall be one or two lamp type only. Where one lamp fixtures are used in continuous rows, two lamp ballasts utilized except where odd lamps occur at end of rows. Ballasts have a power factor of 90% or higher and operate at not higher than 120% of rated current nor rated line voltage. All ballasts carry a 2-year guarantee for material and labor on replacement. Guarantee period starts after Architect's acceptance in writing of lighting installations.

H. All ballasts shall have power factor not less than 0.9.

2.07 MATERIALS

A. Outlet Boxes: Refer to Section 260526.

B. Conduits: Refer to Section 260533.

C. Wires and Cables: Refer to Section 260519.

D. Fixtures: Of types scheduled, type letter referring to designation on the Drawings.

E. Lamps:

1. Manufacturers: General Electric, Phillips, Osram, Sylvania.

2. Incandescent: Inside frosted, 130 volts, of sizes scheduled.

3. Fluorescent:

a. 32 watt lamps

1) Equal to General Electric 32-T8-SP35 U.O.N.

2) Rated not less than 2850 lumens output after 100 hours.

b. 40 watt lamps

1) Equal to General Electric F40-T12-CW-RS.

2) Rated not less than 3150 lumens output after 100 hours.

4. High Intensity Discharge:

a. Phosphor coated. Clear lamps not allowed.

b. Select proper operating position and voltage.

F. Accessories:

1. Manufacturer's standard mounting rings, trim flanges, hanger bars, spacers, supports, plaster frames of nonferrous material or cadmium plated steel. Do not use painted steel plaster frames.

**PART 3 - EXECUTION**

3.01 INSPECTION

A. Inspect Architectural drawings and specifications, including ceiling alternates, to determine ceiling material to be installed.

B. Inspect Architectural reflected ceiling plans.

C. Inspect installed ceiling components for defects affecting the quality and execution of work.

3.02 PREPARATION

A. Verify ceiling material and alignment.

B. Lay out exact locations of fixtures in accordance with reflected ceiling plans, fixtures' and switches' outlet boxes and supports.

C. Provide outlet boxes and conduit.

D. Provide appropriate hardware and fixture accessories to support from ceiling system.

3.03 INSTALLATION

A. Installation of all lighting fixtures done by experienced electrician. Lighting fixtures not installed where finished coat of paint has been applied to ceiling and walls until paint is thoroughly dry. Verify ceiling type with architectural plan and provide all necessary framing and mounting hardware.

B. Contractor to be responsible for proper coordination of all lighting fixture locations. Provide support for all lighting fixtures mounted on or recessed in hung ceiling. Confer with Ceiling Contractor and other trades to coordinate lighting systems.

C. Lighting fixtures to be rigidly mounted to fixture stud in outlet boxes. Malleable iron hickeys or extension pieces provided where required.

D. Provide suitable coverplate or canopy for each lighting fixture outlet box where the lighting fixture does not provide a suitable cover.

E. Lighting fixtures located on exterior of building installed with cadmium plated brass screws and gasketed.

F. Lighting fixture to be installed in suspended T-Bar ceiling shall be attached to the ceiling grid with an attachment device with a capacity capable to resist a force equal to the weight of the light fixture acting in any direction. Lighting fixtures shall be supported directly from the structure above by hangers capable of supporting the weight of the fixture with #12 galvanized steel wire from all 4 corners.

G. Verify all ceiling heights and clearances if mounting height is not indicated on plans or in lighting fixture schedule, or if lighting fixture is relocated because of a conflict with another trade. A mounting height for the lighting fixture is to be submitted for review.

H. Each lighting fixture completely wired in an approved manner with No. 14 AWG copper stranded wire, 600 volt, with type SF-2 insulation; recessed lay-in lighting fixtures furnished with 7 feet No. 14 SF wire and 6 feet Greenfield, 4 feet when installed in an air plenum.

I. Circuit wiring running through the lighting fixtures to be No. 12 AWG with type SF insulation. No joints in the wires other than those absolutely required. Provide wires of sufficient length for making approved connections at the light outlets and at the lampholders or ballasts.

J. Joints and splices within lighting fixtures to be either soldered and taped with plastic electrician's tape or secured by wire nuts or indent type lug fasteners.

K. Protect the lighting fixtures from damage during their unloading or removal, storage or installation, any broken fixtures, lenses, etc. must be replaced with new parts, without any additional expense to the Owner, undue delay or inconvenience.

L. Upon completion of the installation of the lighting fixtures and lighting equipment, they must be in first-class operating order and in perfect condition as to finish, etc. Check for proper operation and appearance, alignment of fixtures and proper placement of lenses, louvers, lamps and other light-controlling or modifying appurtenances.

M. Where special lighting effects, flood or spotlighting is involved, perform final adjustment under the direct supervision of Architect.

N. Cleaning: Immediately prior to occupancy, damp clean all lenses, lighting fixture trims, reflectors, clean lamps or install new lamps as directed, with lenses and fixtures free of labels.

O. Use of Lighting Fixtures: As soon as any portion of lighting fixture work is ready for operation, the Owner shall have the right to operate the same under the supervision of the Contractor. This shall in no way be interpreted to mean the acceptance of such part of the installation or relieve the Contractor of his responsibility for the complete work or any part thereof.

P. Color and type of finish of all lighting fixtures as approved by the Architect.

Q. Install fixtures and accessories in accordance with manufacturer's recommendations and industry standard practice.

R. Coordinate work of this section with that of other trades.

S. Provide lighting fixtures, lamps, switches, and control systems, and wiring.

T. If designation omitted on drawings, provide same type fixture employed in rooms of similar usage (contact this engineer for final direction).

U. Provide spacers for fixtures mounted on low density ceiling material.

V. Provide plaster frames for recessed fixtures in plaster ceilings.

W. Install fixtures in fiber decking and formboard so outlet boxes and openings will not be sight exposed.

X. Prepare fixtures and trim required to be painted.

Y. Outlet boxes locations on drawings are diagrammatic only. Position outlet boxes to coincide with suspension hangers and knock-outs.

Z. Install in accordance with manufacturer's instructions, submittal data, and details on drawings.

3.04 ADJUSTMENT AND CLEANING

A. Adjust lamp positions for desired effects.

1. Adjust lamp positions for desired effects.

2. Align fixtures with building walls and tile joints.

B. Cleaning

1. Remove dirt, grease, and foreign materials from fixtures.

2. Remove fingerprints, smudges, and dirt from fixtures' lenses and lamps.

**END OF SECTION**

SECTION 32 1726 - DETECTABLE WARNING SURFACING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Precast concrete detectable warning tile pavers installed on mortar bed over concrete slab.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 03 30 00 – Cast-in-place Concrete.

3. Section 32 1313 – Site Concrete.

1.02 REFERENCES

A. ASTM International (ASTM):

1. ASTM A1046- Standard Specification for Steel Sheet, Zinc-Aluminum-Magnesium Alloy-Coated by the Hot-Dip Process.

2. ASTM C33 - Standard Specification for Concrete Aggregates.

3. ASTM C67 – Standard Methods of Sampling and Testing Brick and Structural Clay Tile.

4. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

5. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

6. ASTM C150 - Standard Specification for Portland Cement.

7. ASTM C920 – Standard Specifications for Elastomeric Joint Sealants.

8. ASTM C936 - Standard Specification for Solid Concrete Interlocking Paving Units.

B. The Masonry Society (TMS); American Concrete Institute (ACI), and American Society of Civil Engineers (ASCE):

1. TMS 602 / ACI 530.1 / ASCE 6 - Specifications for Masonry Structures.

C. Tile Council of North America (TCNA):

1. TCNA Handbook for Ceramic, Glass, and Stone Tile Installation.

    a. TCNA F101 - Mortar Installation.

    b. TCNA EJ171 - Movement Joints.

D. American National Institute Standards (ANSI):

1. ANSI A118.4 - Specifications for Modified Dry-Set Cement Mortar.

2. ANSI A118.7 – Specifications for High Performance Cement Grouts for Tile Installation.

1.03 REGULATORY REQUIREMENTS

A. Detectable warning surfacing shall conform to:

1. Title 28 Code of Federal Regulations, Part 36, Subpart D: 2010 ADA Standards for Accessible Design, 2010 Standards for Public Accommodations and Commercial Facilities: Title III.

2. CBC Section 11B-705, Detectable Warnings and Detectable Directional Texture.

B. Installed detectable warning pavers shall provide consistent side to side and end to end spacing that complies with the regulatory requirements.

1.04 PROJECT CONDITIONS

A. Weather Limitations for Mortar and Grout:

1. Cold Weather Requirements: The cold weather construction provisions of TMS 602 / ACI 530.1 / ASCE 6 shall be implemented when the ambient temperature falls below 40F$^{o}$.

2. Hot Weather Requirements: The hot weather construction provisions of TMS 602 / ACI 530.1 / ASCE 6 shall be implemented when the ambient temperature exceeds 100$^{o}$ F or 90$^{o}$ F with a wind velocity greater than 8 mph.

1.05 QUALITY ASSURANCE

A. Pre-Installation Conference: CONTRACTOR shall coordinate and conduct pre-installation conference in conformance to Section 01 3119 Project Meetings.

1.06 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including installation instructions maintenance recommendations.

B. Submit layout drawings showing pattern of detectable warning pavers and provide

details at curbs and adjacent construction. Indicate pavers requiring cutting.

C. Material Test Reports: Submit current test reports from an independent testing laboratory indicating that materials used comply with the specification requirements and the proposed products meet the properties specified.

D. Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Color will be selected by ARCHITECT.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protect detectable warning pavers during shipment, storage and construction against damage. Store a minimum of 4 inches off the ground on pallets in a dry location and cover with polyethylene to protect from contact with materials which would cause staining or discoloration.

1.08 WARRANTY

A. Detectable Warning Pavers shall remain free from defects for a period of five years.

B. CONTRACTOR shall warrant that his work will remain free from defects of labor and materials used in conjunction with his work for three years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Hanover Architectural Products.

B. StepStone, Inc.

C. Tile Tech Pavers Inc.

D. Wausau Tile Co.

E. Equal.

2.02 MATERIALS

A. Detectable Warning Paver Materials:

1. Portland Cement: In conformance with ASTM C150.

2. Aggregates: In conformance with ASTM C33, cleaned and properly graded to size. Aggregates shall be a blend from 200 mesh to 5/8 inch.

3. Coloring: Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer’s recommendations.

4. Color Blending: Factory-blend pre-cast paver that has a natural color range so products taken from one batch will have the same range as products from a separate batch.

5. Cleaner: Liquid neutral chemical cleaner with pH factor between 7 and 8, of formulation recommended by sealer manufacturer and approved by OWNER's OEHS.

6. Sealer: Colorless, slip and stain resistant penetrating or acrylic sealer with pH factor between 7 and 10 that does not affect color or physical properties of precast paver surface. Sealer shall be approved by paver manufacturer.

B. Setting Bed, Mortar and Miscellaneous Materials:

1. Setting Bed:

a. Portland Cement: In conformance to ASTM C150.

b. Aggregate: Sand in conformance to ASTM C144. Sand shall be clean, graded and pass a 16 mesh screen.

c. Reinforcing Mesh: In conformance to ASTM A1046. 2 inches X 2 inches 16/16.

2. Mortar: In conformance to ANSI A118.4.

3. Grout: In conformance to ANSI 118.7. Grout colors: selected by the ARCHITECT from the manufacturer's complete color range.

4. Water: Potable and free from deleterious substances.

5. Mortar and Grout Mixes: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimal performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

6. Primer: As recommended by the mortar material manufacturer and approved by paver manufacturer.

7. Sealant and backing materials: In conformance to ASTM C920, Type T, joints subject to pedestrian and vehicular traffic and approved by paver manufacturer.

## 2.03 DETECTABLE WARNING PAVER FABRICATION

A. Detectable Warning Pavers: Factory precast concrete pavers with raised truncated domes conforming to CBC Section 11B-705.

1. Dome Size: Base diameter of 0.90 inch minimum and 0.92 inch maximum, a top diameter of 0.45 inch minimum and 0.47 inch maximum and a height of 0.20 inch.

2. Dome Spacing: Truncated domes in a detectable warning surface shall have a center-to-center spacing of 2.3 inches minimum and 2.4 inches maximum, and a base-to-base spacing of 0.65 inch minimum, measured between the most adjacent domes on a square rigid.

3. Color: In conformance to CBC section 11B-705.1.1.3.

4. Contrast: Detectable warning materials shall provide a 70 percent minimum visual contrast with adjacent walking surfaces.

5. Resiliency: Detectable warning surfaces shall differ from adjoining surfaces in resiliency or sound-on-cane contact.

B. Physical Properties:

1. Size: Nominal 12 inches x12 inches.

2. Thickness: Nominal 2 inches.

3. Sizing Dimensions: Shall not differ by more than 1/16 inch from width, height, length or thickness. Unit shall conform to a true plane and not differ by more than 1/16 inch in either concave and/or convex warpage.

4. Compressive Strength: Shall not be less than 8,000 psi per ASTM C140.

5. Water Absorption: Shall not be greater than 6% per ASTM C936 or ASTM C140.

6. Freeze/Thaw: Durability of the paver shall meet the freeze/thaw tests per Section 8 of ASTM C67 and shall have no breakage and not greater than 1 % loss in dry weight of any individual unit when subject to 50 cycles of freeze/ thaw.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

A. Examine concrete base and verify no sealers, curing compounds or other coatings have been be applied. If present remove in accordance to paver manufacturer.

B. Concrete base shall have a fine broom finish or wood float finish. If not provided scarify mechanically as recommended by paver manufacturer.

C. Remove debris and loose particles and sweep concrete surfaces.

### 1.02 SETTING BED

A. Installation of mortar bed shall conform to TCA F101.

B. Install red wood float strips so that a straight edge can reach the maximum edges of the intended mortar bed. Verify top of float strips are at the correct elevation to allow a flush installation of the detectable warning pavers with the adjacent surfaces.

C. Moisten concrete base and float strips.

D. Apply a thin, continuous coat of pure Portland cement slurry on the concrete surface or dust a thin layer of dry Portland cement on the concrete and wet it. Broom to completely coat the concrete surface with a thin and uniform coating.

E. Place welded wire fabric on chairs or spacers or small mounds of mortar to hold the reinforcement at the center of the setting bed. Welded wire fabric shall overlap a minimum of one mesh.

F. Mix and apply mortar setting bed material in accordance with the manufacturer's instructions to a thickness of 1-1/4 inches. Trowel mortar between the float strips compacting the mortar as much as possible.

G. Using the float strips as the guide cut off the excess mortar placing the excess further down the area to be floated.

H. While the mortar bed is still plastic or has not cured remove the float strips and fill the grooves with fresh mortar.

1.03 PAVER INSTALLATION

A. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.

B. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

C. Lay pavers in pattern on mortar bed as indicated on the Drawings.

D. Apply mortar using the flat side of the trowel first. Move notched side of trowel in a parallel pattern allowing for air to escape. Apply bod coat over the entire setting surface including grout joints. “Back-butter” pavers with 1/8 inch thick mortar for full mortar to mortar contact.

E. Position paver on mortar bond coat using a slight back and forth motion. “Squeeze up” mortar minimum 1/8 inch in grout joints along tile edges and corners eliminating air voids.

F. Level pavers using a straight edge or taught string.

G. Placement Tolerances:

1. Maximum of 1/16 inch height variation between adjacent pavers.

2. Individual pavers shall not vary more than 1/16 inch from level across width of the paver.

3. Paved areas shall not vary more than 1/4 inch from level in a distance of ten feet measured at any location and in any direction.

4. The surface elevation of pavers shall be 1/8 ich to 1/4 inch above adjacent drainage inlets.

3.04 EXPANSION AND CONTROL JOINTS

A. Locate expansion and control joints as indicated on the Drawings and where pavers are in contact with dissimilar materials such as curbs, concrete pavement and walls.

B. Joints shall be uniform, straight of 3/16 inch wide.

C. Install in accordance with TCA Detail EJ171,

D. Carry joint completely through the assembly to surface.

E. Keep joints clear of mortar setting materials and grout.

F. Apply backer materials and sealant in joints following manufacturer's instructions.

3.05 GROUTING

A. Follow grout manufacturer's instructions.

B. Dampen grout joints prior to grout insertion.

C. Install grout using a grout bag or a tuck pointer. Tool the joint with a round tool ("spoon") or brick jointer.

D. Allow excess grout to set up briefly until it can be swept off using a stiff brush or broom.

E. For final cleaning use cheesecloth, clean damp sponge or when necessary, steel wool. Do not use any acidic cleaners to remove excess grout or grout haze.

F. Remove, scrub and wash clean mortar stains and all other types of soiling from exposed paver surfaces.

G. Apply sealer in accordance with manufacturer's directions.

3.06 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project Site.

3.07 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

# COUNTYWIDE COMMUNITY WORKFORCE AGREEMENT

BY AND BETWEEN

**THE COUNTY OF LOS ANGELES**

AND

**THE LOS ANGELES/ORANGE COUNTIES BUILDING AND CONSTRUCTION TRADES COUNCIL AND THE SIGNATORY CRAFT COUNCILS AND LOCAL UNIONS**

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## PURPOSE

The purpose of this Countywide Community Workforce Agreement ("CWA" or "Agreement") is to provide for the orderly settlement of labor disputes and grievances without strikes or lockouts, and to maximize the economic development opportunities for residents and businesses located within the County of Los Angeles ("County"), thereby promoting the public interest in assuring timely and economical completion of construction projects covered by this Agreement ("Covered Projects").

WHEREAS, the County is contemplating that, during the term of this Agreement, the County will likely proceed with the construction of Covered Projects; and

WHEREAS the construction of such Covered Projects will be of the utmost importance to the County and the general public of the County; and

WHEREAS, the work on such Covered Projects will require maximum cooperation between the Parties to this Agreement, as well as with the contractors selected to perform the work covered under this Agreement; and

WHEREAS, both the County and the Unions intend to maximize local economic development by ensuring equity and economic inclusion through comprehensive workforce and business development strategies and partner coordination; and

WHEREAS, this Agreement reflects a commitment by all Parties to the diversity in the workforce hiring; and

WHEREAS, increasing access to employment opportunities with prevailing wages is one way for the County and the Unions to directly combat poverty and unemployment; and

WHEREAS, the County and the Unions are both committed to contribute to the economic development of the community through the inclusion of Local Small Business Enterprise (LSBE), Disabled Veteran Business Enterprise (DVBE), and Social Enterprise (SE) firms in the execution of Covered Projects; and

WHEREAS, the County and the Unions are both committed to eliminating barriers and challenges to open competition and growth for LSBE, DVBE, and SE firms performing work on Covered Projects; and

WHEREAS, the County and the Unions are both committed to eliminating barriers and increasing the hiring and employment in the construction trades of Local Residents and Targeted Workers, including creating more opportunities for women and minorities to have craft labor careers in the construction trades; and

WHEREAS, the Contractors/Subcontractors/Employers ("Contractors") and the Unions desire to mutually establish and stabilize wages, hours, and working conditions for the workers employed on Covered Projects by the Contractors, and further, to encourage close cooperation

among the Contractors and the Unions to the end that a satisfactory, continuous and harmonious relationship will exist among the Parties to this Agreement; and

WHEREAS, large numbers of workers of various skills will be required in the performance of the construction work covered by this Agreement, including those to be represented by the Unions and any other craft labor organization which is signatory to this Agreement employed by Contractors who are signatory to agreements with said labor organizations; and

WHEREAS, it is recognized that Covered Projects will engage multiple contractors and bargaining units on Covered Project sites at the same time over an extended period of time, the potential for work disruption is substantial without an overriding commitment to maintain continuity of work; and

WHEREAS, the interests of the general public, the County, the Unions, Contractors, and workers would be best served if future Covered Projects proceed in an orderly manner free of disruption because of strikes, sympathy strikes, work stoppages, picketing, lockout, slowdowns or other interferences with work; and

WHEREAS, the Parties signatory to this Agreement pledge their full good faith and trust to work towards a mutually satisfactory completion of Covered Projects.

NOW, THEREFORE, IT IS MUTUALLY AGREED BY AND BETWEEN THE PARTIES, AS FOLLOWS:

## ARTICLE 1 DEFINITIONS

1.1 "Agreement" means this Community Workforce Agreement, which meets the definition of a "project labor agreement" pursuant to California Public Contract Code §2500, *et. seq.*

1.2 "Apprentice" as used in this Agreement shall mean those apprentices registered and participating in a Joint Labor/Management Apprenticeship Program ("Apprenticeship Program") approved by the State of California, Department of Industrial Relations, Division of Apprenticeship Standards.

1.3 "Board" means the Los Angeles County Board of Supervisors, acting in their capacity as the governing authority of the County.

1.4 "California Construction Labor Hours" means all craft worker hours performed on a Covered Project by California residents, excluding the hours performed by inspectors, off-site material fabricators, designers, project office staff, or vendors.

1.5 "Construction Contract" means the contract with a prime Contractor for the construction of a Covered Project.

1.6 "Contractor/Subcontractor/Employer" ("Contractors") means the prime Contractor and all subcontractors and owner operators of any tier, with respect to work performed within the

scope of a Construction Contract. Contractors may bid for and be awarded work within the scope of a Construction Contract for a Covered Project without regard as to whether the Contractors are otherwise a party to any Union collective bargaining agreement.

1.7 "Core Employee" as used in this Agreement shall mean an employee whose name appeared on the Contractor's active payroll for sixty (60) working days out of the last one hundred (100) working days immediately before the award of work within the scope of a Covered Contract to the Contractor, who possesses any license and meets all standards required by state or federal law for the work to be performed; and who has the ability to safely perform the functions of the applicable trade; and who has worked at least two-thousand (2,000) hours in the construction craft in which they are employed during the prior four (4) years.

1.8 "County" means the County of Los Angeles and its Departments, Commissions, and Agencies delivering the proposed Covered Projects.

1.9 "Covered Project" means a County construction project that meets one or more of the criteria specified in 1.9.1, below, and which does *not* meet one or more of the criteria specified in 1.9.2, below.

1.9.1 A County construction project shall be considered a "Covered Project" if it meets one or more of the following criteria and does not meet one or more of the criteria specified in 1.9.2, below:

(a) The Board is advised by the relevant County department prior to solicitation for the construction that the construction project has an estimated construction contract value of $5,000,000 or greater.

(b) Prior to the bid advertisement date or request for proposals release date for the construction of a project, the Board determines, in its sole discretion, that it wishes to include a County construction project as a Covered Project even though that project does not have an estimated construction contract value of $5,000,000 or greater.

1.9.2 A County construction project shall not be considered a "Covered Project" if it meets one or more of the following criteria:

(a) The construction project is being let due to an emergency, declared by the United States, or by the State of California, or by the Board, or by the Director of Public Works.

(b) The construction project is for the construction of supportive, interim, and/or affordable housing.

(c) The construction project is being performed using Job Order Contracts.

(d) The project was determined to be a Covered Project, but the Board subsequently cancelled the project.

1.10 "Current Prevailing Wage Determination" means the most recently adopted and published prevailing wage determination by the State of California, Department of Industrial Relations, in effect at the time the work is performed by each Contractor.

1.11 "Disabled Veteran Business Enterprise" or "DVBE" shall mean: (1) A business which is certified by the State of California as a disabled veteran business enterprise; or (2) A business which is verified as a service-disabled veteran-owned small business by the Veterans Administration.

1.12 "Jobs Coordinator" means an individual or entity contracted or employed by a Contractor to facilitate implementation of the Local and Targeted Worker Hiring Policy (LTWHP) and carry out other duties required by the Agreement.

1.13 "Joint Labor/Management Apprenticeship Program" means a joint Union and Contractor administered apprenticeship program certified by the Division of Apprenticeship Standards, Department of Industrial Relations of the State of California.

1.14 "Letter of Assent" means the document which formally binds each Contractor to adherence to all the forms, requirements, and conditions of this Agreement that each Contractor (of any tier) must sign and submit to the County's designated office and to the Council prior to beginning any work covered by this Agreement. The form Letter of Assent is attached as Attachment A.

1.15 "Local and Targeted Worker Hiring Policy" or "LTWHP" means, for each construction project, the policy adopted by the County's Board of Supervisors a copy of which is attached hereto as Attachment D.

1.16 "Local Small Business Enterprise" or "LSBE" shall mean a business which is certified by the State of California as a small business and has had its principal office located in the County for at least one (1) year.

1.17 "Master Labor Agreement" or "MLA" means the local collective bargaining agreements of the signatory Unions having jurisdiction over the work on the Covered Project, as such may be changed from time-to-time, and which are incorporated herein and listed in Attachment B.

1.18 "Project Labor Coordinator" means the designee of the County, either from its own staff or an independent entity acting on behalf of the County, to monitor compliance with this Agreement and assist with developing and implementing the programs referenced herein, all of which are critical to fulfilling the intent and purposes of the Parties and this Agreement, and to otherwise implement and administer this Agreement.

1.19 "Social Enterprise" or "SE" means nonprofit or for-profit businesses whose primary purpose is the "common good" and which "use the methods and disciplines of business and the power of the marketplace to advance their social, environmental and human justice agendas, wherein the organization that applies commercial strategies to maximize improvements in human and environmental well-being," that may "include maximizing social impact rather than profits for external shareholders," and has both: (1) been in operation for at least one (1) year

providing transitional or permanent employment to a Transitional Workforce or providing social, environmental and/or human justice services; and (2) is certified by the County's Department of Economic Opportunity as a SE.

1.20 "Subscription Agreement" means the contract between a Union's Labor Management Trust Funds and a Contractor that is not a party to a current collective bargaining agreement with a union signatory to this Agreement to document that Contractor's agreement to comply with the trust fund contribution requirements of the Letter of Assent described in Section 3.4., below. The Subscription Agreement cannot bind the Contractor beyond the obligations set forth in this Agreement and is limited to work performed within the scope of the Construction Contracts.

1.21 "Skilled Journeyperson" has the same meaning as in California Public Contract Code §2601.

1.22 "Targeted Worker" is defined in the LTWHP, and the categories of Targeted Workers shall be listed in the Craft Employee Request Form created for each Covered Project.

1.23 "Tier 1 Local Resident" is defined in the Local and Targeted Worker Hiring Policy.

1.24 "Tier 2 Local Resident" is defined in the Local and Targeted Worker Hiring Policy.

1.25 Tier 1 Local Residents and Tier 2 Local Residents shall be collectively referred to as "Local Residents".

1.26 "Union" or "Unions" or "Signatory Unions" means the Los Angeles/Orange Counties Building and Construction Trades Council ("Council") affiliated with North America's Building Trades Unions (AFL/CIO), and the local unions and district councils signing this Agreement, whose names are subscribed hereto and who have through their officers executed this Agreement.

## ARTICLE 2 SCOPE OF AGREEMENT

2.1 Parties: Unless otherwise provided or limited herein, this Agreement shall only apply to the Contractors performing work or agreeing to perform work pursuant to a Construction Contract for a Covered Project, the Council, the Unions, and the County. The Council, the Unions and the County shall hereinafter be referred to as the Parties.

2.2 Application of Agreement: This Agreement shall only apply to the work within the scope of a Construction Contract for a Covered Project, as defined above, unless specifically excluded or limited in Section 2.3, below. This Agreement shall in no way limit the County's right to terminate, modify or rescind a Construction Contract and/or any related subcontract or agreement and the County has the sole discretion and right to combine, consolidate, cancel, terminate, or take other action regarding any Construction Contracts or portions of any Construction Contracts. Should the County remove or terminate any Construction Contract and thereafter authorize that work be commenced or re-commenced, that Construction Contract shall

be performed under the terms of this Agreement unless this Agreement has expired prior to the authorization to commence or re-commence such work.

2.3 Exclusions:

2.3.1 This Agreement shall not apply to any off-site maintenance of leased equipment and on-site supervision of such maintenance work.

2.3.2 This Agreement shall not apply to or impact in any way service contracts or operation or maintenance contracts entered into by the County including, but not limited to said contract relating to the Covered Projects, services provided at any County facility, building and/or the operation or maintenance of any County owned and operated facilities.

2.3.3 This Agreement shall not apply to the Contractor's non-manual employees including, but not limited to, superintendents, assistant superintendents, supervisors, staff engineers, master mechanics, office engineers, time keepers, mail carriers, clerks, office workers, messengers, guards, safety personnel, emergency medical and first aid technicians or any other employee of the Contractors above the rank of Craft Foreman, and other engineering, administrative, supervisory, and management employees, including quality control and quality assurance management personnel to the extent they do not perform the work of a Surveyor or Building/Construction Inspector and/or Field Soils and Material Tester (Inspector), as covered by Section 2.3.6.

2.3.4 This Agreement shall not apply to material suppliers of raw materials, manufactured products, offsite hauling or delivery by any means of material, supplies, or equipment required to or from any point of delivery; provided, however, that lay down or storage areas for equipment or material and manufacturing (prefabrication) sites, dedicated solely to a Covered Project, and the movement of materials or goods between locations on a Covered Project site, are within the scope of this Agreement to the extent that those lay down or storage areas and prefabrication sites are for work within the scope of the Construction Contracts.

2.3.5 Certain equipment and systems of a highly technical and specialized nature may have to be installed at the Covered Project. The nature of such equipment and systems, together with requirements of manufacturer's warranty, may dictate that it be prefabricated, pre-piped, and/or pre-wired. The Unions agree to install such material, equipment and systems without incident, or allow such installation to be performed by the manufacturer's employees or a contractor designated by the manufacturer where the Unions are unable to perform such work or the warranty specifies that it may be void absent installation by the manufacturer or certified installation personnel of the manufacturer's authorized contractor or vendor (or the warranty explicitly requires such authorized and certified personnel to perform the installation) and no such authorized union contractor in the applicable trade has successfully bid the work, then such installation shall not be covered under this Agreement. The prime Contractor shall notify the Unions at the

pre-job conference of the use of this provision and shall provide copies of the written warranty to the affected Union that requires the work be performed by the manufacturer's own personnel, or a contractor certified by the manufacturer. When the warranty does not require installation by the manufacturer's own personnel or a contractor certified by the manufacturer, the Unions agree to perform and install such work under the supervision and direction of the manufacturer's representative. This Section 2.3.5 shall not apply to construction equipment owned or rented by contractor used during construction, but which does not become integrated into the site.

2.3.6 This Agreement shall not apply to any employees of the County, design teams (including, but not limited to architects, engineers, master planners), or any other consultants directly contracted by the County (including, but not limited to, project managers, construction managers, inspectors and their employees and their sub-consultants, and other employees of professional service organizations). Notwithstanding the foregoing, this exclusion shall not apply to the classifications of Surveyors and/or Building/Construction Inspector and/or Field Soils and Material Testers (Inspectors) unless they are County employees. This inclusion applies to the scope of work defined in the State of California Wage Determination for that craft. This shall also specifically include such work where it is referred to by utilization of such terms as "quality control" or "quality assurance." Every Inspector performing under these classifications on Covered Projects pursuant to a professional services agreement, a contract directly with the County or a contract with a Contractor shall be bound to all applicable requirements of this Agreement. Covered work as defined by this Agreement shall be performed pursuant to the terms and conditions of this Agreement regardless of the manner in which the work was awarded.

2.3.7 Any work performed on or near or leading to or into a site of work covered by this Agreement and undertaken by state, city or other governmental bodies, or their Contractors; or by public utilities, or their Contractors, for work for which is not within the scope of this Agreement

2.4 The County and/or the Contractors, as appropriate, have the absolute right to award the Construction Contracts under this Agreement to any Contractor notwithstanding the existence or non-existence of any agreements between such Contractor and any Union parties, provided only that such Contractor is ready, willing, and able to execute and comply with this Agreement should such Contractor be awarded work under a Construction Contract for a Covered Project.

## ARTICLE 3 EFFECT OF AGREEMENT

3.1 By executing this Agreement, the Unions and the County agree to be bound by each and every provision of this Agreement. The provisions of this Agreement, including the applicable terms of the Master Labor Agreements ("MLA(s)"), as such may be changed from time-to-time and which terms are incorporated herein by reference, shall apply to the work within the scope of the Construction Contracts for the Covered Projects. To the extent that the provisions of this

Agreement are inconsistent with the applicable MLA, the provisions of this Agreement shall prevail, notwithstanding the provisions of any other local, area and/or national agreement which may conflict with or differ from the terms of this Agreement. However, such does not apply to work performed under the National Cooling Tower Agreement, the National Stack Agreement, the National Transit Division Agreement (NTD), or within the jurisdiction of the International Union of Elevator Constructors and all instrument calibration and loop checking work performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians except that Articles dealing with Work Stoppages and Lock-Outs, Work Assignments and Jurisdictional Disputes, and Settlement of Grievances and Disputes shall apply to such work.

3.2 It is specifically agreed that no later agreement shall be deemed to have precedence over this Agreement unless signed by all Parties signatory hereto who are then currently employed or represented at the Covered Project. Where a subject covered by the provisions of this Agreement is also covered by a MLA, the provisions of this Agreement shall apply. Where a subject is covered by a provision of a MLA and not covered by this Agreement, the provisions of the MLA shall apply. Any dispute as to the applicable source between this Agreement and any MLA for determining the wages, hours of working conditions of employees on this Covered Project shall be resolved under the procedures established in Article 11.

3.3 It is understood that this Agreement constitutes a self-contained, stand-alone agreement and that, by virtue of having become bound to this Agreement, the Contractor will not be obligated to sign any local, area or national collective bargaining agreement as a condition of performing work within the scope of this Agreement, except as provided in Section 3.4, below.

3.4 It is agreed that all Contractors of whatever tier, who have accepted the award of work within the scope of a Construction Contract, shall be required to accept and be bound to the terms and conditions of this Agreement, and shall evidence their acceptance by the execution of the Letter of Assent as set forth in Attachment A hereto, prior to the commencement of work. At the time that any Contractor enters into a subcontract with any subcontractor of any tier providing for the performance of work within the scope of a Construction Contract, the Contractor shall provide a copy of this Agreement to said subcontractor and shall require the subcontractor, as a part of accepting the award of a construction subcontract, to agree in writing in the form of a Letter of Assent to be bound by each and every provision of this Agreement prior to the commencement of work on the Covered Project. No Contractor shall commence work within the scope of a Construction Contract without having first provided a copy of the Letter of Assent as executed by it to the Project Labor Coordinator and the Council, 48 hours before the commencement of such work, or within 48 hours after the award of such work to that Contractor, whichever occurs later. Further, Contractors not signatory to the established Joint Labor/Management Trust Fund Agreements, as described in the MLAs for the craft workers in their employ, shall sign a Subscription Agreement with the appropriate Joint Labor/Management Trust Funds covering the work performed under this Agreement before such work is commenced. It shall be the responsibility of the prime Contractor to have each of its lower-tier Contractors sign such Subscription Agreement with the appropriate Union prior to the Contractor beginning work performed under this Agreement. The Subscription Agreement shall not bind the Contractor beyond the terms and conditions of this Agreement and must be limited to work performed within the scope of a Covered Contract for a Covered Project.

3.5 This Agreement shall be binding on the signatory Contractors hereto only and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such party or any other contract for construction or project to which this Agreement does not apply.

3.6 This Agreement shall be included as a general condition of the Construction Contract for each of the Covered Projects.

## ARTICLE 4 WORK STOPPAGES AND LOCKOUTS

4.1 There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, sickouts, handbilling or other disruptive activity for any reason (including but not limited to disputes relating to the negotiation or renegotiation of applicable MLA(s), economic strikes, unfair labor practice strikes, safety strikes, sympathy strikes, and jurisdictional strikes or disputes) by the Union, or by any employee, and there shall be no lockout by the Contractor. Failure of any Union or employee to cross any picket line established at the Covered Project site is a violation of this Article.

4.2 The Union shall not sanction, aid or abet, encourage, or continue any work stoppage, strike, picketing or other disruptive activity at the Covered Project site and shall undertake all reasonable means to prevent or to terminate any such activity. No employee shall engage in activities which violate this Article. Any employee who participates in or encourages any activities which interfere with the normal operation of the Covered Project shall be subject to disciplinary action, including discharge, and if justifiably discharged for the above reasons, shall not be eligible for rehire on the Covered Project. If any Union is notified of any offsite work stoppage, strike, picketing or other disruptive activity by the Union that will economically and/or materially affect the completion of the Covered Project, the Union will promptly make good faith efforts to cease such Covered Project work disruption.

4.3 The Union shall not be liable for independent acts of employees for whom it has no responsibility. The principal officer or officers of a Union will immediately instruct, order and use their best efforts of their office to cause the employees they represent to cease any violations of this Article. A Union complying with this obligation within two (2) business days of its knowledge of or receipt of notice of such independent acts of employees shall not be liable for unauthorized acts of employees it represents. The failure of the Contractor to exercise its right in any instance shall not be deemed a waiver of its right in any other instance.

4.4 If a MLA, local, regional, and other applicable labor agreements expire during the term of this Agreement, it is specifically agreed that there shall be no strike, sympathy strike, picketing, lockout, slowdown, withholding of work, refusal to work, walk-off, sick-out, sit-down, stand-in, wobble, boycott or other work stoppage, disruption, advising of the public that a labor dispute exists, or other impairment of any kind as a result of the expiration of any local, regional or other applicable labor agreement having application at any Covered Project and/or failure of the parties to that agreement to reach a new contract. Otherwise to the extent that such a local, regional, or other applicable labor agreement does expire and the parties to that agreement have failed to reach agreement on a new contract, work will continue on the Covered Project on one of the

following two bases, both of which will be offered by the Unions involved to the Contractors affected:

4.4.1 Each of the Unions with a contract expiring must offer to continue working on the Covered Project under interim agreements that retain all the terms of the expiring contract, except that the Unions involved in such expiring contracts may each propose wage rates and employer contribution rates to employee benefit funds different from what those wage rates and employer contributions rates were under the expiring contracts. The terms of the Union's interim agreement offered to Contractors will be no less favorable to the Contractor than the terms offered by the Union to any other employer or group of employers covering the same type of construction work in the County.

4.4.2 Each of the Unions with a contract expiring must offer to continue working on the Covered Project under all the terms of the expiring contract, including the wage rates and employer contribution rates to the employee benefit funds if the Contractors affected by that contract agree to the following retroactivity provisions: if a new MLA for the Union having jurisdiction at the Covered Project is ratified and if such new MLA provides for retroactive wage or fringe benefit contribution increases, then each affected Contractor shall pay to its employees (and the respective trust funds for hours worked by employees) who performed work covered by the Agreement at the Covered Project during the hiatus between the effective dates of such labor agreements, an amount equal to any such retroactive wage increase established by such new labor agreement, retroactive to whatever date is provided by the new local, regional or other applicable agreement for such increase to go into effect, for each employee's hours worked on the Covered Project during the retroactive period. All Parties agree that such affected Contractor shall be solely responsible for any retroactive payment to its employees and that neither the County nor any other Contractor has any obligation, responsibility or liability whatsoever for any such retroactive payments or collection of any such retroactive payments, from any such Contractor.

4.4.3 Some Contractors may elect to continue to work on the Covered Project under the terms of the interim agreement option offered under 4.4.1 above and other Contractors may elect to continue to work on the Covered Project under the retroactivity option offered under 4.4.2 above. To decide between the two options, Contractors will be given one (1) week after the particular MLA has expired or one (1) week after the Union has personally delivered to the Contractor in writing its specific offer of terms of the interim agreement pursuant to 4.4.1 above, whichever is the later date. If the Contractor fails to timely select one of the two options, the Contractor shall be deemed to have selected the option of 4.4.2.

4.5 Expedited arbitration will be utilized for all grievances alleging violations of this Article. In lieu of or in addition to any other action at law or equity, any Party, including the County, prime Contractor, and the Project Labor Coordinator, may institute the following procedure when a breach or violation of this Article is alleged to have occurred:

4.5.1 If the County or Contractor contends that any Union has violated this Article, it will serve written notification upon the Business Manager of the Union(s) involved, advising her or him of the fact, with copies of such notice to the prime Contractor, and the Project Labor Coordinator. The Business Manager(s) will immediately instruct, order and use the best efforts of her or his office to cause any violation of this Article to cease.

4.5.2 If the County or Union contends that any Contractor has violated this Article, it will notify the Contractor, prime Contractor, and the Project Labor Coordinator, setting forth the facts which the Union contends violates this Article, at least twenty-four (24) hours prior to invoking the expedited arbitration procedures contained in this Article. It is agreed by the Parties that the term "lockout" for purposes of this Agreement does not include discharge, termination or layoff of employees by the Contractor in the normal course of its business, nor does it include the Contractor's decision to terminate or suspend work on the Covered Project or any portion thereof for operational or special circumstances.

4.5.3 The Party invoking this procedure shall notify the Project Labor Coordinator to select the permanent arbitrator next in sequence from the following list:

1. Tom Pagan
2. Najeeb Khoury
3. Sara Adler
4. Chris Cammeron
5. Fred Horowitz

The parties agree these shall be the five (5) permanent arbitrators under this procedure. Expenses incurred in arbitration shall be borne equally by the Union and the Contractor involved and the decision of the arbitrator shall be final and binding on both the disputing parties, provided, however, that the arbitrator shall not have the authority to alter or amend or add to or delete from the provisions of this Agreement in any way. Notice to the arbitrator shall be by the most expeditious means available, including by telephone and by facsimile or email to the Party alleged to be in violation, to the Council, to the Project Labor Coordinator, and to the involved Union if a Union is alleged to be in violation.

4.5.4 Upon receipt of said notice, the arbitrator shall convene a hearing within twenty-four (24) hours if it is contended that the violation still exists. The arbitrator, with assistance from the Project Labor Coordinator, shall notify the disputing parties by telephone and by facsimile or email of the place and time for the hearing. Notice shall be given to the individual Union(s) and Contractor(s) alleged to be involved and to the Council. Said hearing shall be completed in one session, which, with appropriate recesses at the arbitrator's discretion, shall not exceed twenty-four (24) hours unless otherwise agreed upon by all disputing parties. A failure of any disputing party to attend said hearings shall not delay the hearing of evidence or the issuance of any decision by the arbitrator. The sole issue

at the hearing shall be whether or not a violation of Section 4.1 or 4.2 of this Article has in fact occurred. The arbitrator shall have no authority to consider any matter of justification, explanation or mitigation of such violation. The decision shall be issued in writing within three (3) hours after the close of the hearing and may be issued without a written opinion. If any disputing party desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with or enforcement of the decision.

4.5.5 The arbitrator may order cessation of the violation of this Article and other appropriate relief and such decision shall be served on all disputing parties and on the Project Labor Coordinator by hand or registered mail upon issuance. If the arbitrator determines that a violation of this Article has occurred, the respondent Unions(s) shall, within eight (8) hours of receipt of the award, direct all the employees they represent on the Covered Project to immediately return to work. If the craft(s) involved does not return to work by the beginning of the next regularly scheduled shift following such eight (8) hour period after receipt of the arbitrator's award, and the respondent Union(s) have not complied with their obligation to immediately instruct, order, and use their best efforts to cause a cessation of the violation and return of the employees they represent to work, then the respondent Union(s) shall each pay a sum as liquidated damages to the affected contractor, and each shall pay an additional sum per shift for each shift thereafter on which the craft(s) has not returned to work. Similarly, if the arbitrator determines that a lock-out has occurred, the respondent Contractor(s) shall, within eight (8) hours of receipt of the award, return all the affected employees to work on the Project, or otherwise correct the violation as found by the arbitrator. If the respondent Contractor(s) do not take such action by the beginning of the next regularly scheduled shift following the eight (8) hour period, each respondent Contractor shall pay a sum as liquidated damages to the affected Union(s) (to be apportioned among the affected employees and the benefit funds to which contributions are made on their behalf, as appropriate and designated by the arbitrator) and each shall pay an additional sum per shift for each shift thereafter in which compliance by the respondent Contractor(s) has not been completed. The arbitrator shall retain jurisdiction to determine compliance with this Section and to establish the appropriate sum of liquidated damages, which shall not be less than ten thousand dollars ($10,000) per shift, nor more than twenty-five thousand dollars ($25,000) per shift.

4.5.6 Such decision may be enforced by any Court of competent jurisdiction upon the filing of this Agreement and all other relevant documents referred to above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the other disputing party and to the Project Labor Coordinator. The Project Labor Coordinator shall not be named as a party or real party in interest in any such action. In the proceeding to obtain a temporary order enforcing the arbitrator's decision as issued under this Article, all Parties waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any party's right to participate in a hearing for a final order of enforcement. The Court's order or orders enforcing the arbitrator's

decision shall be served on all disputing parties and on the Project Labor Coordinator by hand or delivered by registered mail.

4.5.7 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance therewith are hereby waived by the disputing parties to whom they accrue.

4.5.8 The fees and expenses incurred in arbitration shall be divided equally by the disputing parties to the arbitration, including Union(s) and the Contractor(s) involved.

4.6 The procedures contained in this Article shall be applicable to alleged violations of Article 4 to the extent any conduct described in Section 4.1 or 4.2 occurs on the Covered Project. Disputes alleging violation of any other provision of this Agreement, including any underlying disputes alleged to be in justification, explanation, or mitigation of any violation of Section 4.1 or Article 4 shall be resolved under the applicable grievance adjudication procedures for these other Articles.

4.7 Notwithstanding any provision of this Agreement to the contrary, it shall not be a violation of this Agreement for any Union to withhold the services of its members (but not the right to picket) from a particular Contractor who:

4.7.1 fails to timely pay its weekly payroll; or

4.7.2 fails to make timely payments to the Union's Joint Labor/Management Trust Funds in accordance with the provisions of this Agreement.

4.7.3 Prior to withholding its members' services for the Contractor's failure to meet its weekly payroll, the Union shall give at least five (5) calendar days written notice of such failure to pay by registered or certified mail, return receipt requested, and by facsimile or email transmission to the involved Contractor, prime Contractor and Project Labor Coordinator. The Union will offer to meet within a three (3) working day period, after the written notice of such failure to pay was sent, to attempt to resolve the dispute with the applicable Contractor's prime Contractor, and the Project Labor Coordinator. Upon the payment of the delinquent Contractor of all monies due and then owing for wages, the Union shall direct its members to return to work and the Contractor shall return all such members back to work.

4.7.4 Prior to withholding its members' services for the Contractor's failure to make timely payments to the Union's Labor/Management Trust Funds, the Union shall give at least thirty (30) calendar days written notice of such failure to pay by registered or certified mail, return receipt requested, and by facsimile or email transmission to the involved Contractor, the prime Contractor, and Project Labor Coordinator. The Union, Contractor, prime Contractor and Project Labor Coordinator will meet within ten (10) calendar days following receipt of the written

notice to attempt to resolve the dispute. Upon payment by the delinquent Contractor of all monies due and then owing for wages and/or fringe benefit contributions, the Union shall direct its members to return to work and the Contractor shall return all such members back to work.

## ARTICLE 5 NO DISCRIMINATION OR HARASSMENT

5.1 This Article is intended to preserve the dignity and professionalism of the workplace and construction site as well as protect the right of employees to be free from discrimination, unlawful harassment, retaliation, and inappropriate conduct toward others based on a protected status. Discrimination, unlawful harassment, retaliation, and inappropriate conduct toward others based on a protected status, are contrary to the values of the County, Contractors and the Unions. The County, Contractors and the Unions will not tolerate unlawful discrimination on the basis of sex, race, color, ancestry, religion, national origin, ethnicity, age, disability, sexual orientation, marital status, medical condition, political affiliation or any other protected characteristic protected by state or federal employment law, nor will it tolerate unlawful harassment or retaliation. All Contractors and employees are responsible for conducting themselves in accordance with this Article. Any employee proven to be in violation of this Article is subject to immediate removal from the workplace and construction site.

5.2 The Parties agree not to engage in any form of unlawful discrimination or harassment of any kind on the grounds of, or because of, race, religion, national origin, ancestry, sex, sexual orientation, age, physical disability, marital status, medical condition, political affiliation, or membership in a labor organization in hiring and dispatching workers for the Covered Project.

5.3 Any employee covered by this Agreement which believes that she, he, or they, has been discriminated against or harassed, in violation of section 5.1 above, shall be referred to the appropriate state and/or federal agency for the resolution of such dispute.

## ARTICLE 6 UNION SECURITY

6.1 The Contractors recognize the Unions as the sole and exclusive bargaining representatives of all craft employees working within the scope of this Agreement.

6.2 Employees are not required to become or remain Union members or pay Union dues or fees as a condition of performing work on a Covered Project. However, Contractors shall make and transmit all deductions for Union dues, fees, and assessments that have been authorized by employees in writing in accordance with the applicable MLA. Nothing in this Section 6.2 is intended to supersede independent requirements of the applicable MLA as to those Contractors otherwise signatory to such MLAs and as to the employees of those Contractors who are performing work on Covered Projects.

## ARTICLE 7 REFERRAL

7.1 The Contractors recognize the Unions as the primary source of all craft labor employed on the Construction Contract for the Covered Projects. For Unions now having a job referral system contained in a MLA, the Contractor agrees to comply with such system, and it shall be used exclusively by such Contractor, except as modified by this Agreement. Such job referral system will be operated in a nondiscriminatory manner and in full compliance with federal, state, and local laws and regulations which require equal employment opportunities and non-discrimination. All of the foregoing hiring procedures, including related practices affecting apprenticeship, shall be operated so as to consider the policies and requirements of the County to encourage employment of Local Residents and Targeted Workers and utilization of LSBE, DVBE and SE's on the Project, and to facilitate the ability of all Contractors to meet their employment needs.

7.2 The Contractor shall have the right to determine the competency of all employees, including the determination that prospective employees meet the qualifications established by the County for employment, the number of employees required, the duties of such employees within their craft jurisdiction, and shall have the sole responsibility for selecting employees to be laid off, all of which shall not be inconsistent with this Agreement and the applicable MLA. The Contractor shall also have the right to reject any applicant referred by a Union, subject to the required payment of show-up pay, for any non-discriminatory reason; provided further that such right is exercised in good faith and not for the purpose of avoiding the Contractor's commitment to employ qualified workers through the procedures endorsed in this Agreement.

7.3 The Unions will exert and document their efforts to recruit and refer a sufficient number of skilled craft workers to fulfill the labor requirements of the Contractor, including specific employment obligations to which the Contractor may be legally and/or contractually obligated; and to refer apprentices as requested to develop a larger, skilled workforce. The Unions will work with their affiliated regional and national unions, and jointly with the Contractor, to identify and refer competent craftpersons as needed for work on Covered Projects, and to identify individuals, particularly Local Residents and Targeted Workers, for entrance into Apprenticeship Programs, or participation in pre-apprenticeship programs agreed to by the County and Council and procedures to assist individuals with qualifying and becoming eligible for such Apprenticeship Programs, all maintained to increase the available supply of skilled craft personnel for Covered Projects. The Union shall not knowingly refer an employee currently employed by a Contractor on Project Work to any other Contractor.

7.4 In recognition of the County's commitment to serve the community and the fact that the community in which the Covered Projects are located will be impacted by the construction activities, the Parties agree to support the development and employment of increased numbers of construction workers from among the Local Residents and Targeted Workers of the County. With the assistance of the Unions as specified in Section 7.5, the Contractor is responsible for ensuring compliance with the LTWHP.

7.5 The Unions agree that, to the maximum extent allowed by law, and as long as they possess the requisite skills and qualifications, the Unions shall follow the referral and recruitment procedures required by this Agreement to provide a sufficient number of skilled craft Local

Residents, Targeted Workers, Apprentices, and Skilled Journeypersons, as requested by the Contractors, to fulfill the requirements of the Contractors. Towards that end, the Unions agree that upon receiving a completed Craft Employee Request Form from a Contractor, the Unions shall follow the procedures required by this Agreement to provide referrals and utilization of qualified workers as follows:

7.5.1 First, qualified Tier 1 Local Residents and Targeted Workers requested by the Craft Employee Request Form.

7.5.2 If the Unions cannot provide the Contractors with a sufficient number of qualified Tier 1 Local Residents and Targeted Workers, then the Union shall certify to the Project Labor Coordinator in the manner specified on the Craft Employee Request Form that all reasonable efforts to recruit Tier 1 Local Residents have been exhausted. Thereafter, the Unions shall recruit and identify for referral qualified Tier 2 Local Residents and Targeted Workers sufficient to meet the number of Local Residents and Targeted Workers requested by the Craft Employee Request Form.

7.5.3 If the Unions still have not provided the Contractors with the attainment of a sufficient number of qualified Local Residents and Targeted Workers from their efforts in compliance with Sections 7.5.1 and 7.5.2, the Contractors and the Unions shall follow the procedures in Section 7.11. The Council will work with Apprenticeship Programs, the affected Contractor(s), and the Jobs Coordinator to indenture a sufficient additional number of qualified Local Residents and Targeted Workers as new Apprentices and/or Skilled Journeymen in accordance with this Agreement. In such cases, if the initiation and enrollment fees present a barrier to a potential Local Resident or Targeted Worker, then the Council and the Unions, along with the Project Labor Coordinator and the Jobs Coordinator, will assist in working with Department of Economic Opportunity, or any such successor agency, and other similar organizations to secure such funds.

7.5.4 Professional services agreements entered into by the County for covered surveying or inspection services, which are separate and apart from the Construction Contract for a Covered Project, do not include the LTWHP requirements, and therefore are not subject to the hiring and referral goals set forth in the LTWHP.

7.6 To facilitate the dispatch of Local Residents, Targeted Workers, Apprentices and Skilled Journeypersons, all Contractors will be required to utilize the Craft Employee Request Form whenever they are requesting the referral of any employee from a Union referral list for any Covered Project. When Local Residents and Targeted Workers are requested by the Contractors, the Unions will refer such workers regardless of their place on the Unions' hiring halls' list and normal referral procedures. The Contractors and Unions agree to maintain copies of all Craft Employee Request Forms used on the Covered Projects submitted or received including transmission verification reports that are date/time imprinted, until the Contractor's work on the project is complete. The Unions also agree to provide to the Project Labor Coordinator copies of any Craft Employee Request Forms wherein the Union has certified that all reasonable efforts to

recruit Local Residents and Targeted Workers have been exhausted. The Contractor shall copy the Project Labor Coordinator on all Craft Employee Request Forms at the time they are sent to the Union.

7.7 Each Contractor and Union must document all efforts made to comply with the hiring process to locate, dispatch, and hire Local Residents and Targeted Workers.

7.8 Local Residents and Targeted Workers may be referred to the Unions from the Project Labor Coordinator, Contractor, or Jobs Coordinator. For any applicant referred by the Project Labor Coordinator, Contractor, or the Jobs Coordinator to qualify as a Targeted Worker, the Jobs Coordinators shall first verify the presence of the Targeted Worker criteria defined by the LTWHP prior to referral to the Unions. The Project Labor Coordinator may ask the Jobs Coordinator to upload into an electronic system of the County's choice, the verification of an employee's Targeted Workers status.

7.9 Each Contractor performing work on a Covered Project that was procured by the County through an alternative project delivery methodology, is required to utilize a skilled and trained workforce, as defined in California Public Contract Code section 2602. The Parties shall utilize the grievance procedures set forth in Article 11 of this PLA to resolve any disputes regarding skilled and trained workforce requirements. To the maximum extent permissible under state law and regulation, including, but not limited to, California Public Contract Code §§ 22164(c)(2), 20146(c)(1), and 20155.4(b)(3), Contractors and County shall be relieved of reporting and enforcement obligations and systems described in California Public Contract Code sections 2602 and 2603, and Contractors' requirement to utilize a skilled and trained workforce shall instead be monitored and enforced by Parties through provisions of this Agreement.

7.10 Core Workforce

7.10.1 The parties recognize the County's interest in promoting competition and inclusion of Local Small Business Enterprises (LSBE), Disabled Veteran Business Enterprises (DVBE) and Social Enterprises (SE), which may not be signatory to a current MLA. In order to promote participation and attract certified LSBEs/DVBEs/SEs to work under this Agreement, and subject to the limitations set forth below, each Contractor that has been certified as an LSBE, DBVE or SE with twenty-five (25) or fewer employees at the time they are awarded a Covered Contract, may first employ three (3) of its core employees prior to employing an employee through the appropriate Union hiring hall. The next (fourth) employee shall be hired from the appropriate Union hiring hall and thereafter, such Contractor may employ, as needed, two (2) additional Core Employees in an alternating manner with Union referrals, up to a total of five (5) Core Employees. Thereafter, all additional employees in the affected trade or craft shall be requested and referred from the appropriate Union hiring hall. Notwithstanding the foregoing, Contractors must comply with the State of California Labor Code requirements for the utilization of Apprentices on Covered Work.

7.10.2 Contractors who are not certified as LSBE, DVBE or SE, and who are not otherwise signatory to a current MLA, may employ, as needed, first, a Core Employee, then an employee through a referral from the appropriate Union hiring hall, then a second Core Employee, then a second employee through the referral system, and so on until a maximum of five (5) Core Employees are employed, thereafter, all additional employees in the affected trade or craft shall be requested and referred from the appropriate Union hiring hall in accordance with this Article.

7.10.3 During any layoff or reduction in workforce, Contractors shall layoff employees in an order and manner consistent with the Core Employee hiring procedures and maintain the required Core Employee-to-Union referral ratios required by this Section for the duration of each Covered Project.

7.10.4 Section 7.10 only applies to Contractors who are not directly signatory to a current MLA for the craft worker in its employ and is not intended to limit the transfer provisions of the MLA of any trade. As part of this process, and in order to facilitate the Agreement's administration procedures, as well as appropriate fringe benefit fund coverage, all Contractors shall require their Core Employees and any other persons employed other than through the referral process, to register with the appropriate Union hiring hall, if any, prior to their first day of employment working under the Construction Contract at the project site.

7.10.5 Prior to each Contractor performing any work on a Covered Project, each Contractor shall provide a list of its Core Employees to the Project Labor Coordinator and the Council. Failure to do so will prohibit the Contractor from using any Core Employees for thirty (30) calendar days after the list is provided. Upon request by any Party to this Agreement, the Contractor hiring any Core Employee shall provide satisfactory proof (i.e., payroll records, quarterly tax records, and such other documentation) evidencing the Core Employee's qualification as a Core Employee to the Project Labor Coordinator and the Council.

7.11 In the event that the referral facilities maintained by the Unions are unable to fill the requisition of a Contractor for a craft's classifications requested by any Contractor within forty-eight (48) hours (excluding Saturdays, Sundays, and holidays) after having provided a fully completed Craft Employee Request Form to the Union, that Contractor may use employment sources other than the union registration and referral services, and may employ any qualified applicants, within the craft classification requested, meeting such standards from any other available source. The Contractor shall inform the Union of any applicants hired from such other sources within forty-eight (48) hours of such applicant being hired, and such applicants shall immediately register with the appropriate Union in accordance with Section 7.10.4 of this Agreement.

7.11.1 In the event that a Contractor, which has not then currently met its hiring goals for Local Residents and/or Targeted Workers, requests one or more Local Residents or Targeted Workers from the Union hiring hall in accordance with Section 7.5, and the Union is unable to fill such request for a Local Resident or a Targeted Worker within a forty-eight (48) hour period after such requisition is made

by the Contractor (Saturday, Sundays and holidays excepted), the Employer shall have five (5) working days to obtain the requested number of Local Residents or Targeted Workers, as requested in the Craft Employee Request Form, from another source. If the Contractor is unable to hire the requested number of Local Residents or Targeted Workers within such five (5) working days from such other source, Contractor shall hire the remaining unfulfilled number of employees from the Union hiring hall. The Employer shall inform the Union of any applicants hired from such other sources within 48 hours of such applicant being hired, and such applicants shall immediately register with the appropriate hiring hall, if any, in accordance with Section 7.10.4 of this Agreement.

7.12 Helmets to Hardhats:

7.12.1 The Parties recognize a desire to facilitate the entry into the building and construction trades of veterans, including female veterans, who are interested in careers in the building and construction trades industry. The Contractors and Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "Center") and the Center's "Helmets to Hardhats" Program to serve as a resource for preliminary orientation, assessment of the construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the Parties.

7.12.2 The Unions and Contractors agree to coordinate with the Center to reach out to veterans, including women, interested in entering into a construction career.

7.12.3 The Unions will assist in providing relevant records and Contractors agree to maintain records of all efforts to assist Helmets to Hardhats employment candidates gain employment on the Covered Project(s). Such records shall include, but not be limited to, documentation of the number of Helmets to Hardhats employment candidates contacted and/or employed and/or indentured into an apprenticeship program or referred to a Union for assessment, including the number of such female candidates. Such records must be submitted to the Project Labor Coordinator, if requested by the County.

7.12.4 Any Helmets to Hardhats employment candidate for work on Covered Projects may be given credit by the Union for any provable past experience and training.

## ARTICLE 8 WAGES AND BENEFITS

8.1 All employees covered by this Agreement shall be classified in accordance with work performed and paid by the Contractor at the hourly wage and benefit rates for those classifications in compliance with the Current Prevailing Wage Determination. Notwithstanding any other provision in this Agreement, Contractors directly signatory to one or more of the MLAs

are required to pay all of the wages set forth in those MLAs, provided those wages are not less than the applicable Current Prevailing Wage Determination.

8.2 All employees covered by this Agreement may be paid by check, paid no later than the end of the work shift each Friday. No more than five (5) days' wages may be withheld in any pay period. Any employee who is discharged or laid off shall be entitled to receive all accrued wages immediately upon discharge or layoff.

8.3 Contractors shall pay contributions to the established employee benefit funds on behalf of all employees performing covered work in the amounts designated in the appropriate MLA and make all employee authorized deductions in the amounts designated in the appropriate MLA; provided, that such contributions shall not exceed the contribution amount set forth in the Current Prevailing Wage Determination. Notwithstanding any other provision in this Agreement, Contractors directly signatory to one or more of the MLAs are required to pay all of the benefits set forth in those MLAs, provided those benefit contributions are not less than the applicable Current Prevailing Wage Determination.

8.4 Pursuant to and as limited by the Subscription Agreement (or for Contractors signatory to a MLA), the Contractor adopts and agrees to be bound by the written terms of the applicable, legally established, trust agreement(s) specifying the detailed basis on which payments are to be made into, and benefits paid out of, such trust funds for its employees. The Contractor authorizes the Parties to such trust funds to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor. Nevertheless, the Contractor's obligation to the trust fund(s) is limited to the work within the scope of the Construction Contract.

8.5 Each Contractor is required to certify under penalty of perjury to the Project Labor Coordinator that it has paid all benefit contributions due and owing to the appropriate Trust(s) prior to the receipt of its final payment and/or retention. The Project Labor Coordinator shall work with any Contractor who is delinquent in payments to assure that proper benefit contributions are made, to the extent of requesting the County or the prime Contractor to withhold payments otherwise due such Contractor, until such contributions have been made or otherwise guaranteed.

## ARTICLE 9 HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAYS

9.1 Hours of Work. Eight (8) hours per day between the hours of 6:00 a.m. and 5:30 p.m., plus one-half (1/2) hour unpaid lunch approximately mid-way through the shift, shall constitute the standard workday. Forty (40) hours per week shall constitute a regular week's work. The work week will start on Sunday and conclude on Saturday. The foregoing provisions of this Article are applicable unless otherwise provided in the Current Prevailing Wage Determination, or unless changes are permitted by law, and such are agreed upon by the Parties. Nothing herein shall be construed as guaranteeing any employee eight (8) hours per day or forty (40) hours per week, or a Monday through Friday standard work schedule.

9.2 Place of Work. Employees shall be at their place of work (as designated by the Contractor), at the starting time and shall remain at their place of work, performing their assigned functions, until quitting time. The place of work is defined as the gang or toolbox or equipment at

the employee's assigned work location or the place where the foreman gives instructions. The Parties reaffirm their policy of a fair day's work for a fair day's wage. There shall be no pay for time not worked, unless otherwise provided in this Agreement or under law, unless the employee is otherwise engaged at the direction of the Contractor.

9.3 Overtime. Overtime shall be paid in accordance with the requirements of the Current Prevailing Wage Determination. There shall be no restriction on the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who will work overtime. There shall be no pyramiding of overtime (payment of more than one form of overtime compensation for the same hour) under any circumstances.

9.4 Shifts and Alternate Work Schedules.

9.4.1 Alternate starting and quitting time and/or shift work may be performed at the option of the Contractor upon three (3) days' prior notice to the affected Union(s) unless a shorter notice period is provided for in the applicable MLA and shall continue for a period of not less than five (5) working days. Saturdays and Sundays, if worked, may be used for establishing the five (5) day minimum work shift. If two shifts are worked, each shall consist of eight (8) hours of continuous work exclusive of a one-half (1/2) hour non-paid lunch period, for eight (8) hours pay. The first shift starting between 6:00 a.m. and 8:00 a.m., is designated as the first shift, with the second shift following eight (8) hours later.

9.4.2 Additional pay or differentials based upon the shift or work schedule of the employees shall only be paid by the Contractor if required by the Current Prevailing Wage Determination.

9.4.3 To the extent permitted by state and federal law, the Contractor may, upon five (5) days' notice to appropriate Union(s), establish a work week of four (4) consecutive ten (10) work hours days (exclusive of the one-half (1/2) hour unpaid lunch approximately halfway through the shift). Such work week should consist of the same four (4) days each week, with the fifth day available as a make-up day if needed.

9.4.4 Because of operational necessities, the second shift may, at the County's direction, be scheduled without the preceding shift having been worked. It is recognized that the County's operations and/or mitigation obligations may require restructuring of normal work schedules. Except in an emergency or when specified in the County's bid specification, the Contractor shall give the affected Union(s) at least three (3) days' notice of such schedule changes.

9.5 Holidays. Recognized holidays on the Covered Projects shall be those set forth and governed by the Current Prevailing Wage Determination.

9.6 Show-up Pay.

9.6.1 Unless the Current Prevailing Wage Determination requires a higher amount, employees reporting for work and for whom no work is provided, except

when given prior notification not to report to work, shall receive two (2) hours pay at their regular straight time hourly rate; while employees who are directed to start work shall receive four (4) hours of pay at the regular straight time hourly rate. Employees who work beyond four (4) hours shall be paid for actual hours worked. Whenever reporting pay is provided for employees, they will be required to remain at the project site and available for work for such time as they receive pay, unless released earlier by the Contractor. Each employee shall furnish the Contractor with his current address and telephone number and shall promptly report any changes to the Contractor.

9.6.2 An employee called out to work outside of his shift shall receive a minimum of two (2) hours pay at the appropriate rate, except as otherwise required by the Current Prevailing Wage Determination. This does not apply to time worked as an extension of (before or after) the employee's normal shift.

9.6.3 When an employee leaves the job or work location of his own volition or is discharged for cause or is not working as a result of the Contractor's invocation of Article 16, the employee shall only be paid for actual time worked.

9.7 Brassing. The Contractor may utilize "brassing" (or similar system) to check employees in and out. Each employee must check himself in and out. The Contractor will provide adequate facilities for checking in and out in an expeditious manner.

9.8 Meal Periods. The Contractor will schedule a meal period of no more than one-half (1/2) hour duration at the work location at approximately the mid-point of the scheduled shift; provided, however, that the Contractor may, for efficiency of the operation, establish a schedule which coordinates the meal periods of two (2) or more crafts. An employee may be required to work through his meal period because of an emergency or a threat to life or property, or for such other reasons as are in the applicable MLA, and if he is so required, he shall be compensated in accordance with state law, unless the Contractor is directly signatory to one or more MLA, in which case the provisions of such MLA will apply.

9.9 Make-up Days. To the extent permitted by the Current Prevailing Wage Determination, when an employee has been prevented from working for reasons beyond the control of the Contractor, including, but not limited to inclement weather or other natural causes, during the regularly scheduled work week, a make-up day may be worked on a non-regularly scheduled work day for which an employee shall receive eight (8) hours pay at the straight time rate of pay or any premium rate required for such hours under the prevailing wage law.

9.10 If the Current Prevailing Wage Determination is in conflict with the applicable prevailing wage determination under state law, then the Contractor shall ensure compliance with state law and this Agreement by implementing the terms and conditions of each determination that is most favorable to the Contractor's employees.

## ARTICLE 10 COMPLIANCE

10.1 The County shall designate a Project Labor Coordinator, either from its own staff or an independent entity acting on behalf of the County, to monitor compliance with this Agreement. The Council shall actively assist the Project Labor Coordinator and the County in developing, implementing and administering the programs referenced in this Agreement, all of which are critical to fulfilling the intent and purposes of the Parties and this Agreement; and to otherwise implement and administer this Agreement.

10.2 All Contractors, Unions, and employees shall comply with all applicable federal, state and County laws, ordinances, and regulations, including, but not limited to, those relating to safety and health, vaccination reporting, employment, and applications for employment. All employees shall comply with the health and safety regulations and policies established by the state and the County and the Contractors. Employees must promptly report any injuries or accidents to a supervisor.

10.3 It shall be the responsibility of the Contractors and the Unions to comply with the provisions of this Agreement.

10.4 The Project Labor Coordinator shall be responsible for oversight in monitoring the compliance of all Contractors with all applicable prevailing wage laws and regulations to the extent required by law. All complaints regarding potential prevailing wage violations may be referred to the Project Labor Coordinator for processing, investigation and resolution, and if not resolved within thirty (30) calendar days of taking cognizance of the potential violation or complaint, the matter may be referred to the State Labor Commissioner by any Party or form the basis for a grievance under Article 11 of this Agreement.

10.5 If the County opts to implement an online certified payroll system for a Covered Project, the Contractors agree to use the County-required online certified payroll system for the submission of certified payroll records and any other documents required by the County or Project Labor Coordinator related to labor compliance and compliance with this Agreement.

## ARTICLE 11 DISPUTE RESOLUTION PROCEDURE

11.1 This Agreement is intended to provide close cooperation between management and labor. Each of the Unions will assign a representative to the Covered Projects for the purpose of completing the construction of the Covered Projects economically, efficiently, continuously, and without interruptions, delays, or work stoppages.

11.2 The Contractors, Unions, and the employees, collectively and individually, realize the importance to all Parties to maintain continuous and uninterrupted performance of the work of the Covered Projects, and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

11.3 Any question or dispute by or between a Contractor, employee and/or a Union and arising out of and during the term of this Agreement, other than disputes arising under Article 4 (Work Stoppages and Lockouts), Article 5 (No Discrimination or Harassment) or Article 13

(Jurisdictional Disputes) shall be considered a grievance and subject to resolution under the following steps:

Step 1: Should a Union, employee or any Contractor have a dispute with another party or parties, and if after conferring within five (5) working days after the disputing party knew or should have known of the facts or occurrence giving rise to the dispute, a settlement is not reached within five (5) working days, the dispute shall be reduced to writing and processed to Step 2.

Step 2: In the event that the representatives are unable to resolve the dispute at the Step 1 meeting, the grieving party shall, within five (5) working days after the Step 1 meeting, notify the responding party and the Project Labor Coordinator of a request to discuss the grievance. The business manager of the Union (or his/her designee) shall meet with the respective jobsite representative of the Contractor and the Project Labor Coordinator within ten (10) working days (or such longer time as all of the parties may mutually agree) after receipt of the request to discuss the grievance. If the grievance is not resolved at the Step 2 meeting, the grievance may be submitted to final and binding arbitration as described in Step 3.

Step 3: In the event a dispute cannot be satisfactorily resolved within the time limits established above in Step 2, either party may submit the dispute to arbitration by written notice to the Project Labor Coordinator and other party within ten (10) working days (or such longer time as mutually agreed) of the date on which the parties met at Step 2. An arbitrator shall be selected by the Project Labor Coordinator in sequential order from the listing of permanent arbitrators specified in Section 4.5.3, above. The arbitrator's decision shall be final and binding upon the parties. The arbitrator shall not have the authority to alter, amend, add to, or delete from the provisions of this Agreement in any way. The failure of any party to attend said hearing shall not delay the hearing of evidence or the issuance of any decision by the arbitrator. Should any party seek confirmation of the award made by the arbitrator, the prevailing party shall be entitled to receive its reasonable attorney fees and costs.

11.4 Failure of the grieving party to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by written consent of the parties involved at the particular step where the extension is agreed upon. The arbitrator shall have the authority to make decisions only on issues presented and shall not have the authority to change, amend, add to or detract from any of the provisions of this Agreement.

11.5 The Project Labor Coordinator shall be notified of all actions at Step 2 or higher by the grieving party and shall, upon the Project Labor Coordinator's request, be permitted to participate in all grievance meetings.

11.6 The time limits specified in any step of this dispute resolution procedure may be extended by written mutual agreement of the parties initiated by the written request of one party to the other, at the appropriate step of the dispute procedure. However, failure to process a dispute

within the time limits provided above, without a request for an extension of time, shall be deemed a waiver of such dispute without prejudice, or without precedent to the processing and/or resolution of like or similar disputes.

11.7 In order to encourage the resolution of disputes at Steps 1 and 2 of this dispute resolution procedure, the Parties agree that any settlements made during such steps, shall not be precedent setting.

11.8 The fees and expenses incurred by the arbitrator, as well as those jointly utilized by the parties (i.e., conference room, court reporter, etc.) in arbitration, shall be divided equally by the parties to the arbitration, including the Union(s) and Contractor(s) involved, however in no circumstance will the Project Labor Coordinator or the County be assigned or assessed any such fees and expenses.

## ARTICLE 12 LABOR/MANAGEMENT COLLABORATION

The Parties will conduct periodic labor/management cooperation meetings, which will be chaired jointly by a designee of the County and a designee of the Council. The co-chairs shall determine the frequency and scheduling of the meetings with the assistance of the Project Labor Coordinator. The purpose of the meetings shall be to update the Parties about the progress and schedule of Covered Projects, promote harmonious and stable labor management relations, ensure effective and constructive communication between labor and management Parties, advance the proficiency of work in the industry, and to evaluate and ensure an adequate supply of skilled labor for all Covered Projects. The County shall convey information detailing the outcomes of the LTWHP goals and progress of Article 19 implementation. All Parties will be invited to attend the labor/management cooperation meetings. Substantive grievances or disputes shall not be reviewed or discussed by this Committee, but instead shall be processed pursuant to the provisions of the applicable dispute resolution procedures of this Agreement.

## ARTICLE 13 JURISDICTIONAL DISPUTES

13.1 The assignment of work will be solely the responsibility of the Contractor performing the work involved and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry ("the Plan") or any successor Plan.

13.2 All jurisdictional disputes on Covered Projects between or among the building and construction trades Unions and the Contractors party to this Agreement, shall be settled and adjusted according to the present Plan established by North America's Building Trades Unions (NABTU) or any other plan or method of procedure that may be adopted in the future by NABTU. Decisions rendered shall be final, binding, and conclusive on the Contractors and Unions party to this Agreement.

13.3 If a dispute arising under this Article involves the Southwest Mountain States Regional Council of Carpenters or any of its subordinate bodies, an arbitrator shall be chosen by the procedures specified in Article V, Section 5, of the Plan from a list composed of John Kagel, Robert Hirsch, and Thomas Pagan, and the Arbitrator's hearing on the dispute shall be held at the

offices of the Council within fourteen (14) days of the selection of the arbitrator. All other procedures shall be as specified in the Plan.

13.4 All Jurisdictional Disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Contractor's assignment shall be adhered to until the dispute is resolved. Individuals violating this section shall be subject to immediate discharge.

## ARTICLE 14 APPRENTICES

14.1 Importance of Training. The Parties recognize the need to maintain continuing support of the programs designed to develop adequate numbers of competent workers in the construction industry, the obligation to capitalize on the availability of the local workforce in the area served by the County, and the opportunities to provide continuing work during the construction of the Covered Projects. To these ends, the Parties will facilitate, encourage, and assist Local Residents and Targeted Workers to commence and progress in Apprenticeship Programs and/or other training programs in the construction industry leading to participation in Apprenticeship Programs. In accordance with Article 19, the County, the Project Labor Coordinator, and the Council, will work cooperatively to identify, or establish and maintain, effective programs and procedures for persons interested in entering the construction industry and which will help prepare them for entry into Apprenticeship Programs.

14.2 Use of Apprentices.

14.2.1 The Unions agree to cooperate with the Contractor in furnishing Apprentices as requested up to the maximum percentage allowed by each Apprenticeship Program. The County shall encourage such utilization, and, both as to Apprentices and the overall supply of Skilled Journeypersons, the Project Labor Coordinator and the Council will work to ensure appropriate and maximum utilization of Apprentices and the continuing availability of both Apprentices and Skilled Journeypersons.

14.2.2 All Apprentices shall work under the direct supervision of a Skilled Journeyperson from the trade in which the Apprentice is indentured. Should a question arise as to a Skilled Journeyperson's qualification under this subsection, the Contractor shall provide adequate proof evidencing the worker's qualification as a Skilled Journeyperson to the Project Labor Coordinator and the Council.

## ARTICLE 15 MANAGEMENT RIGHTS

15.1 Contractor and County Rights. The Contractors and the County have the sole and exclusive right and authority to oversee and manage construction operations on Project work without any limitations unless expressly limited or required by the other Articles of this Agreement or a MLA. In addition to the following and other rights of the contractors enumerated in this Agreement, the Contractors expressly reserve their management rights and all the rights conferred upon them by law. The Contractor's rights include, but are not limited to, the right to:

(a) Plan, direct, and control operations of all work;

(b) To be the sole judge of the qualifications, number and classification of employees required to perform work subject to this Agreement and thus to reject any applicant for employment and to hire, promote, transfer and layoff their own employees at their discretion, respectively, as deemed appropriate to satisfy work and/or skill requirements;

(c) Promulgate and require all employees to observe reasonable jobsite rules, including security and safety policies;

(d) Discharge, suspend or discipline their own employees for just cause;

(e) Utilize, in accordance with County approval, any work methods, procedures or techniques, and select, use and install any types or kinds of materials, apparatus or equipment, regardless of source of manufacture or construction; assign and schedule work at their discretion; and

(f) Assign overtime, determine when it will be worked and the number and identity of employees engaged in such work, subject to such provisions in the applicable MLA(s) requiring such assignments be equalized or otherwise made in a non-discriminatory manner.

15.2 Specific County Rights. In addition to the following and other rights of the County enumerated in this Agreement, the County expressly reserves its management rights and all the rights conferred on it by law. The County's rights include but are not limited to the right to:

(a) Inspect any construction site or facility to ensure that the contractor follows the applicable safety and other work requirements;

(b) Require Contractors to establish a different work week or shift schedule for particular employees as required to meet the operational needs of the Covered Project work at a particular location or in order to accommodate any ongoing business at the Covered Project site where operations may be continuing during periods of construction activity;

(c) Require Contractors to implement additional health or safety measures, as determined necessary by the County.

(d) At its sole option, terminate, delay and/or suspend any or all portions of the Covered Project work at any time; prohibit some or all work on certain days or during certain hours of the day to accommodate any ongoing operations of the County at the Covered Project site and/or to mitigate the effect of ongoing Covered Project work on businesses and residents in the neighborhood of the Covered Project site; and/or require such other operational or schedule changes it deems necessary, in its sole judgment, to effectively maintain its primary operational mission at the Covered Project site and remain a good neighbor to those in the area of its facilities. In order to permit the Contractors and Unions to make appropriate scheduling plans, the County will provide the Project Labor Coordinator, and the affected Contractors(s) and Union(s) with reasonable notice of any

changes it requires pursuant to this section; provided, however, that if notice is not provided in time to advise employees not to report for work, show-up pay shall be due pursuant to the provision of Section 9.6;

(e) Approve any work methods, procedures and techniques used by contractors whether or not these methods, procedures or techniques are part of industry practices or customs; and

(f) Investigate and process complaints, through its Project Labor Coordinator, in the matter set forth in Articles 4 and 11.

15.3 Use of Materials. There should be no limitations or restriction by Union upon a contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization, of equipment, machinery, packaging, precast, prefabricated, prefinished, or preassembled materials, tools or other labor-saving devices, subject to the application of the State Public Contracts and Labor Codes as required by law in reference to offsite construction. Generally, the onsite installation or application of such items shall be performed by the craft having jurisdiction over such work. The County and its Project Labor Coordinator shall advise all contractors of, and enforce as appropriate, the off-site application of the prevailing wage law as it affects Covered Project work.

## ARTICLE 16 SAFETY, PROTECTION OF PERSON AND PROPERTY

16.1 It shall be the responsibility of each Contractor to ensure safe working conditions and employee compliance with any safety rules contained herein or established by the County, the State and the prime Contractor. It is understood that the employees have an individual obligation to use diligent care to perform their work in a safe manner and to protect themselves and the property of the Contractor and the County.

16.2 Unions and Employees shall be bound by the safety, security and visitor rules established by the Contractor and the County. These rules will be published and posted in conspicuous places by the Contractor throughout the work site. An employee's failure to satisfy his obligations under this Article will subject him to discipline, including discharge.

16.3 The Parties acknowledge that the County and Contractor have a policy, which prohibits the use, sale, transfer, purchase and/or possession of a controlled substance, alcohol and/or firearms while on the County's premises.

16.4 The Parties to this Agreement adopt the attached Drug and Alcohol Testing Policy set forth in Attachment C, which shall be the sole policy and procedure utilized under this Agreement.

16.5 A Contractor may suspend all or a portion of the job to protect the life and safety of employees. In such cases, employees will be compensated only for the actual time worked; provided, however, that where the Contractor requests employees to remain at the site and be available for work, the employees will be compensated for stand-by time at their appropriate hourly rate of pay.

## ARTICLE 17 SAVINGS CLAUSE

17.1 The Parties agree that in the event any Article, provision, clause, sentence, or word of the Agreement is determined to be illegal or void as being in contravention of any applicable law, by a final court of competent jurisdiction, the remainder of the Agreement shall remain in full force and effect. The Parties further agree that if any Article, provision, clause, sentence or word of the Agreement is determined to be illegal or void, by a final court of competent jurisdiction, the Parties shall substitute, by mutual agreement, in its place and stead, an Article, provision, sentence or word which will meet the objections to its validity and which will be in accordance with the intent and purpose of the Article, provision, clause, sentence or word in question.

17.2 The Parties also agree that in the event that a decision of a court of competent jurisdiction materially alters the terms of the Agreement such that the intent of the Parties is defeated, then this entire Agreement shall be null and void.

17.3 The provisions of this Agreement shall not be applicable where prohibited by Presidential Executive Order, federal or state law, or where the application would be inconsistent with terms and conditions of a grant or a contract with the agency of the United States, State of California, or the instruction of an authorized representative of these agencies with respect to any grant or contract.

## ARTICLE 18 PRE-JOB CONFERENCE

18.1 Each Contractor is required to conduct a pre-job conference with the Unions no less than six (6) working days prior to commencing work on each Covered Project. The purpose of the conference will be to, among other things, convey craft workforce needs, the schedule of work for the Covered Project, the Covered Project's rules, and propose Union work assignments.

18.2 The Project Labor Coordinator may work with the prime Contractor and Council to facilitate the scheduling of all pre-job conferences, but ensuring each Contractor conducts a pre-job conference in accordance with this CWA is the responsibility of the prime Contractor.

18.3 The prime Contractor shall make the relevant plans and specifications available to the Unions prior to each pre-job conference to the extent the County has not declared the plans and specifications to be confidential for security or other reasons. If the County has declared the plans and specifications to be confidential, the County shall make them available to the Unions upon the Unions' execution of a non-disclosure agreement.

18.4 All Union work assignments shall be disclosed by each Contractor at the pre-job conference. Should there be covered work that was not previously assigned at a pre-job conference, or additional covered work be added to the scope of the Covered Project, the Contractor(s) performing such work will conduct a separate pre-job conference.

18.5 Any Union in disagreement with a proposed preliminary assignment shall notify the affected Contractor of its position in writing, with a copy sent to the Project Labor Coordinator, within five (5) working days after the pre-job conference occurred. Within five (5) working days after the period allowed for Union notices of disagreement with the Contractor's proposed

assignments, but prior to the commencement of any work, the Contractor shall make final assignments in writing with copies sent to the Project Labor Coordinator and Council.

18.6 A Contractor's failure to conduct a pre-job conference in accordance with this CWA is considered a breach of contract, and any affected Union may pursue a grievance under Article 11 of this CWA to seek a remedy for such a violation. Provided, however, if the Contractor has conducted a pre-job conference in accordance with this CWA, that Contractor is not required to participate in any additional pre-job conferences or mark-up meetings related to the original scope(s) of work assigned at the pre-job conference. Contractor shall use its best efforts to provide information reasonably necessary upon the request of one of the Unions.

18.7 The Project Labor Coordinator may attend and facilitate each pre-job conference. At each pre-job conference, the Project Labor Coordinator may address the programs, goals and outcomes related to Local Resident and Targeted Worker employment, as well as the progress of implementing Article 19, Work and Economic Opportunity, on the project.

## ARTICLE 19 WORK AND ECONOMIC OPPORTUNITY

19.1 The Parties recognize the proposed Covered Projects' economic opportunity and impact on County residents, businesses and the communities surrounding the proposed Covered Projects. The Parties are committed to working in partnership to create a skilled and trained local workforce that is reflective of the population of the communities surrounding the proposed Covered Projects and within the County. Towards that end, the Parties agree to establish and implement a framework for work and economic opportunity to maximize career opportunities for Local Residents and Targeted Workers, including those who have not previously qualified to be employed on construction projects, and to provide meaningful outreach, training and business opportunities for LSBE, DVBE, and SE Contractors to successfully work under this Agreement.

19.2 As coordinated by the Contractor and Unions, the Parties will work together with the County; SEs; non-profits; veteran assistance organizations; and other community groups, who work with Targeted Worker populations, to conduct outreach and recruit a sufficient number of Local Residents and Targeted Workers who are interested in beginning a construction career. Such Local Residents and Targeted Workers will be assessed by the Project Labor Coordinator or Jobs Coordinator to determine their career readiness level and coordinate potential entrance into a local MC3 pre-apprenticeship program or, if a veteran or otherwise qualified, potential direct entry into an Apprenticeship Program, or, if appropriate to their level of skill and training, join the Union as a Skilled Journeyperson. The recruitment and outreach level of effort, including the quantity of Local Residents and Targeted Workers recruited, will fluctuate based on the Projects' hiring needs and schedule.

19.3 The Council and the Unions will work with the Project Labor Coordinator and Jobs Coordinators to identify and support local outreach events and programs designed to recruit and develop adequate numbers of qualified workers in the construction industry, to arrange for tours of their joint apprenticeship committees and programs, and to provide contact information for Union representatives.

19.4 The Parties recognize the importance of providing direct assistance to Local Residents and Targeted Workers to help them overcome barriers to employment. Towards that end, if necessary, Local Residents and Targeted Workers will be referred by the Project Labor Coordinator or Jobs Coordinator to America's Job Centers of California (AJCC) or other community-based organizations and SE firms or agencies that provide supportive services. The Project Labor Coordinator, in coordination with the County, will monitor and report the outcomes of all referrals to employment support service providers. If the initiation and enrollment fees present a barrier to a potential Local Resident or Targeted Worker, then the Council and the Unions, along with the Project Labor Coordinator and the Jobs Coordinator, will assist in working with Department of Economic Opportunity, or any such successor agency, and other similar organizations to secure such funds.

19.5 In order to create career pathways for Local Residents and Targeted Workers who may need additional training and preparation for a construction career, the Parties will partner with local pre-apprenticeship programs that are authorized by the Council to teach the Multi-Craft Core Curriculum (MC3). The Parties recognize the need to continue to develop pre-apprenticeship training programs to meet the significant demand for local skilled craft labor at each Covered Project location. Towards that end, the Parties will collaborate to determine and develop the optimal MC3 pre-apprenticeship training plan for each Covered Project location.

19.6 After successful graduation from the MC3 pre-apprenticeship program, the Contractor will work together with the Council's Apprenticeship Readiness Fund, Project Labor Coordinator, and Unions to assist such graduates with preferential entry into an Apprenticeship Program and finding employment on a Covered Project. Both the Unions and Contractors recognize the importance of increasing the supply of local skilled craft labor by assisting Local Residents and Targeted Workers start their construction careers on Covered Projects.

19.7 For Veterans, Local Residents and other Targeted Workers who have verifiable past experience and do not require additional training or assistance, the Unions agree to give them credit for provable past experience in their relevant craft or trade, including experience gained working for Contractors not otherwise signatory to a MLA, in order to bring them directly into an Apprenticeship Programs at a higher level, or as a Skilled Journeyperson, if qualified. The Unions shall put on their rolls qualified bona fide Local Residents and Targeted Workers for work on Covered Projects.

19.8 The Project Labor Coordinator, with the assistance of the Council, the Unions and Contractors, will produce detailed monthly reports for the County measuring compliance with this Agreement, including but not limited to, the cumulative Local Resident and Targeted Worker hiring goals for each Covered Project and the economic impact on Local Residents and Targeted Workers. The reports may be produced, in part, by utilizing an online certified payroll reporting system if the County ultimately implements such a system.

19.9 The Project Labor Coordinator, with the assistance of the Council, the Unions, and Contractors, will produce detailed reports to the County on the progress of implementing the programs specified in this Article, including an evaluation of the successes and obstacles in the implementations of these provisions. This report will be produced at least annually, or more frequently at the sole discretion of the County.

19.10 The Council and the Unions will, in coordination with the Project Labor Coordinator and Jobs Coordinators, participate in orientations at least twice per year for LSBE, DVBE, and SE contractors regarding the CWA and the employee benefit trust funds.

19.11 The Council and Unions will support local events and programs designed to recruit, develop, educate and inform certified LSBE, DVBE, and SE contractors seeking access and readiness to contract for work on Covered Projects. In order to attract and promote participation of LSBE, DVBE, and SE Contractors, the Unions will work with the Project Labor Coordinator to identify Contractors who are certified or may be qualified to become certified as a LSBE, DVBE or SE for outreach related to contracting opportunities on Covered Projects.

19.12 Women in Trades Advisory Council

19.12.1 The County and Council have established and co-chair the Los Angeles County Women in Trades Advisory Council to provide a forum to engage in recommending, planning, development, and implementation of strategies to increase female recruitment, training, placement and retention.

19.12.2 The Council's Executive Secretary and County will each designate a co-chair of the Women in Trades Advisory Council and coordinate the participation of each Union and affiliated Apprenticeship Program with the assistance of the Project Labor Coordinator.

19.12.3 In order to increase the participation and retention of female craft workers, each Union shall use a good faith effort to establish a Tradeswomen Mentoring Program for their female apprentices and journeyman that provide support, mentoring, and fosters a neutral, unbiased and supportive environment where female craft workers may express their thoughts and career objectives. The Council shall report annually to the Project Labor Coordinator about the efforts to establish each Unions' Tradeswomen Mentoring Program.

19.12.4 Members of the Tradeswomen Mentoring Program are encouraged to engage with female pre-apprentices through the network of apprenticeship readiness programs and youth organizations to facilitate support and access to apprenticeship.

19.13 LSBE, DVBE, and SE Programs

19.13.1 The Parties recognize that the proposed Covered Projects are subject to the County's LSBE, DVBE, and SE Preference Programs.

19.13.2 In order to encourage participation of certified LSBE, DVBE, and SE businesses, the Parties agree that individual subcontracts awarded to certified LSBE, DVBE, and SE businesses on Covered Projects with a subcontract award value of $50,000 or less will be entirely exempt from this Agreement. Any subcontracts excluded from this Agreement pursuant to this Article shall not be subject to the terms of this Agreement, and the Unions and Council shall have no obligations to provide workers for or reporting of workers for work performed under any such excluded subcontracts.

19.13.3 No Union shall undertake any strike, work stoppage, or other action against a certified LSBE, DVBE or SE business performing work excluded pursuant to this Article, and the Parties expressly agree that any such work shall not be subject to trust fund contributions by application of this Agreement. This Agreement shall not limit the rights of Unions to seek to organize and to utilize legal and administrative remedies not precluded by this Agreement, according to applicable federal or state laws, to secure such rights.

## ARTICLE 20 STEWARDS

20.1 Each Union shall have the right to designate one working craft employee as steward for each Contractor employing such craft on the Covered Project. Such designated steward shall be a qualified workman assigned to a crew and shall perform the work of the craft. The steward shall not perform supervisory duties. Under no circumstances shall there be nonworking stewards. Stewards shall be permitted a reasonable amount of time during working hours to perform applicable Union duties related to the work being performed by the craft employees of his Contractor and not to the work being performed by other Contractors or their employees.

20.2 Authorized representatives of the Union(s) shall have access to the Covered Project, provided that such representatives fully comply with posted visitor, security, and safety rules, and provided that they do not unnecessarily interfere with the employees or cause them to neglect their work.

## ARTICLE 21 TERM

21.1 This Agreement shall become effective for a term of five (5) years on the date it becomes fully executed by the County, the Council, and each Union for which a signature line is included below. The Agreement applies to Covered Projects with a bid advertisement date or a request for proposals advertisement date during the effective term of the Agreement and shall continue in full force and effect until all the work within the scope of the Construction Contracts for the Covered Projects is completed and accepted by the County.

21.2 Construction of any phase, portion, section, or segment of work within the scope of a Construction Contract shall be deemed complete when such phase, portion, section or segment has been turned over to the County by the Contractor and the County has accepted such phase, portion, section, or segment. As areas and systems of the Covered Project are inspected and construction-tested and/or approved and accepted by the County or third parties with the approval of the County, the Agreement shall have no further force or effect on such items or areas, except when and if the Contractor is directed by the County to engage in repairs or modifications required by its contract(s) with the County.

21.3 Notice of each final acceptance received by the Contractor on a Covered Project will be available to the Project Labor Coordinator and the Council with the description of what portion, segment, etc. has been accepted. Final acceptance may be subject to a "punch" list, and in such case, the Agreement will continue to apply to each such item on the list until it is completed to the satisfaction of the County and notice of acceptance is given by the County or its representative to the Contractor. At the request of the Union, complete information describing any

"punch" list work involving otherwise turned-over and completed facilities which have been accepted by the County, will be available upon request from the Project Labor Coordinator.

## ARTICLE 22 RESPONSIBILITY FOR COSTS

22.1 The County and the Unions shall each be responsible for their own legal costs including all attorneys' fees and associated disbursements that might accrue with regard to any legal challenge over the adoption by the County of this Agreement and related to claims directly challenging the legality of this Agreement, or a particular section of language that has been adopted herein.

## ARTICLE 23 MISCELLANEOUS PROVISIONS

23.1 This Agreement shall be construed and interpreted both as to validity and to performance of the Parties in accordance with the laws of the State of California. Legal actions concerning any dispute, claim or matter arising out of or in relation to this Agreement shall be instituted in the Superior Court of the County of Los Angeles, State of California, or any other appropriate court in such county.

23.2 Any notice, demand, request, document, consent, approval, or communication required by or to be given to the County shall be sent to the office or individual designated by the County.

23.3 The terms of this Agreement shall be construed in accordance with the meaning of the language used and shall not be construed for or against any Party by reason of the authorship of this Agreement or any other rule of construction which might otherwise apply.

23.4 The persons executing this Agreement on behalf of the Parties hereto warrant that (i) such party is duly organized and existing, (ii) they are duly authorized to execute and deliver this Agreement on behalf of said party, (iii) by so executing this Agreement, such party is formally bound to the provisions of this Agreement, and (iv) the entering into this Agreement does not violate any provision of any other agreement to which said party is bound.

23.5 Any amendment or modification to this Agreement must be in writing and executed by the County and Council.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the day and year written below.

THE UNION OFFICIALS signing this Agreement warrant and represent that they are authorized to collectively bargain on behalf of the organizations whom they represent and the members of such organizations.

**COUNTY OF LOS ANGELES**

By _____ Date: 6/7/2023
Fesia A. Davenport
Chief Executive Officer

APPROVED AS TO FORM:

_____ Date: 05/22/2023
Michael Simon
~~Acting~~ Assistant County Counsel

**LOS ANGELES/ORANGE COUNTIES BUILDING AND CONSTRUCTION TRADES COUNCIL**

By: _____ Date: 5-18-2023
Chris Hannan
Executive Secretary

DocuSign Envelope ID: 2FDA59F7-353C-4E84-90F3-6A94B9F93C18

## Union Signatory Page

Asbestos Heat & Frost Insulators (Local 5)

Boilermakers (Local 92)

Bricklayers & Allied Craftworkers (Local 4)

Cement Masons (Local 500)

Cement Masons (Local 600)

Electricians (Local 11)

Elevator Constructors (Local 18)

Gunite Workers (Local 345)

Iron Workers (Reinforced – Local 416)

Iron Workers (Structural – Local 433)

Laborers (Local 300)

Laborers (Local 1184)

District Council of Laborers

Laborers (Local 1309)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Painters & Allied Trades DC 36

Pipe Trades (Local 250)

Pipe Trades (Local 345)

Pipe Trades (Plumbers Local 78)

Pipe Trades (Plumbers/Fitters Local 761)

Pipe Trades (Plumbers/Fitters Local 398)

Pipe Trades (Sprinkler Fitters Local 709)

Pipe Trades (Road Sprinkler Local 669)

Plasterers (Local 200)

Plaster Tenders (Local 1414)

Roofers & Waterproofers (Local 36)

Sheet Metal Workers (Local 105)

Southwest Mountain States Regional Council of Carpenters

Teamsters (Local 986)

**LOS ANGELES COUNTYWIDE CWA**
**ATTACHMENT A: LETTER OF ASSENT**

PLACE ON COMPANY LETTERHEAD

Ms. Soo Kim
Contracting and Business Relations Manager
Los Angeles County Public Works
900 S. Fremont Ave.
Alhambra, CA 91803

TRANSMIT ELECTRONICALLY TO: CWA@pw.lacounty.gov and upload to LCPTracker

COVERED PROJECT NAME: (Project Name)

Dear Ms. Kim:

This is to certify that the undersigned Contractor has read and understood the Countywide Community Workforce Agreement (CWA) entered into between the County of Los Angeles (County) and the Los Angeles/Orange Counties Building and Construction Trades Council (Council) and the signatory craft unions and district councils signing the CWA. The undersigned Contractor hereby agrees to comply with all of the terms and conditions of the aforementioned duly signed CWA.

The undersigned Contractor acknowledges that compliance with the provisions of Articles 7 and 19 relating to Local Residents, Targeted Workers, workforce referral and development and apprenticeship participation are of particular importance.

It is understood that the signing of this Letter of Assent shall be as binding on the undersigned Contractor as though the Contractor had signed the CWA and Contractor shall require all its subcontractors, of whatever tier, to become similarly bound for all work within the scope of this CWA.

(Name of Construction Company)

By: _____ _____
(Name and Title of Authorized Executive) Date

_____
(Contractor's State License No.)

This Letter of Assent shall become effective and binding upon the undersigned Contractor as of below date of execution and shall remain in full force and effect until the completion of the above stated project.

Sincerely,

## ATTACHMENT B: APPLICABLE UNION MASTER LABOR AGREEMENTS

1. Southern California Chapter, Western Insulation Contractors Association and Local No. 5, International Association of heat and Frost Insulators and Allied Workers Master Labor Agreement.

2. Western States Articles of Agreement Between the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers AFL-CIO and the Signatory Contractors.

3. The Executive Council of the Mason Contractors Exchange of Southern California, Inc. and Bricklayers and Allied Craftworkers Local #4.

4. Master Labor Agreement between Southern California General Contractors and Eleven Southern California Counties Cement Masons.

5. Southern California Master Labor Agreement between Southern California General Contractors and The Southern California District Council of Laborers.

   Tunnel Master Agreement between Associated General Contractors of California, Inc. and Southern California District Council of Laborers Affiliated with the Laborers' International Union of North America, AFL-CIO.

6. Inside Wireman's Agreement between Local Union 11 International Brotherhood of Electrical Workers and Los Angeles County Chapter National Electrical Contractors Association.

   Southern California 9th District Sound & Communications Agreement Addendum No. 1 to the 9th District Sound & Communications Agreement by and Between International Brotherhood of Electrical Workers and National Electrical Contractors Association.

   Intelligent Transportation Systems Agreement between Local Union 11 International Brotherhood of Electrical Workers and Los Angeles County Chapter National Electrical Workers and Los Angeles County Chapter National Electrical Contractors Association.

7. National Elevator Bargaining Association Agreement with Intentional Union of Elevator Constructors.

8. Gunite/Shotcrete Commercial Agreement by between Gunite and/or Shotcrete Contractors and The Southern California District Council of Laborers and its Affiliate Gunite Local #345.

9. District Council of Iron Workers of the State of California and vicinity and its Locals 416 and 433 and the Western Steel Council et al.

10. Master Labor Agreement between Southern California Contractors Association, Inc. and International Union of Operating Engineers Local Union No. 12.

11. Master Labor Agreement between Painters and Allied Trades District Council No. 36 and the Los Angeles Paint & Finishing Contractors Association et al..

    Southern California Drywall Finishers Joint Agreement between Painters and Allied Trades District Council No. 36 and the Western Wall & Ceiling Contractors Association

Master Labor Agreement between Painters and Allied Trades District Council No. 36 on behalf of Glaziers, Architectural Metal and Glass Workers Local Union No. 636 and Individual Contractors

Master Labor Agreement between Floor Covering Association of Southern California, Inc. and Painters and Allied Trades District Council No. 36 of the International Union of Painters and Allied Trades AFL-CIO-CLC on behalf of Resilient Floor and Decorative Covering Local Union No. 1247.

12. Master Agreement for the Plumbing and Piping Industry of Southern California between California Plumbing and Mechanical Contractors Association and Southern California Pipe Trades District Council No. 16 of the United Association.

13. Agreement between National Fire Sprinkler Association, Inc. and Sprinkler Fitters Local Union No. 709, Los Angeles, California, of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada

14. Labor Agreement between Western Walls & Ceiling Contractors Association, Inc. California Plastering Conference and Operative Plasterers' and Cement Masons' International Association, AFL-CIO Local Union 200.

15. Plaster Tenders' Master Agreement between Western Wall and Ceiling Contractors Association, Inc. and Southern California District Council of Laborers and its affiliated Plaster Tenders of Southern California Local Union 1414.

16. Master Labor Agreement by and between Local #36 and 220 of the United Union of Roofers, Waterproofers and Allied Workers and the Individual Roofing Contractors and Others.

17. Collective Bargaining Agreement between International Association of Sheet Metal, Air, Rail and Transportation Workers Local Union No. 105 & SMACNA Los Angeles & Orange Empire SMACNA.

18. Southern California Master Labor Agreement between Southern California General Contractors and Teamsters Joint Council #42 and Teamsters Local Union #87.

19. Southern California Master Labor Agreement Between United General Contractors, Inc. and the Southern Regional Council of Carpenters and Local Unions in the Twelve Southern California Counties and Nevada affiliated with the United Brotherhood of Carpenters and Joiners of America

## ATTACHMENT C - DRUG AND ALCOHOL TESTING POLICY

The Parties recognize the problems that drug and alcohol abuse have created in the construction industry and the need to develop drug and alcohol abuse prevention programs. Accordingly, the Parties agree that in order to enhance the safety of the workplace and to maintain a drug and alcohol-free work environment, individual Contractors shall require applicants or employees to undergo drug and alcohol testing in accordance with this CWA and this policy, Attachment C – Drug and Alcohol Testing Policy, hereafter "Policy."

1. It is understood that the use, possession, transfer, or sale of illegal drugs, narcotics, or other unlawful substances, as well as being under the influence of alcohol and the possession of or consuming alcohol is absolutely prohibited while employees are on the Contractor's job premises or while working on any jobsite in connection with work performed under the CWA.

2. No Contractor may implement a drug and alcohol testing program that does not conform in all respects to the provisions of this Policy.

3. No Contractor may implement drug and alcohol testing at any jobsite unless written notice is given to the Union setting forth the location of the jobsite, a description of the project under construction, and the name and telephone number of the prime Contractor's project manager. Said notice shall be provided at the pre-job conferences for each Covered Project. Failure to give such notice shall make any drug and alcohol testing engaged in by the Contractor a violation of the CWA and subject to the Article 11 grievance procedure.

4. A Contractor who elects to implement drug and alcohol testing pursuant to this Policy shall require all craft employees on the Covered Project to be tested. With respect to individuals who become employed on the Covered Project subsequent to the proper implementation of a valid drug and alcohol testing program, such test shall be administered upon the commencement of employment on the project, whether by referral from a Union dispatch office, transfer from another project, or another method. Individuals who were employed on the project prior to proper implementation of a valid drug and alcohol testing program may only be subjected to testing for the reasons set forth in paragraphs 5(g)(l) through 5(g)(3) and paragraphs 6(a) through 6(e) of this Policy. Refusal to undergo such testing shall be considered sufficient grounds to deny employment on the project.

5. The following procedure shall apply to all drug and alcohol testing:

    a. The Contractor may request urine samples only. The applicant or employee shall not be observed when the urine specimen is given. An applicant or employee, at his or her sole option, shall, upon request, receive a blood test in lieu of a urine test. No employee of the Contractor shall draw blood from a bargaining unit employee, touch or handle urine specimens, or in any way become involved in the chain of custody of urine or blood specimens. A Union business representative, subject to the approval of the individual applicant or employee, shall be permitted to accompany the applicant or

employee to the collection facility to observe the collection, bottling, and sealing of the specimen.

b. A Contractor may request an applicant or employee promptly, within four (4) hours of the Contractor's request, perform an alcohol breathalyzer test at a certified laboratory only, and cutoff levels shall be those mandated by applicable state or federal law.

c. The testing shall be done by a laboratory approved by the Substance Abuse & Mental Health Services Administration (SAMHSA), which is chosen by the Contractor and the Union.

d. An initial test shall be performed using the Enzyme Multiplied Immunoassay Technique (EMIT). In the event a question or positive result arises from the initial test, a confirmation test must be utilized before action can be taken against the applicant or employee. The confirmation test will be by Gas Chromatography/Mass Spectrometry (GC/MS). Cutoff levels for both the initial test and confirmation test will be those established by SAMHSA and this Policy. Should these SAMHSA levels be changed during the course of the CWA or new testing procedures are approved, then these new regulations will be deemed as part of this existing CWA. Confirmed positive samples will be retained by the testing laboratory in secured long-term frozen storage for a minimum of one (1) year. Handling and transportation of each sample must be documented through strict chain-of-custody procedures.

e. In the event of a confirmed positive test result, the applicant or employee may request, within forty-eight (48) hours, a sample of his/her specimen from the testing laboratory for purposes of a second test to be performed at a second laboratory, designated by the Union and approved by SAMHSA. The retest must be performed within ten (10) days of the request. Chain of custody for this sample shall be maintained by the Contractor between the original testing laboratory and the Union's designated laboratory. Retesting shall be performed at the applicant's or employee's expense. In the event of conflicting test results, the Contractor may require a third test, at the Contractor's expense.

f. If, as a result of the above testing procedure, it is determined that an applicant or employee has tested positive, this shall be considered sufficient grounds to deny the applicant or employee his/her employment on the project.

g. No individual who tests negative for drugs and alcohol pursuant to the above procedure and becomes employed on the project shall again be subjected to drug and alcohol testing with the following exceptions:

    1) Employees who are involved in industrial accidents resulting in damage to plant, property, or equipment or injury to him/her or others may be tested for drugs or alcohol pursuant to the procedures stated hereinabove.

    2) The Contractor may test employees following thirty (30) days' advance written notice to the employee(s) to be tested and to the applicable Union. Notice to the applicable Union shall be sent by certified mail to the affected Union with a copy to the Project Labor Coordinator. Such testing shall be pursuant to the procedures stated hereinabove.

3) The Contractor may test an employee where the Contractor has reasonable cause to believe that the employee is impaired from performing his/her job. Reasonable cause shall be defined as being aberrant or unusual behavior, the type of which is a recognized and accepted symptom of impairment (e.g., slurred speech, unusual lack of muscular coordination). Such behavior must be actually observed by at least two (2) persons, one (1) of whom shall be a supervisor who has been trained to recognize the symptoms of drug and alcohol abuse or impairment and the other of whom shall be the Job Steward. If the Job Steward is unavailable or there is no Job Steward on the Covered Project, the other person shall be a member of the applicable Union's bargaining unit. Testing shall be pursuant to the procedures stated hereinabove. Employees who are tested pursuant to the exceptions set forth in this paragraph and who test positive will be removed from the Contractor's payroll.

h. Applicants or employees who do not test positive shall be paid for all time lost while undergoing drug and alcohol testing. Payment shall be at the applicable wage and benefit rates set forth in the Current Prevailing Wage Determination. Applicants who have been dispatched from the Union and who are not put to work pending the results of a test will be paid waiting time until such time as they are put to work. It is understood that an applicant must pass the test as a condition of employment. Applicants who are put to work pending the results of a test will be considered probationary employees.

6. The Contractors will be allowed to conduct periodic jobsite drug and alcohol testing on the Project under the following conditions:

   a. The entire jobsite must be tested, including any employee or subcontractor's employee who worked on that project three (3) working days before or after the date of the test;

   b. Jobsite testing cannot commence sooner than fifteen (15) days after start of the work on the project;

   c. Prior to start of periodic testing, a Union business representative will be allowed to conduct an educational period on company time to explain periodic jobsite testing program to affected employees;

   d. Testing shall be conducted by an SAMHSA-certified laboratory, pursuant to the provisions set forth in paragraph 5 hereinabove.

   e. Only two (2) periodic tests may be performed in a twelve (12)-month period.

7. It is understood that the unsafe use of prescribed medication, or where the use of prescribed medication impairs the employee's ability to perform work, is a basis for the Contractor to remove the employee from the jobsite.

8. Any grievance or dispute that may arise out of the application of this Policy shall be subject to the grievance and arbitration procedures set forth in the CWA.

9. The establishment or operation of this Policy shall not curtail any right of any employee found in any law, rule, or regulation. Should any part of this Policy be found unlawful by a court of competent jurisdiction or a public agency having jurisdiction over the Parties, the remaining portions of the CWA shall be unaffected, and the Parties shall enter negotiations to replace the affected provision.

10. Present employees, if tested positive, shall have the prerogative for rehabilitation program at the employee's expense. When such program has been successfully completed, the Contractor shall not discriminate in any way against the employee. If work for which the employee is qualified exists, he/she may be reinstated.

11. The Contractor agrees that results of urine and blood tests performed hereunder will be considered medical records held confidential to the extent permitted or required by law. Such records shall not be released to any persons or entities other than designated Contractor representatives and the applicable Union. Such release to the applicable Union shall only be allowed upon the signing of a written release by the employee, and the information contained therein shall not be used to discourage the employment of the individual applicant or employee on any subsequent occasion.

12. Employees who seek voluntary assistance for substance abuse may not be disciplined for seeking such assistance. Requests from employees for such assistance shall remain confidential and shall not be revealed to other employees or management personnel without the employee's consent. Employees enrolled in substance abuse programs will be subject to all Contractor rules, regulations, and job performance standards with the understanding that an employee enrolled in such a program is receiving treatment for an illness.

13. The Contractor shall indemnify and hold the Union harmless against any and all claims, demands, suits, or liabilities that may arise out of the application of this Policy.

14. This Policy shall constitute the only Policy in effect between the Parties and Contractors concerning drug and alcohol abuse, prevention, and testing. Any modifications thereto must be accomplished pursuant to collective bargaining negotiations between the Parties.

## SPECIMEN REPORTING CRITERIA

| Initial Test Analyte | Initial Test Cutoff [1] | Confirmatory Test Analyte | Confirmatory Test Cutoff Concentration |
|---|---|---|---|
| Marijuana metabolites (THCA)[2] | 50 ng/ml [3] | THCA | 15 ng/ml |
| Cocaine metabolite (Benzoylecgonine) | 150 ng/ml 3 | Benzoylecgonine | 100 ng/ml |
| Codeine/ Morphine | 2000 ng/ml | Codeine<br>Morphine | 2000 ng/ml<br>2000 ng/ml |
| Hydrocodone/ Hydromorphone | 300 ng/ml | Hydrocodone<br>Hydromorphone | 100 ng/ml<br>100 ng/ml |
| Alcohol | 0.02% | Ethanol | 0.02% |
| Oxycodone/ Oxymorphone | 100 ng/ml | Oxycodone<br>Oxymorphone | 100 ng/ml<br>100 ng/ml |
| 6-Acetylmorphine | 10 ng/ml | 6-Acetylmorphine | 10 ng/ml |
| Phencyclidine | 25 ng/ml | Phencyclidine | 25 ng/ml |
| Amphetamine/ Methamphetamine | 500 ng/ml | Amphetamine<br>Methamphetamine | 250 ng/ml<br>250 ng/ml |
| MDMA[4]/MDA[5] | 500 ng/ml | MDMA<br>MDA | 250 ng/ml<br>250 ng/ml |
| Initial Test Analyte | Initial Test Cutoff | Confirmatory Test Analyte | Confirmatory Test Cutoff Concentration |
| Barbiturates | 300 ng/ml | Barbiturates | 200 ng/ml |
| Benzodiazepines | 300 ng/ml | Benzodiazepines | 300 ng/ml |
| Methadone[6] | 300 ng/ml | Methadone | 100 ng/ml |
| Methaqualone | 300 ng/ml | Methaqualone | 300 ng/ml |
| Propoxyphene | 300 ng/ml | Propoxyphene | 100 ng/ml |

[1] For grouped analytes (i.e., two or more analytes that are in the same drug class and have the same initial test cutoff):

**Immunoassay:** The test must be calibrated with one analyte from the group identified as the target analyte. The cross-reactivity of the immunoassay to the other analyte(s) within the group must be 80 percent or greater; if not, separate immunoassays must be used for the analytes within the group.

**Alternate technology:** Either one analyte or all analytes from the group must be used for calibration, depending on the technology. At least one analyte within the group must have a concentration equal to or greater than the initial test cutoff or, alternatively, the sum of the analytes present (i.e., equal to or greater than the laboratory's validated limit of quantification) must be equal to or greater than the initial test cutoff.

[2] An immunoassay must be calibrated with the target analyte, 9-tetrahydrocannabinoJ-9- carboxylic acid (THCA).

[3] **Alternate technology (THCA and benzoylecgonine):** The confirmatory test cutoff must be used for an alternate technology initial test that is specific for the target analyte (i.e., 15 ng/ml for THCA, 100 ng/ ml for benzoylecgonine).

[4] Methylenedioxymethamphetamine (MDMA)

[5] Methylenedioxyamphetamine (MDA)

[6] Employees with a prescription for methadone who are using the medication as prescribed, and are not impaired and can safely perform their work, will not be considered to have violated this Policy.

**MEMORANDUM OF UNDERSTANDING REGARDING**

**"QUICK" DRUG SCREENING TESTS PURSUANT TO**

**ATTACHMENT C – DRUG AND ALCOHOL TESTING POLICY**

It is hereby agreed between the Parties hereto that a Contractor who has otherwise properly implemented drug and alcohol testing, as set forth in the Policy, shall have the right to offer an applicant or employee a "quick" drug screening test. This "quick" screen test shall consist either of the "ICUP" urine screen or similar test or an oral screen test. The applicant or employee shall have the absolute right to select either of the two "quick" screen tests, or to reject both and request a full drug test.

An applicant or employee who selects one of the "quick" screen tests, and who passes the test, shall be put to work immediately. An applicant or employee who fails the "quick" screen test, or who rejects the "quick" screen tests, shall be tested pursuant to the procedures set forth in the Policy. The sample used for the "quick" screen test shall be discarded immediately upon conclusion of the test. An applicant or employee shall not be deprived of any rights granted to them by the Policy as a result of any occurrence related to the "quick" screen test.

SACHI A. HAMAI
Chief Executive Officer

# County of Los Angeles
# CHIEF EXECUTIVE OFFICE

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June 11, 2019

**ADOPTED**
BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES
20 June 11, 2019
CELIA ZAVALA
EXECUTIVE OFFICER

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, California 90012

Dear Supervisors:

**APPROVAL OF UPDATED BOARD POLICY**
**COUNTYWIDE LOCAL AND TARGETED WORKER HIRING POLICY**
**(ALL DISTRICTS)**
**(3 VOTES)**

## SUBJECT

The Chief Executive Office recommends approval of the updated Board Policy for Countywide Local and Targeted Worker Hiring.

## IT IS RECOMMENDED THAT THE BOARD:

Approve the updated Countywide Local and Targeted Worker Hiring Policy.

## PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

The recommended action will update the Countywide Local and Targeted Worker Hiring Policy (Policy) incorporating requirements that reflect lessons learned, best practices and recently adopted Board motion. In response to the September 6, 2016, the Board adopted a motion by Supervisors Ridley-Thomas and Solis, which established a Countywide Policy and directed the Chief Executive Officer to adopt a consolidated Policy consistent with the Chief Executive Office Report to the Board dated August 1, 2016. The Policy has been updated in consultation with the Directors of Public Works, Internal Services, Parks and Recreation, Workforce Development, Aging and Community Services, Consumer and Business Affairs, and the Executive Director of the Los Angeles County Development Authority (formerly known as Community Development Commission/Housing Authority of the County of Los Angeles).

**CWA ATTACHMENT D**

**FISCAL IMPACT/FINANCING**

There will be no fiscal impact to the County resulting from the approval of the proposed Board Policy.

**FACTS AND PROVISIONS/LEGAL REQUIREMENTS**

NA

**IMPACT ON CURRENT SERVICES (OR PROJECTS)**

The proposed updated Policy does not impact current services or projects.

**CONCLUSION**

Upon approval of the recommended updated Policy, please return one adopted copy to the Chief Executive Office, Capital Programs Division.

Respectfully submitted,

Sachi A. Hamai

SACHI A. HAMAI
Chief Executive Officer

SAH:JJ:DPH
BMB:AMA:KAV:kb

Enclosures

c: Executive Office, Board of Supervisors
County Counsel
Auditor-Controller
Audit Committee
Economic Development Policy Committee
Internal Services
Los Angeles County Development Authority
Parks and Recreation
Public Works

Los Angeles County
# BOARD OF SUPERVISORS POLICY MANUAL

| Policy #: | Title: | Effective Date: |
|---|---|---|
| 0.000 | COUNTYWIDE LOCAL AND TARGETED WORKER HIRING | |

## PURPOSE

Establishes the Countywide Local and Targeted Worker Hiring Policy for all County-sponsored construction and development projects, including local hiring for Targeted Workers, Veterans, Job Order Contracts, and Affordable Housing and Mixed-Use Affordable Housing projects.

## REFERENCE

October 27, 2015 Board Order 21

February 9, 2016 Board Order 47-A

August 1, 2016 Chief Executive Office memo to the County Board of Supervisors, *"Development of a Countywide Local Worker Hire Policy Board Motion of October 27, 2015, Agenda Item No. 21 and Board Motion of February 9, 2016, Agenda item No. 47-A"*

September 6, 2016 Board Order 14

March 21, 2017 Board Order 2

## POLICY

On September 6, 2016, the Board of Supervisors approved the Countywide Local and Targeted Worker Hiring Policy [LTWHP or Policy]. This Policy was approved to provide Los Angeles County's investment in public works, County-financed affordable housing projects and developer-financed economic development projects on County property as a catalyst for local job creation, construction careers training, and revenue generation for the County. Additionally, the Policy establishes a pathway for the County to enhance employment opportunities particularly for qualified Local and Targeted Workers who face multiple barriers to employment, such as homelessness, former foster youth, and formerly incarcerated individuals.

The Policy requires that all County departments, commissions and agencies administering project development agreements, including but not limited to; ground leases, loan agreements, grant agreements, design-build contracts, and contracts for County capital and construction projects that require Board approval to comply with the Policy as set by the County Board of Supervisors.



**CWA ATTACHMENT D**

This Policy is also a component of the Community Benefits for County Economic Development Projects Policy which establishes criteria and procedures for economic development projects in the Los Angeles County in order to generate economic benefits for the businesses, community, and residential, commercial or industrial area surrounding each project.

All prime Contractors providing services under the above-mentioned project agreements and/or contracts must comply with the LTWHP requirements and hiring goals established by the County, as outlined below. Additionally, depending on the total project budget as determined by the County, one of the following hiring goals of the LTWHP requirements shall apply:

- Mandatory Hiring Goals
- Best Efforts Hiring Goals
- No LTWHP Hiring Goals

**POLICY REQUIREMENT FOR LOCAL RESIDENCY PREFERENCE AREA FOR TIER 1 AND 2**

A **Tier 1 Qualified Local Resident** is defined as a County resident whose primary residency is: (1) within five (5) miles of the proposed project site; and (2) is within a qualifying Zip Code. If a qualifying Zip Code is partially located within the 5-mile radius, then the entire Zip Code is considered as Tier I Zip Code, and workers living in that entire Zip Code area may qualify as Tier I hire.

A **Tier 2 Qualified Local Resident** is defined as a County resident whose primary residency is: (1) within a qualifying Zip code; and (2) that qualifying Zip Code is beyond five (5) miles of the proposed project site.

A **qualifying Zip Code** is defined as a Zip Code within the County of Los Angeles, where either: (1) the average percentage of households living below 200 percent of the Federal Poverty Level (FPL) for that individual's primary residency's Zip Code is greater than the County average for such households; or (2) the Zip Code is one of 11 additional Zip Codes determined by the Board on September 6, 2011 to be a Zip Code where at least 30 percent of the population is living in poverty, and with an unemployment rate of at least 150 percent of the national average.

**POLICY REQUIREMENT FOR TARGETED WORKERS ELIGIBILITY**

A **Targeted Worker** is an individual who is both a County resident and who faces one or more of the following barriers to employment:

1. Has a documented annual income at or below 100 percent of the Federal Poverty Level;
2. Has no high school diploma or GED;
3. Has a history of involvement with the criminal justice system;
4. Is experiencing protracted unemployment (receiving unemployment benefits for at least 6 months);
5. Is a current recipient of government cash or food assistance benefits;
6. Is homeless or has been homeless within the last year;
7. Is a custodial single parent;
8. Is a former foster youth;
9. Is a veteran, or is the eligible spouse of a veteran of the United States armed forces, under Section 2(a) of the Jobs for Veterans Act (38 U.S.C.4215[a]);
10. Is an eligible migrant and seasonal farmworker;

11. Is currently an English language learner;
12. Is an older Individual (55+);
13. Is disabled; or
14. Is an individual with a low level of literacy.

**POLICY REQUIREMENT HIRING GOALS**

Project Budget Greater than $2.5 Million (Mandatory Hiring Goals)

For projects with a total project budget greater than $2.5 million, with the exception of affordable housing projects, there shall be a ***mandatory*** hiring goal of at least 30 percent of California construction labor hours performed by either Tier 1 or Tier 2 Qualified Local Residents on each project.

California construction labor hours is defined as all craft worker hours performed on the project by California residents, excluding the hours performed by off-site material fabricators, designers, project office staff, or vendors.

For projects with a total project budget greater than $2.5 million, with the exception of affordable housing projects, there shall be a ***mandatory*** hiring goal of at least 10 percent of California construction labor hours on the project performed by those classified as a Targeted Worker. Hours worked by a Targeted Worker who is also a Tier 1 or Tier 2 Qualified Local Resident may be applied towards the 30 percent goal;

For projects with a total project budget greater than $2.5 million, with the exception of affordable housing projects, there shall be a ***mandatory*** requirement to use a Jobs Coordinator, as that term is defined in the Implementation Policy Guidelines issued by the CEO, to facilitate implementation of the targeted hiring requirement of this Policy. The Jobs Coordinator shall work closely with Workforce Development, Aging and Community Services, local agencies such as America's Job Centers of California, Social Enterprises, and local community-based organizations to outreach, recruit and create a pipeline to employ residents from the community in which the project is located; and

The Contractor shall ensure the ***mandatory*** hiring requirements provided for Local and Targeted Workers are met in accordance with this Policy.

Project Budget of $500,000 to $2.5 million (Best Efforts Hiring Goals)

For projects with a total project budget of $500,000 to $2.5 million, with the exception of affordable housing projects, there shall be a ***best effort*** hiring goal of at least 30 percent of California construction labor hours worked on each project performed by either Tier 1 or Tier 2 qualified local residents on each project. There is no Targeted Worker hiring requirement;

For affordable housing projects and mixed-use affordable housing projects that include County-funded facilities receiving funds administered by Community Development Commission (CDC), and Housing Authority of County of Los Angeles (HACOLA) projects with a project budget greater than $2.5 million, there shall be a ***best effort*** hiring goal of at least 30 percent qualified local residents and 10 percent Targeted Workers of California construction labor hours performed; and

The Contractor shall ensure posting a wide array of its construction job advertisements and/or seeking the assistance of a community service provider organization if necessary to ensure the ***best efforts*** hiring requirement provided for Local Workers is met in accordance with this Policy.

All Projects Hiring Goals

For all projects, with the exception of affordable housing projects, a minimum ratio of one apprentice hour for every five journeyman hours shall be enforced, per State Labor code requirement, and contractors will strive to obtain half of all apprentice hours on the project be performed by Local and Targeted Workers. Hours worked by an apprentice who is also a Targeted Worker or a local resident may be applied towards the 30 percent local resident and/or the 10 percent Targeted Worker hire goal.

Policy Exemptions

Exceptions for projects in jurisdictions enforcing their own local hiring policy, and for projects with federal or State funding prohibitions on geographic preferences will be determined on a case-by-case basis by Chief Executive Office (CEO), in consultation with the County Board of Supervisors Offices and County Counsel, and the exemption shall be stated in the corresponding Board letter.

Affordable housing projects financed with federal funds subject to 24 CFR Part 135 will follow local hiring and training guidelines promulgated through Section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. 1701u) (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by certain Housing and Urban Development (HUD) financial assistance can be directed to low- and very low-income persons, particularly those who are recipients of government assistance for housing, and to business concerns which provide economic opportunities to low- and very low-income persons.

Contractors working with the Housing Authority of the County of Los Angeles on public housing modernization construction projects that exceed $2.5 million and are funded with non-federal funding will partner with Workforce Development, Aging and Community Services and other local agencies, such as America's Job Centers of California, Social Enterprises, community-based organizations, etc. to outreach, recruit and train public housing residents for employment opportunities.

**POLICY IMPLEMENTATION**

Details of the implementation of this Policy shall be provided in the latest version of the Implementation Policy Guidelines issued by the CEO.

Applicable referenced Policy language shall be included in all Board-awarded County construction and development project documents. In addition:

- All requests for Solicitation/Proposal/Invitations for Bid (RFP/IFB), specifications must require all contractors submitting bids or proposals to agree to the terms of the County of Los Angeles (County) LTWHP.

- All construction project general contracts must include a provision obligating the contractor and its subcontractors to comply with the terms of the County's LTWHP through execution of an agreement.

- The construction contract must include provisions establishing enforcement and compliance of the LTWHP.

Reporting Requirements

The contractor, on behalf of itself and its subcontractors, shall submit Local and Targeted Worker Hiring data to the County Project Manager or designated County representative.

Monthly Mandatory Compliance Withholding

The Contractor's compliance with the approved the Local and Targeted Workforce and Hire Status Reports will be evaluated monthly.

To enforce compliance on contracts containing ***mandatory*** hiring goals, an amount will be withheld from the monthly progress payment to the contractor in proportion to the deficit percentage of the mandated Local and Targeted Hiring Goal percentage and the actual percentage obtained. The maximum that may be withheld during the duration of the project is one percent of the total construction contract amount, but not to exceed $500,000, comprised of 0.75 percent for Local Worker goal compliance, and 0.25 percent for Targeted Worker goal compliance. This amount is called the Monthly Mandatory Compliance Withholding (MMCW) amount. The percentage of the MMCW that will be withheld for a given month will be the same as the percentage of the deficit in achieving the LTWHP targets for that month.

The maximum MMCW amount is determined as follows:

Construction Contract Value X .75% ÷ Number of months in baseline construction schedule = Monthly Mandatory Compliance Withholding (MMCW) for Local Workers

Construction Contract Value X .25% ÷ Number of months in baseline construction schedule = Monthly Mandatory Compliance Withholding (MMCW) for Targeted Workers

If the Targeted Worker Hiring mandatory requirements of the Policy have not been satisfied as required for a project, the contractor nonetheless may be deemed to be in compliance if the contractor demonstrates both (a) that the Contractor and each of its subcontractors have complied with all other requirements of the Policy, and (b) that the contractor and each of its subcontractors have satisfactorily demonstrated the following:

- Documented contact with the Department of Workforce Development, Aging and Community Services, America Job Centers or with an agency that supports and provides employment and training services for Targeted Workers in construction employment, and in which instance the agency did not refer a qualified Targeted Worker to the contractor or subcontractor within 48 hours of the job request for fair consideration of the Targeted Worker.

County Reporting:

County departments, commissions, and agencies shall provide quarterly reports to the CEO on compliance with the LTWHP for their construction projects during the quarter. CEO shall provide consolidated quarterly reports to the Board and the Economic Development Policy Committee on the compliance of data measures of the Local and Targeted and Apprentice Worker Hire Policy requirements.

County departments, commissions, and agencies administering construction projects under this Policy will be required to monitor and provide enforcement of the Policy. It should be noted the contractor is ultimately responsible for their and their subcontractors compliance with the County's LTWHP requirements.

Referral Process for LTWHP

The following resources may be used to connect contractors to workers meeting the definition of a Local Worker or a Target Worker, should the contractor require assistance. Additional Community Service Providers may be used by contractors and subcontractors to identify local residents and Targeted Workers.

- Los Angeles County Workforce Development, Aging, and Community Services: http://wdacs.lacounty.gov/
- LA Jobs: https://www.jobsla.org/vosnet/Default.aspx
- Cal Jobs: http://www.caljobs.ca.gov/vosnet/Default.aspx
- Helmets to Hardhats: https://www.helmetstohardhats.org
- America's Job Center of California: http://www.americasjobcenter.ca.gov

**RESPONSIBLE DEPARTMENTS**

Chief Executive Office
County Counsel

**DATE ISSUED/SUNSET DATE**

**Issue Date: XX,XX, 2019** **Sunset Date: XX,XX, 20XX**

# REPORT OF
# HAZARDOUS BUILDING MATERIALS SURVEY
# HUNTINGTON PARK LIBRARY
# RENOVATION PROJECT
# 6518 MILES AVENUE
# HUNTINGTON PARK, CALIFORNIA
# PCA: P9700260
# PROJECT ID: 00002340
# PW CONTRACT: 15545
# KLEINFELDER PROJECT NO. 20235545.009A

**MAY 2, 2024**

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A Report Prepared for:

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**Capital Projects Management**
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**REPORT OF HAZARDOUS BUILDING MATERIALS SURVEY**
**HUNTINGTON PARK LIBRARY RENOVATION PROJECT**
**6518 MILES AVENUE**
**HUNTINGTON PARK, CALIFORNIA**
**PCA: P9700260**
**PROJECT ID: 00002340**
**PW CONTRACT: 15545**
**KLEINFELDER PROJECT NO. 20235545.009A**

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May 2, 2024
Kleinfelder Project No. 20235545.009A


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2 Summary of Lead-Containing Materials XRF Survey Results
3 Summary of Other Hazardous Building Materials Survey Results

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A Laboratory Analytical Report, Chain-of-Custody Documentation, and XRF Field Data Sheets
B Inspector Certifications
C CDPH Form 8552 – Lead Hazard Evaluation Report




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# 1 EXECUTIVE SUMMARY

This report presents results of the Hazardous Building Materials Survey (HBMS) performed by Kleinfelder on April 8 and 15, 2024 at the Huntington Park Library (Site), located at 6518 Miles Avenue in Huntington Park, California. The HBMS was performed at the Site to evaluate the presence, location, and quantity of accessible suspect hazardous building materials that may represent a potential worker safety hazard if disturbed, and/or may require special handling and/or disposal as hazardous waste as part of the upcoming Site renovation project. Suspect hazardous building materials included asbestos-containing materials (ACMs), lead-containing materials (LCMs), and building equipment that may contain other hazardous materials such as polychlorinated biphenyls (PCBs), mercury or mercury vapor, and chlorofluorocarbon (CFC)-containing refrigerants.

The following presents a summary of the HBMS findings. The findings are based on field observations/instrument readings during the HBMS and Kleinfelder's review of laboratory analytical results of samples collected during the HBMS. Detailed discussions of HBMS survey methods and results are presented in Sections 3 through 5 of this report.

Asbestos-Containing Materials

- Dark tan 12-inch vinyl floor tile and associated black mastic located in the Main Communications Room (MCR) on the 3rd floor of the Site.
- Brown mastic associated with 4-inch brown rubber base cove. This material is located in the MCR on the 3rd floor and the Staff Lounge on the 1st floor.

Lead-Containing Materials

- Glaze applied to the white porcelain mop sink in the Janitor's Closet on each floor of the Site.
- White paint applied to metal columns in the Library on the 1st Floor.
- White paint applied to the metal stair railing in Stairwell #2.

Other Hazardous Building Materials

- Fluorescent light tubes that may contain mercury or mercury vapor.
- Fluorescent light fixture ballasts that may contain PCBs.


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- Batteries in exit signs and emergency light fixtures that may contain battery acid and/or heavy metals.
- Drinking fountain that contains hydrofluorocarbon (HFC)-containing refrigerant.


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# 2 INTRODUCTION AND BUILDING DESCRIPTIONS

## 2.1 INTRODUCTION

This report presents results of the HBMS performed by Kleinfelder on April 8 and 15, 2024 at the Huntington Park Library (Site) located at 6518 Miles Avenue in Huntington Park, California. The HBMS was performed at the Site to evaluate the presence, location, and quantity of accessible suspect hazardous building materials that may represent a potential worker safety hazard if disturbed, and/or may require special handling and/or disposal as hazardous waste as part of the upcoming Site renovation project. Suspect hazardous building materials included ACMs, LCMs, and building equipment that may contain other hazardous materials such as PCBs, mercury or mercury vapor, and CFC-containing refrigerants.

The HBMS scope of services was presented in Kleinfelder Proposal No. MF220343.001P/09-0000 dated February 9, 2024. Los Angeles County Public Works (PW) authorized the proposal in their Notice to Proceed letter dated February 21, 2024.

## 2.2 SITE DESCRIPTION

The Site building was constructed circa 1961 and consists of an approximately 33,480-square feet, three-story concrete- and steel-framed structure. Exterior finishes consist of concrete panels. Interior walls are finished with plaster, with portions of the public Site restrooms further finished with ceramic wall tile. Flooring consists of carpet, vinyl floor tile, or ceramic floor tile. Ceilings are finished with 2- by 4-feet or 2- by 2-feet lay-in ceiling tiles.

## 2.3 PHYSICAL LIMITATIONS

Kleinfelder's survey included accessible interior and exterior areas of the Site building that are anticipated to be affected by the upcoming renovation project. In accordance with the approved scope of services, destructive inspection and sampling methods were not used during the survey. Based on these limitations, there is a possibility that additional ACMs, LCMs, or other hazardous materials may be encountered within the Site building that were not identified during Kleinfelder's survey for the upcoming renovation project. If suspect hazardous materials are encountered during hazardous material abatement activities, they should be assumed to be hazardous until results of an appropriate assessment show whether special handling and/or disposal are necessary.


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# 3 ASBESTOS-CONTAINING MATERIALS SURVEY

## 3.1 ASBESTOS-CONTAINING MATERIALS SURVEY METHODS

Kleinfelder personnel performed a visual survey of the Site and collected representative bulk samples of building materials suspected to contain asbestos. Mr. Richard Stevenson, a California Division of Occupational Safety and Health (DOSH, also known as Cal/OSHA) Certified Asbestos Consultant (CAC, No. 06-3992) performed the survey. The survey was completed consistent with United States Environmental Protection Agency (US EPA) Asbestos Hazard Emergency Response Act (AHERA) methods (40 Code of Federal Regulations [CFR] Part 763) and South Coast Air Quality Management District (SCAQMD) Rule 1403 requirements as guidelines.

Areas of homogeneous suspect ACM were identified by the visual inspection of building materials. Bulk samples of suspect ACM were collected using hand tools, such as utility knives, chisels, or putty knives, or using a T-handled manual corer with 3-inch brass core tubes. Up to approximately 2-square inches of material were collected for each sample, which was then placed in either 2- or 4-ounce plastic “Whirl-Pak” sample bags and labeled with a unique sample identification number directly on the sample bag. Sampling tools were cleaned with soap and water following the collection of each sample.

Kleinfelder collected a total of 47 representative bulk building material samples (Samples HPL-1 through HPL-47) during the Site asbestos survey. Bulk samples collected during the survey were delivered by Kleinfelder under chain-of-custody protocol to SGS Forensic Laboratories (Forensic) in Carson, California for analysis of asbestos content by polarized light microscopy (PLM). Forensic is a US EPA and California state-certified laboratory and National Voluntary Laboratory Accreditation Program (NVLAP) participant. PLM analysis has a limit of quantification (LOQ) of 1 percent (%) asbestos. PLM results reported as “trace” denote the presence of asbestos below the PLM LOQ. Point-count analysis is necessary to quantitatively confirm asbestos content is less than 1%.

Summaries of building material samples collected, sample locations, asbestos content, condition, friability, and area estimates are presented in Table 1. Sample location maps, showing the approximate locations of building material samples collected on each floor of the Site, are provided as Figures 1 through 3. Copies of the analytical laboratory reports and chain-of-custody documentation are included in Appendix A. A copy of Mr. Stevenson’s current CAC license is included in Appendix B.


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## 3.2 REGULATORY OVERVIEW FOR ASBESTOS

Regulatory oversight for the management, removal, and disposal of ACMs is provided by a variety of federal, state, and local agencies.

The three primary regulations enforced by regulatory agencies that govern various activities (e.g., inspection, assessment, abatement, etc.) relating to ACMs include the following: AHERA, National Emission Standards for Hazardous Air Pollutants (NESHAP), and the Asbestos Construction Safety Standard (as codified in Federal Occupational Safety and Health Administration [OSHA] and Cal/OSHA regulations). US EPA regulations concerning the identification, handling, management, and abatement of ACMs (as defined in the AHERA and NESHAP) are implemented locally by SCAQMD. Both Cal/OSHA and Federal OSHA regulate asbestos as a worker health and safety issue. In addition, the transportation and disposal of asbestos-containing wastes are overseen by the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC). Federal OSHA, US EPA, DTSC, and SCAQMD define ACM as material containing greater than 1% asbestos.

The following is a brief description of the three major regulations relating to ACMs.

### 3.2.1 Asbestos Hazard Emergency Response Act

AHERA (40 CFR Part 763), as implemented by the US EPA, primarily pertains to the assessment and management of ACMs in Kindergarten through Grade 12, non-profit schools. However, many of the procedures, training requirements, and certifications defined by AHERA have become the industry standard for most other facilities. For this survey, AHERA protocols were generally utilized in the identification, assessment, and sampling of building materials suspected of containing asbestos.

### 3.2.2 National Emission Standards for Hazardous Air Pollutants

The asbestos NESHAP (40 CFR Part 61, Subpart M) is an asbestos standard that protects the general public from asbestos exposure due to renovation or demolition activities. NESHAP requires surveying for suspect materials (as defined above), notifying of intent to renovate or demolish, removing Regulated Asbestos-Containing Material (RACM) prior to renovation or demolition, and properly managing asbestos-containing wastes. A RACM is defined by NESHAP as any of the following:

- Any friable ACM;


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- A Category I non-friable ACM (such as floor tiles, mastics, and asphalt roofing products) that has become friable or will be subject to sanding, grinding, cutting, or abrading during renovation or demolition activities; and
- A Category II non-friable ACM (all other non-friable ACMs) that has a high probability of becoming friable during demolition or renovation activities.

NESHAP requires that demolition activities be conducted with no visible emissions using wet methods. Note that although NESHAP regulates renovation and demolition activities, it does not protect individual workers performing asbestos abatement or provide instructions for how asbestos abatement projects should be performed.

### 3.2.3 Asbestos Standard for the Construction Industry

Federal OSHA, under its Asbestos Standard for the Construction Industry (29 CFR 1926.1101), and Cal/OSHA, under California Code of Regulations (CCR) Title 8, Section 1529, regulate asbestos exposure in the workplace. This includes persons working in a building containing ACM, as well as asbestos abatement workers/contractors. For abatement workers and contractors, the Asbestos Standard for Construction (i.e., the Construction Standard) regulates the following:

- Protection of workers and the public during removal of ACM;
- Medical surveillance requirements for workers;
- Detailed requirements for how ACMs are to be removed; and
- Training requirements for abatement personnel.

Furthermore, Cal/OSHA defines asbestos-containing construction material (ACCM) as any building material that contains more than 0.1% asbestos by weight. Building materials presumed or known to contain at least “trace” amounts (less than 1%, but greater than 0.1% by weight) of asbestos should be considered ACCM and managed according to Cal/OSHA regulations (as presented in CCR Title 8, Section 1529).

## 3.3 ASBESTOS-CONTAINING MATERIALS SURVEY RESULTS

Based on Kleinfelder’s observations and evaluation of the laboratory analytical reports, the following ACMs, defined as materials containing greater than 1% asbestos or materials containing “trace” asbestos that have not been further analyzed by point count methods, were confirmed to be present at the Site. Estimated quantities are based on area measurements made by Kleinfelder staff at the time of the survey.


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- Dark brown 12-inch vinyl floor tile and associated black mastic located on the 3rd Floor MCR (Samples HPL-8 through HPL-11) contain trace chrysotile and 2% chrysotile asbestos, respectively, and is classified as non-friable ACM. This material was observed to be in good condition at the time of the survey and is estimated to encompass 50-square feet.
- Brown mastic associated with 4-inch brown rubber base cove (Samples HPL-13 and HPL-36 contains trace anthophyllite asbestos. This material is located in the MCR on the 3rd floor and the Staff Lounge on the 1st floor. This material was observed to be in good condition at the time of the survey and is estimated to encompass 40-square feet in the locations it was observed.


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# 4 LEAD-CONTAINING MATERIALS SURVEY

## 4.1 LEAD-CONTAINING MATERIALS SURVEY METHODS

Kleinfelder personnel performed a survey of painted and/or coated surfaces at the Site suspected of containing lead. Mr. Richard Stevenson, a California Department of Public Health (CDPH) Certified Lead Inspector/Assessor (No. LRC-00000992), performed the LBP survey using US EPA, Federal Housing and Urban Development (HUD), and CDPH protocols as a general guidance.

Predominant interior and exterior painted and/or coated surfaces were tested for the presence of lead utilizing a Thermo Niton XL5 Plus portable x-ray fluorescence (XRF) analyzer unit. The XRF unit allows for non-destructive/non-intrusive measurements of lead content in paints up to 3/8-inch thick. Kleinfelder collected 200 XRF readings (including instrument calibration checks) from Site building components suspected of containing lead. The XRF measurements were recorded manually on field forms during the survey.

The survey also included a visual observation and physical assessment of painted surfaces. The physical assessment is performed by assessing whether a painted surface is in intact, fair, or poor condition. Suspect painted surfaces observed to be cracking, peeling away from the substrate, or otherwise damaged are considered to be in fair to poor condition, depending on the degree of the observed damage. Materials that do not exhibit these conditions are considered to be intact.

## 4.2 REGULATORY OVERVIEW FOR LEAD-CONTAINING MATERIALS

The US EPA, HUD and CDPH define lead-based paint (LBP) as paint containing greater than 0.5% lead by weight or 5,000 parts per million (ppm) of total lead by laboratory analysis, or a lead content of 1.0 milligram per square centimeter ($mg/cm^2$) by XRF measurement. Furthermore, the Los Angeles County Code of Ordinances Chapter 11.28 defines LBP as paint containing equal to or greater than 0.7 $mg/cm^2$ total lead by XRF measurement. Federal OSHA and Cal/OSHA regulations (Lead Construction Standard) do not provide a definition for “lead-based paint” but refer to the US EPA, HUD and CDPH criteria mentioned above. Cal/OSHA is primarily concerned with worker protection and regulates any amount of lead contained within painted building components.

Both Federal OSHA and Cal/OSHA provide an Action Level (AL) of 30 micrograms per cubic meter ($\mu g/m^3$) of airborne lead for an 8-hour, time-weighted average (TWA). Specific worker training and worker protection are to be provided by employers if workers are exposed to airborne


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lead at or above the AL. Additionally, both Federal OSHA and Cal/OSHA provide a Permissible Exposure Limit (PEL) for worker exposure to airborne lead particles of 50 µg/m$^3$ of air for an 8-hour, TWA.

According to Cal/OSHA (CCR Title 8, Section 1532.1), employers may assume that disturbance of coatings or materials shown to contain less than 0.06% lead by weight (equivalent to 600 ppm lead) will not result in exposures above the applicable AL as long as workers are not performing the Cal/OSHA designated “trigger tasks” (such as manual demolition, manual sanding or scraping, or abrasive blasting). However, renovation or demolition activities that include materials with lead in any concentration could, under certain circumstances, trigger Federal OSHA and Cal/OSHA regulations. The concentrations of airborne lead generated by disturbing paints at the Site would vary based upon several factors, including the type of activity (including "trigger tasks") and the severity of disturbance to the building materials. Measurement of airborne lead concentrations would require air monitoring during building material disturbance by a trained lead professional.

## 4.3 LEAD-CONTAINING MATERIALS SURVEY RESULTS

A summary of Kleinfelder’s XRF measurements of the various painted and coated/glazed building components is presented in Table 2. A copy of the XRF Measurement Record Log documenting XRF readings in the field is included in Appendix A. A copy of Mr. Stevenson’s current CDPH license is included in Appendix B. A copy of CDPH Form 8552 - Lead Hazard Evaluation Report, required for each lead inspection performed in public or residential buildings and submitted by Kleinfelder to CDPH, is included in Appendix C.

In accordance with CCR Title 8 Section 1532.1, CCR Title 17 Section 35001 et. seq., and Title 11 Chapter 28 of the Los Angeles County Code, XRF measurement results were interpreted as follows: a “Positive- LBP” result is indicated when the XRF measurement reading is 0.7 mg/cm$^2$ or greater; a Negative-Lead-Containing Paint (LCP) is indicated when the XRF measurement reading is greater than 0.10 mg/cm$^2$ but less than 0.7 mg/cm$^2$; and a “Negative” result is indicated when the XRF measurement reading is less than 0.10 mg/cm$^2$.

Based on Kleinfelder’s review of XRF readings taken at the Site, the following painted or coated surfaces had a recorded lead content equal to or greater than 0.7 mg/cm$^2$ using an XRF instrument and are classified as LBPs:

- Glaze applied to the white porcelain mop sink in the Janitor’s Closet on each floor of the Site.


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- White paint applied to metal columns in the Library on the 1st Floor.

Based on Kleinfelder's review of XRF readings, the following painted or coated surfaces had lead contents greater than 0.10 mg/cm$^2$ but less than 0.7 mg/cm$^2$ using an XRF instrument and, therefore, are classified as LCPs:

- White paint applied to the metal stair railing in Stairwell #2.


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# 5 OTHER HAZARDOUS BUILDING MATERIALS SURVEY

## 5.1 OTHER HAZARDOUS BUILDING MATERIALS SURVEY METHODS

Kleinfelder personnel visually inspected the Site for equipment that may contain PCBs, mercury or mercury vapor, CFC-containing refrigerants, and other potential hazardous materials. No samples of suspect hazardous materials were collected during this portion of the survey.

## 5.2 REGULATORY OVERVIEW FOR OTHER HAZARDOUS MATERIALS

Other suspect hazardous building materials documented at the Site included PCB-containing equipment, equipment containing HFCs, and Universal Wastes (e.g., fluorescent light tubes and batteries). Regulatory oversight for removal and disposal of these materials is provided by a variety of federal and state agencies.

### 5.2.1 PCBs

US EPA (40 CFR Part 761) requires that insulating oils containing PCBs at concentrations greater than 50 milligrams per liter be disposed of properly by a licensed hazardous waste hauler. Cal/OSHA provides a PEL for worker exposure to airborne PCBs of 0.05 milligram per cubic meter ($mg/m^3$) on an 8-hour TWA basis.

### 5.2.2 Universal Waste

California's Universal Waste Rule allows individuals and businesses to transport, handle, and recycle certain common hazardous wastes, termed Universal Wastes, in a manner that differs from the requirements of most hazardous wastes. The hazardous waste regulations found in CCR, Title 22, Division. 4.5, Chapter 11, Section 66261.9 list seven categories of hazardous wastes that can be managed as Universal Wastes. An unwanted item that falls within one of these waste streams may be handled, transported, and recycled following the simple requirements set forth in the Universal Waste Regulations (UWR) in CCR Title 22, Division 4.5, Chapter 23.

A small quantity generator of Universal Waste accumulates no more than 5,000 kilograms (kg) of waste and no more than 35 kg of mercury drained from gauges on a given site. A US EPA identification (ID)/Notification and Uniform Hazardous Waste Manifest is not required for the disposal of Universal Wastes. Universal Wastes should be placed in containers according to the "Universal Waste Container Requirements" in CCR Title 22, Section 66273.13. Universal Wastes, and containers and packages of Universal Waste, should be labeled or marked to identify their


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types. Universal Waste should be sent to a facility authorized to collect, recycle, or dispose of such wastes.

Pursuant to Cal/OSHA, the PEL for airborne mercury is 0.1 mg/$m^3$ and the PEL for acid (using the PEL for sulfuric acid) is 1.0 mg/$m^3$ of air for an 8-hour TWA basis.

Certain other regulations that may apply include the following (although this is not a complete list):

- 29 CFR 1910.1000 - Air Contaminants.
- 40 CFR, Part 82 - Protection of Stratospheric Ozone; Refrigerant Recycling.
- 40 CFR, Part 761 - PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.
- 40 CFR, Parts 260 through 270 - Federal Regulations for Identification, Transportation, and Disposal of Hazardous Wastes.
- 22 CCR, Division 4.5 - California Regulations for Identification, Transportation, and Disposal of Hazardous Wastes.
- 49 CFR, Parts 171 through 180 - United States Department of Transportation (DOT) regulations.

## 5.3 OTHER HAZARDOUS BUILDING MATERIALS SURVEY RESULTS

A summary of equipment observed at the Site that may contain other hazardous materials is presented in Table 3. Typical suspect hazardous building materials observed at the Site included, but are not limited to:

- Approximately 1,120 fluorescent light tubes that may contain mercury or mercury vapor.
- Approximately 436 fluorescent light fixture ballasts that may contain PCBs.
- Batteries in approximately 14 exit signs and emergency light fixtures that may contain battery acid and/or heavy metals.
- Six drinking fountains, each labeled as containing approximately four ounces of R-410A refrigerant, an HFC-containing refrigerant.


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# 6 CONCLUSIONS AND RECOMMENDATIONS

## 6.1 CONCLUSIONS

The following ACMs, LCMs, and other hazardous building materials were identified at the Site.

Asbestos-Containing Materials

- Dark tan 12-inch vinyl floor tile and associated black mastic located in the on the 3rd floor of the Site.
- Brown mastic associated with 4-inch brown rubber base cove. This material is located in the MCR on the 3rd floor and the Staff Lounge on the 1st floor.

Lead-Containing Materials

- Glaze applied to the white porcelain mop sink in the Janitor's Closet on each floor of the Site.
- White paint applied to metal columns in the Library on the 1st Floor.
- White paint applied to the metal stair railing in Stairwell #2.

Other Hazardous Building Materials

- Fluorescent light tubes that may contain mercury or mercury vapor.
- Fluorescent light fixture ballasts that may contain PCBs.
- Batteries in exit signs and emergency light fixtures that may contain battery acid and/or heavy metals.
- Drinking fountain that contains HFC-containing refrigerant.

## 6.2 RECOMMENDATIONS

Planned renovation or general work activities, which may disturb ACM, LCM, or other hazardous building materials, should be performed by properly trained and qualified personnel in accordance with all federal, state, and local regulations, as implemented by Cal/OSHA, Federal OSHA, US EPA, DTSC, and SCAQMD. Prior to future renovation or demolition work, Kleinfelder recommends that the following actions be taken:

- Prior to building renovation, the Site owner should retain a State of California-licensed asbestos/lead abatement contractor to perform abatement of ACM and LCM that could


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potentially be disturbed. The general contractor for the renovation project may be a source of information concerning locally licensed abatement contractors. Kleinfelder can also provide names of licensed and qualified abatement contractors in the area, upon request.

- Submittal of an SCAQMD *Notification of Demolition or Asbestos Removal* is required for every demolition in SCAQMD jurisdiction, even when no ACMs are present, and for each asbestos removal project where the amount of ACM to be removed is equal to, or greater than, 100 square feet. Prior to the initiation of abatement or demolition work, the abatement or demolition contractor must complete the *Notification of Demolition or Asbestos Removal* form and submit it to SCAQMD at least 10 business days before the start of abatement or demolition. SCAQMD will return the form, with a "notification number" added, to the abatement or demolition contractor, depending on who submitted the form.
- Written notification to the local Cal/OSHA district office will be required from the selected asbestos/lead abatement contractor regarding its "Intent to Conduct Asbestos Related Work" and/or "Intent to Conduct Lead-Related Work." These notifications should be submitted at least 24 hours in advance of performing the respective asbestos-related or lead-related work.
- The Site may have a waste management program designed to manage and reduce waste. Kleinfelder recommends PW research Site records regarding its waste management program to evaluate whether the other potentially hazardous building materials can be managed under the Universal Waste Rules. These items will require segregation and may require further testing and analysis to determine whether they meet the definition of a hazardous waste in California. Hazardous wastes should only be handled by properly trained workers.
- Notification should be provided to contractor and subcontractor personnel as to the presence of ACM, LCM, and other hazardous building materials at the Site.


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## 7 LIMITATIONS

Kleinfelder's work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions, and at the date the services were provided. Our conclusions, opinions and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by PW (Client), the Project Manager, and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

The work performed was based on project information provided by the Client. If Client does not retain Kleinfelder to review any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our estimate. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. It should be recognized that definition and evaluation of environmental conditions are a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of site conditions present due to the limitations of data from field studies. Although risk can never be eliminated, more-detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service that provide adequate information for their purposes at acceptable levels of risk. Acceptance of this report will indicate that the Client has reviewed the document and determined that it does not need or want a greater level of service than provided.

During the course of the performance of Kleinfelder's services, hazardous materials may have been discovered. Kleinfelder assumes no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury that results from pre-existing hazardous materials being encountered or present on the Site, or from the discovery of such hazardous materials. Nothing


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contained in this letter should be construed or interpreted as requiring Kleinfelder to assume the status of an owner, operator, or generator, or person who arranges for disposal, transport, storage, or treatment of hazardous materials within the meaning of any governmental statute, regulation, or order. Client is solely responsible for directing notification of all governmental agencies, and the public at large, of the existence, release, treatment or disposal of any hazardous materials observed at the Site, either before or during performance of Kleinfelder's services. Client is responsible for directing all arrangements to lawfully store, treat, recycle, dispose, or otherwise handle hazardous materials, including cuttings and samples resulting from Kleinfelder's services.


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