



SPECIFICATIONS

Lubbock District
Lubbock SE MNT & Special Crews
New Perimeter Fencing & Gates

Lubbock District-05

Lubbock SE MNT & Special Crews
Lubbock County, Texas
Site No: 059003

Project No: 05-1859-26-01

TEXAS DEPARTMENT of TRANSPORTATION
6230 East Stassney Lane,
Austin, Texas 78744

Support Services Division
Facilities Planning & Management Section
6230 East Stassney Lane,
Austin, Texas 78744

Date: 12/12/2025

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SITE SURVEY – PROJECT LOCATIONS

Lubbock SE MNT Survey
Lubbock County, TEXAS
Site No: 059003

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END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 PROJECT IDENTIFICATION

TEXAS DEPARTMENT OF TRANSPORTATION
Lubbock District – 05, Lubbock County,
Lubbock SE Maintenance Facility
US Highway 87/Interstate Highway 27 & 66th street -Lubbock, TX 79404

1.2 CONTRACT DESCRIPTION

- A. NEW perimeter fencing/posts is to be installed per TXDOT security fence & gate standards on recently purchased land. About 3,700 linear feet of new fence and posts.
- B. Install NEW (2) 20' cantilever sliding gate is to be installed per TXDOT security fence & sliding gate standards – Final location TBD.
- C. Perform Work of Contract under Lump Sum Total cost contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

- A. Concurrent work by Owner or others: Owner reserves the right to conduct minor work with his own forces or separate contractors during the construction. Work will be coordinated with the contractor along the general demarcation line shown on the civil drawings.

1.4 OWNER SUPPLIED PRODUCTS

- A. Owner will arrange for and deliver Owner-furnished items.
- B. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
- C. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
- D. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
- E. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
- F. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Access to Site: Contractor will have unrestricted access to site. Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.6 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases. Except where specifically intended otherwise, the subject of all imperative statements is the Contractor. For example, 'Provide tile' means 'Contractor shall provide tile.'

1.7 CONTRACTOR

- A. **Permits and Fees:** Apply for, obtain, and pay for permits, if applicable, fees, and utility company back charges required to perform the work. Contractor is responsible for contacting the local service providers (municipality, water, electric, and communications). Refer to plans for additional information. All inspections at site will be conducted by TxDOT staff.
- B. **Codes:** Comply with applicable codes and regulations indicated on coversheet of Construction Drawings. Submit copies of inspection reports, notices and similar communications to Owner.
- C. **Dimensions:** Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. **Do not scale drawings.**
- D. **Existing Conditions:** Notify Owner of existing conditions differing from those indicated on the drawings. Do not remove or alter structural components without prior written approval of the Architect.
- E. **Coordination:**
 - 1. Coordinate the work of all trades.
 - 2. Prepare coordination drawings for areas above ceilings where close tolerances are required between building elements and mechanical and electrical work.
 - 3. Verify location of utilities and existing conditions prior to beginning work.
- F. **Installation Requirements, General:**
 - 1. Inspect substrates and report unsatisfactory conditions in writing.
 - 2. Do not proceed until unsatisfactory conditions have been corrected.
 - 3. Take field measurements prior to fabrication where practical. Form to required

shapes and sizes with true edges, lines and angles. Provide inserts and templates as needed for work of other trades.

4. Install materials in accordance with Manufacturer's instructions and approved submittals.
5. Install materials in proper relation with adjacent construction and with proper appearance.
6. Restore units damaged during installation. Replace units which cannot be restored at no additional expense to the Owner.
7. Refer to additional installation requirements and tolerances specified under individual specification sections.

G. Definitions:

1. Provide: Furnish and install, complete with all necessary accessories, ready for intended use. Pay for all related costs.
2. Reviewed: Review of items submitted. Not a limitation or release for compliance with the Contract Documents or regulatory requirements. Refer to limitations of 'Reviewed' in General and Supplementary Conditions.

- H. **Intent:** Drawings and specifications are intended to provide the basis for proper completion of the work suitable for the intended use. Anything not expressly set forth but which is reasonable implied or necessary for proper performance of the project shall be included.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SCHEDULE OF VALUES

- A. Submit printed schedule on Owner provide form or electronic media.
- B. **Coordination:** Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets
 - b. Submittals Schedule
 - c. Contractor's Construction Schedule
 - 2. Submit the Schedule of Values to the Architect in duplicate no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- C. **Format and Content:** Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section. Identify separately site mobilization, bonds and insurance, and a breakdown of the General Contractors general conditions.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location
 - b. Name of Architect
 - c. TxDOT project number
 - d. Contractor's name and address
 - e. Date of submittal
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division
 - b. Description of the Work
 - c. Change Orders (numbers) that affect value
 - d. Allowances (numbers) per bid proposal
 - e. Dollar value
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent
 - 3. Provide a breakdown of the Contract Sum (labor & materials) in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

- a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Provide separate line items in the Schedule of Values for each Allowance per bid proposal.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
10. Provide any additional information as set forth in the UGC.

1.2 APPLICATIONS FOR PAYMENT

- A. Submit two copies of each application to Architect for review, 7 days prior to Payment Application Time.
- B. Each monthly Application for Payment shall be consistent with previous applications and payments as certified by Architect, TxDOT Project Manager, TxDOT District Representative and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at Substantial Completion, and final Application for Payment require additional documentation.
- C. **Payment Application Times:** The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- D. **Payment Application Forms:** Use forms provided by TxDOT for Applications for Payment.
- E. **Application Preparation:** Complete every entry on form. Architect and TxDOT Project Manager will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values. Use updated schedule if revisions were made.
 2. Include amounts of Change Orders approved before last day of construction period covered by application.
 3. Submit Contractor's Affidavit of Payment of Debts and Claims – Monthly Progress Payment
 4. Submit HUB Subcontracting Plan (HSP) Prime Contractor Progress Assessment Report.
 5. Submit updated two construction schedules with each Application for Payment.
- F. **Transmittal:** Submit 5 signed original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- G. **Initial Application for Payment:** Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors
 2. Schedule of Values
 3. Contractor's Construction Schedule
 4. Products list
 5. Schedule of unit prices
 6. Submittals Schedule
 7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work
- H. **Application for Payment at Substantial Completion:** After issuing the Certificate of Substantial Completion, submit an Application for Payment for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. **Final Payment Application:** Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Updated final statement, accounting for final changes to the Contract Sum
 2. Owner provided document, "Contractor's Affidavit of Payment of Debts and Claims –Final Payment"
 3. Owner provided document, "Consent of Surety to Final Payment"
 4. Evidence that claims have been settled
 5. Final liquidated damages settlement statement if applicable.
 6. HUB Subcontracting Plan (HSP) Prime Contractor Progress Assessment Report.
 7. Buy America form D-9-USA 1 or it equivalent.
 8. If required, a close-out Change Order.
 9. Provide any additional information as set forth in UGC.
- J. **Substantiating Data:** When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
1. Affidavits attesting to off-site stored products.
 2. Construction progress schedules, revised and current.

1.3 CHANGE PROCEDURES

- A. **Submittals:** Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions.

- C. **Owner-Initiated Proposal Requests:** Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 2. Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- D. **Contractor-Initiated Proposals:** If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. **Use TxDOT approved Proposal Requests.**
 - a. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

1.4 CHANGE ORDER PROCEDURES

- A. On approval of a Proposal Request, Owner will issue a Change Order for signatures of Contractor and Architect on Owner's appropriate form.
1. Execution of Change Orders: Owner shall issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- B. **Correlation Of Contractor Submittals:**
1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.

2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer and/or Owner will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer and/or Owner.
- D. Defective Work will be partially repaired to instructions of Architect/Engineer and/or Owner and unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer and /or Owner.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Architect/Engineer and/or Owner to assess defects and identify payment adjustments is final.
- G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 1. Products wasted or disposed of in a manner that is not acceptable.
 2. Products determined as unacceptable before or after placement.
 3. Products not completely unloaded from transporting vehicle.
 4. Products placed beyond lines and levels of required Work.
 5. Products remaining on hand after completion of the Work.
 6. Loading, hauling, and disposing of rejected products.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 PRODUCT LIST:

- A. Within 30 days after date of Contract, submit to Architect 5 copies of complete list of products and materials which are proposed for installation.
- B. Prepare list on basis of each Specification section.
- C. For products specified under reference standards, include with listing of each product:
 - 1. Name and address of manufacturer.
 - 2. Trade name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data, including performance and test data, reference standards.

1.2 CONTRACTOR'S OPTIONS:

- A. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any product and manufacturer named.
- C. For products specified by naming only one product and manufacturer, there is no option, unless a substitution is approved as specified below.

1.3 SUBSTITUTIONS:

- A. During Bidding, no substitution requests will be considered.
- B. Within 30 days after date of Contract, Architect will consider formal requests from Contractor for substitutions of products in place of those specified. No request for substitutions will be considered after this date.
- C. Submit an electronic copy of request for substitution. Include in substitution:
 - 1. Data substantiating compliance of proposed substitution with Contract documents.
 - 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature, including product description, performance and test data and reference standards.
 - c. Samples, if applicable.
 - d. Name and address of similar projects on which product was used and date of installation.

3. For construction methods:
 - a. Detailed written descriptions of proposed method.
 - b. Complete drawings illustrating methods or revisions.
 4. Itemized comparison of proposed substitution with product or method specified.
 5. Data relating to changes in construction schedule.
- D. In making request for substitution, Bidder/Contractor represents:
1. He has personally investigated proposed product or method and determined that it is equal or superior in all respects to that specified.
 2. He will provide same guarantee for substitution as for product or method specified.
 3. He will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
 4. He waives all claims for additional costs related to substitution which subsequently becomes apparent
- E. Substitutions will not be considered if:
1. They are indicated or implied on show drawings or product data submittals without formal request as submitted in accordance with *Article 1.3* of this Section.
 2. Acceptance will require substantial revision of Contract Documents.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

- A. **Timing:** Architect will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- B. **Conditions:** Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements.
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.

SUBSTITUTION REQUEST

PROJECT: _____

PROJECT NO.: _____

TO: TxDOT Construction Project Manager

FROM: CONTRACTOR/BIDDER

CONTRACTOR (BIDDER) HEREBY REQUESTS ACCEPTANCE OF THE FOLLOWING PRODUCT OR SYSTEMS AS A SUBSTITUTION IN ACCORD WITH PROVISIONS OF DIVISION ONE OF THE SPECIFICATIONS:

1. SPECIFIED PRODUCT OR SYSTEM:

Substitution request for (Generic Description): _____

Specification Section No.: _____ Article(s) _____ Paragraph (s) _____

2. SUPPORTING DATA:

Product data for proposed substitution is attached (description of product, reference standards, performance and test data).

Sample is attached

Sample will be sent if requested

3. QUALITY COMPARISON:

	SPECIFIED PRODUCT	SUBSTITUTION
Name brand:	_____	_____
Catalog No.	_____	_____
Manufacturer:	_____	_____
Vendor:	_____	_____
Significant Variations:	_____	_____
Maintenance Service Available:	_____ Yes	_____ No
Spare Part Source:	_____	

4. PREVIOUS INSTALLATIONS:

Identification of similar projects on which proposed substitution was used:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:

6. EFFECT OF SUBSTITUTION:

Proposed substitution affects other parts of Work: _____ No _____ Yes (If yes, explain)

Substitution changes Contract Time: _____ No _____ Yes Add/Deduct _____ days.

Substitution requires dimensional revision or redesign of structure or M & E Work:

_____ No _____ Yes (If yes, attach complete data)

Saving or credit to Owner, if any, for accepting substitution: \$_____.

Extra cost to Owner, if any, for accepting substitution: \$_____.

7. CONTRACTOR'S (BIDDER'S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:

I/we:

_____ have investigated the proposed substitution.

_____ believe that it is equal or superior in all respects to specified product, except as stated above.

_____ will provide the same warranty as specified for specified product.

_____ have included complete cost data and implications of the substitution.

_____ will pay redesign and special inspection costs caused by the use of this product.

_____ will pay additional costs to other contractors caused by the substitution.

_____ will coordinate the incorporation of the proposed substitution in the Work.

_____ will modify other parts of the work as needed, to make all the work complete and functioning.

_____ waive future claims for added cost to Contract caused by the substitution.

Contractor (Bidder): _____ Date: _____

By: _____

Answer all questions and complete all blanks - use "N/A" if not applicable.

ARCHITECT REVIEW AND ACTION

____Resubmit substitution request:

____Provide more information in following categories.

____Sign Contractor's (Bidder's) Statement of Conformance.

____Substitution accepted.

____Substitution is accepted with the following comments.

____Substitution not accepted.

____Substitution Request received too late.

Architect / Engineer of Record

Date

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Provide project superintendent and other supervisory personnel required for proper performance of the work.
 - 2. Submit list of subcontractors' names, phone numbers and trade work.
 - 3. Participate in a pre-construction meeting at a time and place determined by the Owner for the purpose of identifying responsibilities of the Owner's and Architect's personnel and explanation of administrative procedures.
 - 4. Schedule and conduct monthly meetings, distribute meeting Minutes.
 - 5. Schedule and conduct other meetings as necessary, distribute meeting Minutes.
 - 6. Owner to schedule and conduct other meetings as necessary, the Owner will distribute meeting Minutes.
 - 7. Preparation of Contractor's Construction Schedule.
 - 8. Preparation of the Schedule of Values.
 - 9. Installation and removal of temporary facilities and controls.
 - 10. Preparation of the Submittal Review Schedule.
 - 11. Delivery and processing of submittals.
 - 12. Progress meetings.
 - 13. Preinstallation conferences.
 - 14. Project closeout activities.
 - 15. Startup and adjustment of systems.
 - 16. Project closeout activities.
 - 17. Submit bar chart progress schedule, updated monthly.
 - 18. Prepare submittal schedule coordinated with progress schedule.
 - 19. Submit schedule of values, divided so as to facilitate payments to subcontractors, on forms acceptable to the Owner. Schedule, when approved, will be used as the basis for the Contractor's Application for payment.
 - 20. Submit schedule of required tests.
 - 21. Perform all field engineering, layout, and surveying required for layout of project.
 - 22. Submit and post a list of emergency telephone numbers and addresses for individuals to be contacted in case of emergency.
 - 23. Record drawings and specifications to be maintained and annotated by contractor as work progresses to record actual construction, and be turned over to the

Architect at substantial completion. See Section 01 70 00 for detailed requirements.

24. Submit payment request procedures.
25. Perform quality control during installation.
26. Clean and protect the work.

- C. **Conservation:** Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
- D. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- H. After Owner occupies the premises any access to complete remaining Work or correct defective Work must be coordinated with the Owner's representative in order to minimize disruption of Owner's activities.

1.2 CONSTRUCTION LAYOUT

- A. The General Contractor shall include in his bid the cost for providing all construction staking by a Registered Public Surveyor (Surveyor) licensed by Texas Board of Professional Land Surveyors who can demonstrate experience and competence to perform the work described. The grades, spot elevations, dimensions radii, flow line elevations, existing bench marks, excavation and site grading will be indicated on the plans. In the event that discrepancies are noted in the plans by the Contractor and/or the Surveyor, the Architect and/or Engineer of Record shall be notified and the discrepancies shall be resolved prior to proceeding with the Work. The Surveyor shall supervise the layout work and establish at least three (3) separate permanent bench marks, to which easy access may be had during the progress of the work, to determine and verify lines and grades.
- B. Under the supervision of the Surveyor, the layout of the work shall be made from the surveyor-established base lines, utility alignments, curb faces, key trees, bench marks and all other control lines as indicated on the plans; and the Contractor shall be

responsible for all measurements in connection therewith as specified and as indicated on the plans.

- C. Contractor shall be responsible for having the Surveyor **verify that elevations of form work**. The Surveyor shall return a second time to **verify site grading, sidewalk elevations, rough grading next to buildings, concrete curb elevations, base material elevations prior to paving**. All surveying work shall comply with the elevations, lines and grades shown on the plans and **provide a written report and large size (22" x 34") drawings indicating findings** to the Architect and/or Engineer of Record for consideration and response prior to placing concrete, placing asphalt or install landscaping. Contractor shall not proceed further without Surveyor's Report / Drawings and the contractor shall be responsible for making the required corrections prior to continuing the Work. No extra charge or compensations will be allowed due to differences between actual dimensions and the measurements indicated on the drawings.
- D. Employ Land Surveyor registered and acceptable to the Owner.
- E. Locate and protect survey control and reference points. Promptly notify Architect/Engineer of discrepancies discovered.
- F. Control datum for survey is that established by Owner provided survey.
- G. Verify set-backs and easements; confirm drawing dimensions and elevations.
- H. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- I. **Submit copy of site drawing signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.**
- J. Maintain complete and accurate log of control and survey work as Work progresses.
- K. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- L. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- M. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.3 PRECONSTRUCTION MEETING

- A. The Owner's Representative will schedule a pre-construction conference and organizational meeting at the Project Site or other convenient location after execution of the Agreement and prior to commencement of construction activities. The Owner's Representative will conduct the meeting to review responsibilities and personnel assignments.

- B. **Attendees shall include:** The Owner, Architect/Engineer and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. **The Agenda shall discuss items of significance that could affect progress including such topics as:**
 - 1. Tentative construction schedule
 - 2. Critical Work sequencing
 - 3. Designation of responsible personnel
 - 4. List of Subcontractors, trade work, names and phone numbers
 - 5. Procedures for processing field decisions and Change Orders
 - 6. Procedures for processing Applications for Payment
 - 7. Distribution of Contract Documents
 - 8. Submittal of Shop Drawings, Product Data and Samples
 - 9. Preparation of record documents
 - 10. Use of the premises
 - 11. Office, Work and storage areas
 - 12. Equipment deliveries and priorities
 - 13. Safety procedures
 - 14. First Aid
 - 15. Security
 - 16. Housekeeping
 - 17. Working hours
- D. The Owner's Representative will record Minutes and distribute copies within five days after meeting to participants, with copies to contractor and those affected by decisions made.
 - 1. General Contractor will distribute Minutes to others.

1.4 **PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-weekly intervals.
 - 1. Coordinate dates of meetings with Architect and TxDOT Inspector.
 - 2. Prepare Contractor's Application for Payment (CAP) on TxDOT form. Architect shall provide forms required for payment submittal.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. **Agenda:**
 - 1. Review of Minutes of previous meetings
 - 2. Review of Work progress
 - 3. Field observations, problems, and decisions
 - 4. Identification of problems impeding 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
- E. Record Minutes and distribute copies within three days after meeting to participants, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1.5 **PRE-INSTALLATION MEETINGS**

- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific section.
- C. Notify Architect/Engineer and Owner 14 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.
 - a. Contract documents
 - b. Options
 - c. Related Change Orders
 - d. Purchases
 - e. Deliveries
 - f. Shop Drawings, Product Data and Quality Control Samples
 - g. Possible Conflicts
 - h. Compatibility Problems
 - i. Time Schedules
 - j. Weather Limitations
 - k. Manufacturer's Recommendations
 - l. Compatibility of Materials
 - m. Acceptability of Substrates
 - n. Temporary Facilities
 - o. Space and Access Limitations
 - p. Governing Regulations
 - q. Safety
 - r. Inspection and Testing Requirements
 - s. Recording Requirements
 - t. Protection
- E. Record Minutes and distribute copies within three days after meeting to participants, with copies to Architect/Engineer, Owner, and those affected by decisions made.

1. Do not proceed if the conference cannot be successfully concluded.
2. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.6 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regularly scheduled times convenient for all parties involved. Project Coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and specific pre-installation conferences.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting decisions or action and distribute copies to everyone in attendance and to others affected by those decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work.

1.2 SUBMITTALS

- A. Submittals Schedule: Submit an electronic file in MS Office Project. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal
 - 2. Specification Section number and title
 - 3. Submittal category (action or informational)
 - 4. Name of subcontractor
 - 5. Description of the Work covered
 - 6. Scheduled date for Architect's final release or approval
- B. Contractor's Construction Schedule: Submit an electronic copy of the initial schedule, large enough to show entire schedule for entire construction period.
- C. CPM Reports: Concurrent with CPM schedule, submit an electronic copy of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- D. Daily Construction Reports: Submit an electronic copy at monthly intervals, when requested.
- E. Field Condition Reports: Submit an electronic copy at time of discovery of differing conditions.
- F. Special Reports: Submit an electronic copy at time of unusual event.

1.3 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. If a Preliminary Construction Schedule is not required, delete subparagraph below or revise to require initial submittal within 14 days of date established for commencement of the Work.
 - 3. Delete subparagraph below if not allowed.
 - 4. Revise subparagraph below if schedule must be continuously updated to reflect current status and changes in timing for submittals.
 - 5. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. **Procedures:** Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. **Time Frame:** Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. **Activities:** Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. **Submittal Review Time:** Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. **Startup and Testing Time:** Include not less than seven days for startup and testing.
 5. **Substantial Completion:** Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and TxDOT Project Manager administrative procedures necessary for certification of Substantial Completion.
- D. **Constraints:** Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Seasonal variations
 - b. Environmental control
 5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals
 - b. Mockups
 - c. Fabrication
 - d. Sample testing
 - e. Deliveries
 - f. Installation
 - g. Tests and inspections
 - h. Adjusting
 - i. Curing
 - j. Startup and placement into final use and operation
 6. **Area Separations:** Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion
 - b. Permanent space enclosure
 - c. Completion of mechanical installation
 - d. Completion of electrical installation
 - e. Substantial Completion
- E. **Milestones:** Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
First paragraph below establishes progress measured in dollar volume of the Work.

- F. **Cost Correlation:** At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
 2. Retain three subparagraphs below for CPM schedule.
 3. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 4. Each activity cost shall reflect an accurate value subject to approval by Architect.
 5. Total cost assigned to activities shall equal the total Contract Sum.
- G. **Contract Modifications:** For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. **General:** Prepare network diagrams using AON (activity-on-node) format.
- B. Projects using CPM schedules should begin with a preliminary network diagram of type described below or a preliminary bar-chart schedule.
- C. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- D. Revise paragraph and subparagraphs below to suit Project.
- E. **CPM Schedule:** Prepare Contractor's Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 14 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

- F. **CPM Schedule Preparation:** Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals
 - b. Mobilization and demobilization
 - c. Purchase of materials
 - d. Delivery
 - e. Fabrication
 - f. Installation
 - g. Testing
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- G. **Initial Issue of Schedule:** Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity
 2. Description of activity
 3. Principal events of activity
 4. Immediate preceding and succeeding activities
 5. Early and late start dates
 6. Early and late finish dates
 7. Activity duration in workdays
 8. Total float or slack time
 9. Average size of workforce
 10. Dollar value of activity (coordinated with the Schedule of Values)
- H. **Schedule Updating:** Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed
 2. Changes in early and late start dates
 3. Changes in early and late finish dates
 4. Changes in activity durations in workdays
 5. Changes in the critical path
 6. Changes in total float or slack time
 7. Changes in the Contract Time

2.4 REPORTS

- A. **Daily Construction Reports:** Maintain a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site
 2. Approximate count of personnel at Project site
 3. Material deliveries
 4. High and low temperatures and general weather conditions
 5. Accidents
 6. Meetings and significant decisions
 7. Unusual events (refer to special reports)
 8. Stoppages, delays, shortages, and losses
 9. Emergency procedures
 10. Orders and requests of authorities having jurisdiction
 11. Change Orders received and implemented
 12. Proposed Construction Change Directives
 13. Construction Change Directives received and implemented
 14. Services connected and disconnected
 15. Equipment or system tests and startups
 16. Substantial Completions authorized
- B. **Field Condition Reports:** Have field reports available for review by owner.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. **Contractor's Construction Schedule Updating:** At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. **Distribution:** Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- C. **Distribution:** Provide electronic copy to Architect in MS Office Project format.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUBMITTAL PROCEDURES

- A. **General:** Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
- B. **Coordination:** Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. **Processing Time:** Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 - 4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 21 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
 - 5. Schedule submissions at least 40 days before reviewed submittals will be needed, in accordance with the above review times noted above (the above allows for one resubmittal review and distribution) and approved submittal schedule.
- D. Insert list of submittals below allowing concurrent review or delete and identify submittals in Sections where they are specified. Structural, mechanical, plumbing, and electrical components are examples of the Work that often require simultaneous transmittal to Architect and consultants.

- E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
1. Coordinate each submittal with requirements of work of Contract Documents.
 2. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect's review of submittals.
 3. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's review of submittals, unless Architect gives written acceptance of specific deviations.
 4. Notify Architect, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- F. **Identification:** Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name
 - b. Date
 - c. Name and address of Architect
 - d. Name and address of Contractor
 - e. Name and address of Subcontractor
 - f. Name and address of Supplier
 - g. Name of Manufacturer
 - h. Submittal number
 - i. Number and title of appropriate Specification Section
 - j. Drawing number and detail references, as appropriate
 - k. Location(s) where product is to be installed, as appropriate
 - l. Other necessary identification
- G. **Deviations:** Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- H. **Additional Copies:** Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- I. **Transmittal:** Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use form acceptable to the Owner and Architect. Provide locations on form for the following information:
 - a. Project name

- b. Date
 - c. Destination (To)
 - d. Source (from)
 - e. Names of Subcontractor, Manufacturer, and Supplier
 - f. Category and type of submittal
 - g. Submittal purpose and description
 - h. Specification Section number and title
 - i. Drawing number and detail references
 - j. Transmittal number, numbered consecutively
 - k. Submittal and transmittal distribution record
 - l. Remarks
 - m. Signature of Transmitter
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- J. **Resubmittals:** Make resubmittals in same form and number of copies as initial submittal.
- 1. When revised for resubmission, identify changes made since previous submission.
 - 2. Mark revised submittals with original number and sequential alphabetic suffix. Note date and content of previous submittal.
 - 3. Note date and content of revision in label or title block and clearly indicate extent of revision.
- K. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- L. Resubmit submittals until they are marked 'REVIEWED'.
- M. **Distribution:** Furnish copies of final submittals to Manufacturers, Subcontractors, Suppliers, Fabricators, Installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- 1. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- N. **Use for Construction:** Use only final submittals with mark indicating 'REVIEWED'.
- 1. Begin no work which requires submittals until return of submittals with Architect's stamp and initials or signature indicating review.
- O. Submittals not requested will not be recognized or processed.

1.2 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit preliminary outline Schedules within 15 days after date of Owner-Contractor Agreement for coordination with Owner's requirements. After review, submit detailed schedules within 7 days modified to accommodate revisions recommended by Architect/Engineer and Owner.

- B. Related Section 01 32 16 – Construction Progress Schedule: Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, Subcontractors, Suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit computer generated horizontal bar chart or other approved form with separate line for each section of Work, identifying first work day of each week.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for Owner furnished products and products identified under Allowances.
- J. **Revisions To Schedules:**
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate Contractors.

1.3 **PROPOSED PRODUCTS LIST**

- A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of Manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give Manufacturer, trade name, model or catalog designation, and reference standards.

1.4 **SUBCONTRACTOR LIST**

- A. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity perform subcontract or supplying products
 2. Number and title of related Specification Sections(s) cover by Subcontractor
 3. Drawing number and detail references, as appropriate, covered by subcontract
- B. Submit three copies of Subcontractor list, unless otherwise indicated. Architect will return two copies.
1. Mark up and retain one returned copy as a Project Record Document.

1.5 **PRODUCT DATA**

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- C. Submit number three Contractor copies, plus two copies Architect/Engineer will retain.
- D. Mark each copy to identify applicable products, models, options, and other data. Supplement Manufacturers' standard data to provide information specific to this Project.
- E. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- F. Distribute copies after review.

1.6 **SHOP DRAWINGS**

- A. Prior to submitting shop drawings, Contractor shall furnish Architect with complete Shop Drawing Submittal Log. No Submittals will be reviewed until a complete Submittal Log has been submitted to Architect.
1. Contractor shall submit all required shop drawings and product data to the Architect with reasonable promptness and in an orderly sequence so as to cause no delay in the work.
 2. Prepare and submit, with construction schedule, a separate schedule listing dates for submission and lead dates for reviewed shop drawings, product data and samples for each item.
 3. No extension of time shall be allowed because of failure to properly coordinate and sequence submittals.
- B. **Shop Drawings:** Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- C. **Shop Drawings:** Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. **Preparation:** Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions
 - b. Identification of products
 - c. Fabrication and installation drawings
 - d. Roughing-in and setting diagrams
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring
 - f. Shopwork manufacturing instructions
 - g. Templates and patterns
 - h. Schedules
 - i. Design calculations
 - j. Compliance with specified standards
 - k. Notation of coordination requirements
 - l. Notation of dimensions established by field measurement
 - m. Relationship to adjoining construction clearly indicated
 - n. Seal and signature of professional engineer if specified
 - o. Wiring Diagrams: Differentiate between Manufacturer-installed and field-installed wiring
 2. **Sheet Size:** Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 22 by 24 inches.
 3. **Number of Copies:** Submit five opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing
- D. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. All work must ultimately comply with the contract documents unless Architect/Engineer gives specific written acceptance of specific deviations.
- F. Distribute copies after review.

1.7 SAMPLES

- A. **Samples:** Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. **Samples For Initial Selection as Specified in Product Sections:**
 1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
 2. Submit samples of finishes from full range of Manufacturers' standard colors, textures, and patterns for Architect/Engineer selection.
- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

- D. Include identification on each sample, with full Project information.
- E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain two samples.
 - 1. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.
 - 2. Retain one sample on construction site for field comparison as needed.
- F. Samples will not be used for testing purposes unless specifically stated in specification section.
- G. Distribute samples after review.

1.8 DESIGN DATA

- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.
- B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

- A. When specified in individual specification sections, submit certification by Manufacturer, installation/application Subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.
- B. Submit report within 10 days of observation to Architect/Engineer for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 ERECTION DRAWINGS

- A. Submit drawings for Architect/Engineer's benefit as contract administrator or for Owner.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

1.14 PROJECT WARRANTY AND MAINTENANCE MANUAL:

- A. Prior to final payment, the Contractor shall furnish two complete sets, in tabbed standard size ring binders, of equipment data, maintenance information, operations instructions, and warranties for equipment and systems provided under this contract. See Section 01700 for detailed requirements.
- B. Provide warranties as specified. Warranties shall not limit length of time for remedy of damages Owner may have by legal statute. Contractor, Supplier, or Installer responsible for performance of warranty shall sign warranties.
- C. Material Safety Data Sheets (MSDSs): Submit information directly to TxDOT.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. **Approval Stamp:** Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

PART 4 - ARCHITECT'S/ACTION

- 4.1 **General:** Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
 - B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
 - C. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
 - D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence and secure Manufacturers certification as certified installer, when applicable.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- E. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Perform Work by persons qualified to produce required and specified quality. The Contractor shall comply with applicable local, state, and federal codes and regulations.
 - 1. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for or this Project, whose work has resulted in construction with a record of successful in-service performance.
 - 2. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 3. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
 - 4. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
 - 5. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual

Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

6. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
7. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
8. Factory-Authorized Service Representative Qualifications: An authorized representative of Manufacturer who is trained and approved by Manufacturer to inspect installation of Manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- G. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- I. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work
 2. Incidental labor and facilities necessary to facilitate tests and inspections
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples
 4. Facilities for storage and field curing of test samples
 5. Delivery of samples to testing agencies
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency
 7. Security and protection for samples and for testing and inspecting equipment at Project site
- J. **Coordination:** Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.2 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.3 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard by date of issue current on date for receiving bids, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.4 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. **Label Information:** Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.5 MOCK-UP REQUIREMENTS

- A. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect 14 days in advance of dates and times when mockups will be constructed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 - 5. Allow seven days for initial review and each re-review of each mockup.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer.

1.6 TESTING AND INSPECTION SERVICES

- A. Refer to Specifications Section 01 40 10 – Testing Laboratory Services.
- B. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time specialist and responsible officer.
 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- C. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer and / or Owner.
1. Laboratory: Authorized to operate at Project location.
 2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- D. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.
- E. The work will be observed by the Architect/Engineer (Owner's Representative) or the Owners field observer and performed to his satisfaction in accordance with the Contract Plans and Specifications. The Owner's representative and Architect/Engineer will decide all questions which may arise as to the quality of acceptability of materials furnished and work performed; the manner of performance and rate of progress of the work; the interpretations of the contract plans and specifications; and the acceptable fulfillment of the contract on the part of the Contractor. The Owner's decisions will be final, and he will have executive authority to enforce and make effective such decisions and orders if the contractor fails to carry out the work promptly.
- F. Reports will be submitted by independent firm to Architect/Engineer, TxDOT Project Manager (2 copies) and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- G. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services.
 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- H. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- I. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- J. **Agency Responsibilities:**
1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.

4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Architect/Engineer.
 7. Attend preconstruction meetings and progress meetings.
- K. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer and to Contractor. When requested by Architect/Engineer, provide interpretation of test results.
- L. **Limits On Testing Authority:**
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.
- M. Any materials and/or workmanship which are rejected by the Engineer by reason of failure to conform to the requirements of the plans or specifications shall be removed and replaced at Contractor's expense, including testing expense to correct faulty work.
- N. Inspections and testing required by law, ordinances, rules and regulations or other public authorities are the responsibility of the Contractor. It is the sole responsibility of the Contractor to call for testing and any work not tested will be automatically rejected.
- O. Contained in the various specification sections are requirements for certification of products, testing, adjusting, and balancing of equipment and other tests and standards. Testing is required for, but not limited to, the following items of work:
1. Soils-compaction control and hydrocarbon concentrations
 2. Cast-in-place concrete
 3. Concrete reinforcement
 4. Asphalt pavement
 5. Cement-Sand Backfill material
 6. Crushed limestone base materials
 7. Water and sludge
 8. Other items in the Scope of Work

1.7 **CONTRACTOR'S RESPONSIBILITIES**

- A. Cooperate with laboratory personnel; provide access to the work area.
- B. Provide to laboratory, preliminary representative samples of materials to be tested in required quantities.
- C. Furnish labor and equipment:
1. To provide access to the work to be tested.
 2. To obtain and handle samples at the site.
 3. To facilitate inspections and tests.
 4. For laboratory's exclusive use for storage and curing of test samples.

1.8 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer or Owner. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Refer to Section 01 33 00 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted
 - 2. Description of the Work tested or inspected
 - 3. Date test or inspection results were transmitted to Architect
 - 4. Identification of testing agency or special inspector conducting test or inspection

- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.4 REPAIR AND PROTECTION

- A. **General:** On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 40 15

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SUMMARY

- A. The testing laboratory shall make all inspections and perform all tests in accordance with the building code, local authorities, state regulations, **TxDOT Test Standards**, and the ASTM specifications and the Contract Documents.
- B. Materials and workmanship not meeting the required standards are to be removed and replaced. Replacement and subsequent testing shall be at the expense of the Contractor.
- C. Testing, inspection and certifications specified in other sections of these Specifications shall be paid by the Contractor.
- D. Inspection by the laboratory shall not relieve the Contractor or Fabricator of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

1.2 SELECTION AND PAYMENT:

- A. The General Contractor shall employ and pay for services of an independent testing laboratory, to perform inspection and testing services specified in this section and noted in other specifications sections. The selected independent testing laboratory shall furnish unit or hourly costs for performing work as described in this section. The Owner reserves the right to determine which tests and the quantity of each herein described or elected.

1.3 REFERENCED STANDARDS:

- A. The latest adopted edition of all standards referenced in the Section shall apply, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.

1.4 QUALITY ASSURANCE:

- A. Testing Laboratory shall meet the requirements of ASTM E329 and ASTM E543.
- B. Testing Laboratory shall be insured against errors and omissions by a professional liability insurance policy having a limit of liability not less than \$500,000.
- C. Testing Laboratory shall be under the direction of a Registered Engineer licensed in the State of Texas, having at least five years experience in inspection and testing of construction materials.
- D. Laboratory staff monitoring concrete work shall be ACI certified inspectors.

- E. Laboratory staff performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI, “Standard and Guide for Qualification and Certification of Welding Inspectors”. The inspector may be supported by assistant inspectors who may perform specific inspection functions under the supervision of the inspector. Assistant inspectors shall be currently certified AWS Certified Associate Welding Inspectors (CAWI). The work of the assistant inspectors shall be regularly monitored by the inspector, generally on a daily basis.
- F. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.5 LABORATORY RESPONSIBILITIES:

- A. Attend pre-construction meetings and progress meetings when requested, to coordinate work with the Contractor and address quality control issues.
- B. Test samples of design mixes submitted by Contractor.
- C. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
- D. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.
- E. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- F. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Materials.
- G. Perform all inspections and tests in accordance with building code requirements for “Special Inspection” whether or not such inspections are specified in the Contract Documents.

1.6 LABORATORY REPORTS:

- A. After each inspection and test, promptly submit copies of laboratory reports to Architect, Engineer, Owner and to Contractor.
- B. **Include:**
 - 1. Date issued
 - 2. Project title and number
 - 3. Name of inspector
 - 4. Date and time of sampling or inspection
 - 5. Identification of product and specifications section
 - 6. Location in the Project
 - 7. Type of inspection or test
 - 8. Date of test
 - 9. Results of tests
 - 10. Conformance with Contract Documents.

1.7 LIMITS ON TESTING LABORATORY AUTHORITY:

- A. Laboratory may not release, revoke, alter, or enlarge the requirements of the Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work, except where such approval is specifically called for in these specifications.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.8 CONTRACTOR RESPONSIBILITIES:

- A. See technical sections of these specifications for specific requirements.
- B. Advise laboratory sufficiently in advance of construction operations to allow laboratory to complete any required checks or tests and to assign personnel for field inspection and testing as specified.
- C. Provide facilities for safe storage and proper curing of concrete test samples on project site for the first 24 hours and also for subsequent field curing as required by ASTM specifications C31.
- D. Provide incidental labor and equipment as required to assist laboratory personnel in obtaining and handling samples at the site and in accessing work for inspection.
- E. Furnish concrete mix designs, in accordance with ACI 301, Section 3.9, made by an independent testing laboratory or qualified concrete supplier. Where mix designs are required, the laboratory shall be selected and paid by the Contractor.
- F. Provide current welder certifications for each welder to be employed.
- G. Furnish fabrication and erection inspection of all welds in accordance with the AWS D1.1, Chapter 6.
- H. Pre-qualification of all welding procedures to be used in executing the work

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 FILLING AND BACKFILLING:

- A. The Contractor shall make available to the laboratory, adequate samples of each fill and backfill material from the proposed sources of supply not less than 10 days prior to the start of the work.
- B. Laboratory shall analyze samples as required to provide a soil description and to determine compliance with quality requirements. Perform the following tests:

1. Test for liquid limit in accordance with ASTM D423.
 2. Test for plastic limit of soils and plasticity index of soils in accordance with ASTM D424.
 3. Tests for moisture density relations of soil in accordance with ASTM D698 or D1557, as applicable.
- C. Furnish a report for each individual test and state whether sample conforms to specified requirements or reasons for nonconformance.
- D. Inspect under slab drainage material and placement for compliance with specified gradation, quality and compaction.
- E. Make in-place compaction test for moisture content, moisture-density relationship, and density of fill material after compaction to determine that backfill materials have been compacted to the specified density. Number of tests shall be as follows:
1. One test for each 5,000 square feet of area of each lift placed under floor slab. Stagger test locations in each lift from those in the previous lift. Perform a minimum of three tests for each lift.
 2. One test for each 100 linear feet, or portion thereof, of each lift placed against foundation walls, with locations staggered from those in the previous lift.
 3. One test of each lift placed below any isolated footing, and every 100 linear feet under continuous footings, with locations taken on a different side from that in the lift below.

3.2 CONCRETE REINFORCING STEEL AND EMBEDDED METAL ASSEMBLIES:

- A. Inspect all concrete reinforcing steel prior to placing of concrete for compliance with the Contract Documents and approved shop drawings. All instances of noncompliance shall be immediately brought to the attention of the Contractor for correction. If uncorrected by the Contractor, they shall be listed in the report.
- B. **Observe and report on the following:**
1. Number and size of bars.
 2. Bending and lengths of bars.
 3. Splicing.
 4. Clearance to forms including chair heights.
 5. Clearance between bars or spacing.
 6. Rust, form oil, and other contaminations.
 7. Grade of Steel.
 8. Securing, tying and chairing of bars.
 9. Excessive congestion of reinforcing steel.
 10. Installation of anchor bolts and placement of concrete around anchor bolts.
 11. Fabrication and installation of embedded metal assemblies, including visual inspection of all welds.
 12. Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with Contract Documents.
- C. Provide a qualified, experienced inspector to inspect reinforcing steel. Inspector shall have a minimum of three years experience inspecting reinforcing steel in project of similar size.

3.3 CONCRETE INSPECTION AND TESTING

- A. Secure composite samples of concrete at the jobsite in accordance with ASTM C172.
- B. Mold and cure three specimens from each sample in accordance with ASTM C31. The test cylinders shall be stored in the field 24 hours and then carefully transported to the laboratory and cured in accordance with ASTM C31.
- C. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information.
- D. Make one strength test (three cylinders or beams) for each 75 cubic yards or fraction thereof, of each mix design placed in one day.
- E. Make one slump test for each set of cylinders following the procedural requirements of ASTM C143 and ASTM C172. Make additional slump tests whenever the consistency of the concrete appears to vary. Do not permit placement of concrete having measured slump outside the limits given on the drawings, except when approved by the Architect. Slump tests corresponding to samples from which strength tests are made shall be reported with the strength test results. Other slump tests need not be reported.
- F. Determine total air content of air entrained normal-weight concrete sample for each strength test in accordance with ASTM C231.
- G. Determine temperature of concrete sample for each strength test.
- H. Monitor the addition of water at the jobsite and the length of time the concrete is allowed to remain in the truck before placement. Report any significant deviation from the approved mix design to the Architect, the Contractor, and the concrete supplier.
- I. Observe the placing of all concrete, except non structural slabs-on-grade and site work. Observe and report on placing method, consolidation, cold joints, and length of drop and displacement of reinforcing. Report deficiencies to the Contractor immediately for corrective action. Inspections may be reduced to a periodic basis when all procedures have been deemed satisfactory by the laboratory.
- J. The testing laboratory shall certify each delivery ticket indicating class of concrete delivered (or placed), amount of water added and the time at which the cement and aggregate was dispensed into the truck, and the time at which concrete was discharged from the truck.
- K. **Evaluation and Acceptance:**
 - 1. If the measured slump or air content of air entrained concrete falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed to meet the requirements of the specifications and shall be rejected.
 - 2. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results are equal to or exceed the specified strength and no individual test result (average of two cylinders) is below the specified strength by more than 500 psi.

3. Completed concrete work will be accepted when the requirements of “Specifications for Structural Concrete for Building,” ACI 301, Chapter 18 have been met.
- L. Comply with ACI 311, “Guide For Concrete Inspection” and “ACI Manual of Concrete Inspection” (SP-2).
- M. Inspect the application of curing compound and monitor all curing conditions to assure compliance with Specification requirements. Report curing deficiencies to the Contractor immediately and submit a report to the Architect.

3.4 **MASONRY:**

A. **Compressive Test for Mortar**

1. Secure composite samples of mortar at the jobsite in accordance with ASTM C780.
2. Mold and cure three cube specimens in accordance with ASTM C109 and C780. Supervise the curing and protection provided by the contractor for test specimens in the field and the transportation from the field to the laboratory. The specimens shall be stored in the field 24 hours and then be moved to the laboratory and cured in accordance with ASTM C780.
3. Test specimens in accordance with ASTM C780. Two specimens shall be tested at 28 days for acceptance and one shall be tested at 7 days for information.
4. Make one strength test (three cubes) for each 2,000 square feet of wall area.

3.5 **STRUCTURAL STEEL:**

- ##### A. Inspect all structural steel during fabrication and during the after erection for conformance with Contract Documents and shop drawings, as requested by the Owner.

B. **Shop Inspection:**

1. Examination of steel for straightness and alignment.
2. Examination of all fabricated pieces for compliance with Contract Documents and shop drawings.
3. Visual examination of all shop welding.
4. Ultrasonic testing of all full penetration welds.
5. Examination of galvanizing.
6. Examination of installation of shop welded shear studs.
7. Examination of shop painting.

C. **Field Inspection:**

1. Proper erection of all pieces.
2. Proper installation of all bolts, including the checking of calibration of impact wrenches used with high strength bolts.
3. Plumbness of structure and proper bracing.
4. Field Painting.
5. Visual examination of all field welding.
6. Ultrasonic testing of all penetration welds.
7. Installation of field welded shear studs.

- ##### D. **Qualification of Welders:** Fabricator and erector shall provide the testing laboratory with names of welders to be employed in the work, together with certification that welders have passed

qualification tests within the last year using procedures specified in the AWS D1.1. The Owner shall verify all welders' qualifications.

- E. Inspection of shop and field welding shall be “verification inspection”, in accordance with Section 6 of AWS D1.1 on an “as needed” basis, and as follows:
1. Visually inspect the welding of all shop fabricated members and note the location of all cover plates, connectors, bearing stiffeners, splices, and fillet welds for proper return around ends and check for seams, folds, and delaminations.
 2. Ultrasonically test all penetration welds in accordance with ASTM E164.
 3. Inspect surfaces to be welded. Surface preparations, fit-up and cleanliness of surface shall be noted.
 4. The welding inspector shall be present during alignment and fit-up of members being welded, and shall check for correct surface preparation of root openings, sound weld metal and proper penetration in the root pass. Where weld has not penetrated completely, the inspector shall order the joint to be chipped down to sound metal, or gouged out and rewelded. Root passes shall be thoroughly inspected for cracks. All cracks shall be gouged out and rewelded to two inches beyond each end of crack.
 5. The inspector shall check that all welds have been marked with the welders' symbol. The inspector shall make the welds requiring repairs and shall make a reinspection. The inspector shall maintain a written record of all welds. Work completed and inspected shall receive an identification mark by the inspector.
 6. The testing laboratory shall advise the Owner and the Architect of any shop and/or field conditions which, in his opinion, may require further tests and examination by means other than those specified. Such further tests and examinations shall be performed as authorized by the Owner and the Architect.
 7. The Owner reserves the right to use ultrasonic or radiographic inspection to verify the adequacy of all welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1.
- F. Inspection of bolted construction shall be in accordance with AISC “Specification for Structural Steel Buildings” and as follows:
1. All bolts shall be visually inspected to ensure that the plies have been brought into snug contact.
 2. High strength bolting shall be inspected in accordance with Section 9 of the AISC “Specifications for Structural Joints Using ASTM A325 or A490 Bolts.”
 3. For all high strength bolts, unless specifically noted on the Drawings to require only “snug-tight” installation, the inspector shall observe the required jobsite testing and calibration, and shall confirm that the procedure to be used provides the required tension.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
 - 1 Exercise measures to conserve energy.
 - 2 Provide and install temporary overhead power from Utility Company.
 - 3 Set temporary meter and switchgear at start of construction.
 - 4 Specified switchgear shall not be used to construct building until building is in “dry-in” stage.
- B. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.
- C. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
- B. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Owner must authorize use of permanent system for temporary purposes.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.
- B. Enclose building prior to activating temporary cooling in accordance with enclosures article in this section.
- C. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Owner must authorize use of permanent system for temporary purposes.
- D. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases. Owner must authorize use of permanent system for temporary purposes.

1.7 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.
- B. Contractor shall provide, maintain, and pay for telephone service for field operations at time of project mobilization.

- C. **Electronic Communication Service:** Provide temporary electronic communication service, including electronic mail, in common-use facilities.

1.8 **FACSIMILE SERVICE**

- A. Provide, maintain and pay for facsimile service and dedicated telephone line to field office at time of project mobilization.

1.9 **TEMPORARY WATER SERVICE**

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations. Exercise measure to conserve energy.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.10 **TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.
- B. Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1.11 **FIELD OFFICES AND SHEDS**

- A. **Office:** Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture drawing rack and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 10 persons.
- C. Locate offices and sheds minimum distance of 30 feet from existing and new structures. Location shall be within the project site's limit of construction and approved by the Owner. No use of Owner equipment will be permitted.
- D. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.
- E. **Construction:** Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - 1 Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed at completion of Work.
 - 2 Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
 - 3 Exterior Materials: Weather resistant, finished color acceptable to Owner.
 - 4 Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.

- 5 Lighting for Offices: 50 ft C at desk top height, exterior lighting at entrance doors.
- 6 Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

F. **Environmental Control:**

- 1 Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
- 2 Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.

G. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 - Product Requirements.

H. **Preparation:** Fill and grade sites for temporary structures sloped for drainage away from buildings.

I. **Installation:**

- 1 Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- 2 Employee Residential Occupancy: Not allowed on Owner's property.

J. Maintenance And Cleaning:

K. Maintain approach walks free of mud, water, and snow.

L. **Removal:** At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.12 **VEHICULAR ACCESS**

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Location approved by Owner.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants and control valves free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering streets.
- H. Do not use existing on-site roads for construction traffic.

1.13 PARKING

- A. Provide temporary surface parking areas to accommodate construction personnel.
- B. Locate as approved by Owner.
- C. When site space is not adequate, provide additional off-site parking.
- D. Use of existing on-site streets and driveways used for construction traffic is not permitted.
- E. Do not allow heavy vehicles or construction equipment in parking areas.
- F. Do not allow vehicle parking on existing pavement.
- G. **Permanent Pavements and Parking Facilities:**
 - 1 Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
 - 2 Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
- H. **Maintenance:**
 - 1 Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 2 Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- I. **Removal, Repair:**
 - 1 Remove temporary materials and construction when permanent paving is usable.
 - 2 Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - 3 Repair permanent facilities damaged by use, to original or specified condition.
- J. **Mud From Site Vehicles:** Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- D. **Waste Disposal Facilities:** Provide waste-collection containers in sizes adequate to handle waste from the construction operations. Comply with requirements of authorities having jurisdiction.

Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site immediately after filled. Remove waste upon owner's request.

1.15 PROJECT IDENTIFICATION

A. Project Identification Sign:

- 1 One painted sign, 32 sq ft area, bottom 6 feet above ground.
- 2 Content:
 - a. Project number, title, logo and name of Owner as indicated on Contract Documents.
 - b. Name of Prime Contractor.
- 3 Graphic Design, Colors, Style of Lettering: Reviewed and approved by Owner.
- 4 No other signs are allowed without Owner permission except those required by law.

B. Design sign and structure to withstand wind velocity per building code.

C. **Sign Painter:** Experienced as professional sign painter.

D. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

E. Show content, layout, lettering and color.

F. Sign Materials:

- 1 Structure and Framing: New wood, structurally adequate.
- 2 Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick standard large sizes to minimize joints.
- 3 Rough Hardware: Galvanized
- 4 Paint and Primers: Exterior quality.

G. Installation:

- 1 Erect at designated location.
- 2 Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- 3 Install sign surface plumb and level, with butt joints. Anchor securely.
- 4 Paint exposed surfaces of sign, supports, and framing.

H. **Maintenance:** Maintain signs and supports clean, repair deterioration and damage.

I. **Removal:** Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 TRAFFIC REGULATION

A. Signs, Signals, And Devices:

- 1 Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
- 2 Traffic Cones and Drums, Flares and Lights: As approved by authority having jurisdiction.
- 3 Flag person Equipment: As required by authority having jurisdiction.

- B. **Flag Persons:** Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. **Flares And Lights:** Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. **Haul Routes:**
 - 1 Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
 - 2 Confine construction traffic to designated haul routes.
- E. **Traffic Signs and Signals:**
 - 1 Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 - 2 Relocate as Work progresses, to maintain effective traffic control.
- F. **Removal:**
 - 1 Remove equipment and devices when no longer required.
 - 2 Repair damage caused by installation.
 - 3 Remove post settings.

1.17 FIRE PREVENTION

- A. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1 Prohibit smoking with buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
 - 2 Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- B. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
 - 1 Provide minimum one fire extinguisher in every construction trailer and storage shed.

1.18 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.19 ENCLOSURES AND FENCING

- A. **Construction:** Commercial grade chain link fence.
- B. Provide 6 feet high fence around construction site; equip with vehicular and pedestrian gates with locks. Contractor may tie into existing chain link fence if it exists to complete enclosure of the construction site.
- C. **Exterior Enclosures:**
 - 1 Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.20 SECURITY

- A. **Security Program:**
 - 1 Protect Work and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2 Initiate program in coordination with Owner's existing security system at project mobilization.
 - 3 Maintain program throughout construction period until Owner occupancy.
- B. **Entry Control:**
 - 1 Restrict entrance of persons and vehicles into Project site.
 - 2 Allow entrance only to authorized persons with proper identification.
 - 3 Maintain log of workers and visitors, make available to Owner on request.
- C. **Personnel Identification (Owner occupied sites):**
 - 1 Provide identification badge to each person authorized to enter premises.
 - 2 Badge To Include: Personal photograph, name and assigned number, expiration date and employer.
 - 3 Maintain list of accredited persons, submit copy to Owner on request.
 - 4 Require return of badges at expiration of their employment on the Work.
- D. **Security Enclosure and Lockup:** Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- E. **Restrictions:**
 - 1 Do no work on days indicated in Owner-Contractor Agreement.

1.21 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.22 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.23 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.24 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.25 PEST CONTROL

- A. Provide methods, means, and facilities to prevent pests and insects from damaging the work.

1.26 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of [authorities having jurisdiction.

1.27 RODENT CONTROL

- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.28 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
- B. Remove underground installations. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 OPERATION, TERMINATION, AND REMOVAL

- A. **Supervision:** Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. **Maintenance:** Maintain facilities in good operating condition until removal.
 - 1 Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. **Temporary Facility Changeover:** Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. **Termination and Removal:** Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1 Materials and facilities that constitute temporary facilities are property of Contractor.
 - 2 Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3 At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Requirements."

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project.

1.2 DEFINITIONS

- A. **Products:** Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. **Named Products:** Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. **New Products:** Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. **Comparable Product:** Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. **Substitutions:** Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. **Basis-of-Design Product Specification:** Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.3 SUBMITTALS

- A. **Substitution Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. **Substitution Request Form:** Use form provided by Owner, reference Section 01 63 00 Substitutions and Product Options.
 - 2. **Documentation:** Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.

- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. **Architect's Action:** If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
- a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- B. **Comparable Product Requests:** Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 01 33 00 "Submittal Procedures."
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. **Basis-of-Design Product Specification Submittal:** Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. **Delivery and Handling:**
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. **Storage**
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Store cementitious products and materials on elevated platforms.
 - 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 7. Protect stored products from damage and liquids from freezing.
 - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Refer to Division 2 – 14, 21, 22-28, 31-33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 70 00 – Execution and Closeout Requirements.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. **Product Selection Procedures:**
 - 1. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 - 2. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 - 3. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 - 4. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 - 5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified

product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.

6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
7. Visual Matching Specifications: Where Specifications include the phrase “as selected from manufacturer’s colors, patterns, textures” or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.
 - a. Standard Range: Where specifications include the phrase “standard range of colors, patterns, textures” or similar phrase, Architect will select color pattern, or texture from manufacturer’s product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase “full range of colors, patterns, textures” or similar phrase, Architect will select color, pattern or texture form manufacturer’s product line that include both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Reference Section 01 25 00 – Substitutions and Procedures.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements.
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 80-ft. in spaces without a suspended ceiling.
- B. Comply with Manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use equipment or tools that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. 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. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

1.2 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Pre-installation Conferences: Include Owner's construction forces at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

1.3 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of Manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

1.4 FINAL CLEANING

- A. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instruction.
- C. Conduct the following cleaning operations before requesting inspection for certification of Final Completion for entire or a portion of the Project:
 - 1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - 2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - 3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - 4. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - 5. Remove snow and ice to provide safe access to building.
 - 6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - 7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - 8. Sweep concrete floors broom clean in unoccupied spaces.
 - 9. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - 10. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - 11. Remove labels that are not permanent.
 - 12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 13. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - 14. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

15. Replace parts subject to unusual operating conditions.
 16. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 17. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 18. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - a. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - b. Leave Project clean and ready for occupancy.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

1.5 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and Owner 14 days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.6 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of substantial completion.
- B. Demonstrate Project equipment and instructed by qualified representative who is knowledgeable about the Project.

- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.7 TESTING, ADJUSTING AND BALANCING

- A. Refer to Mechanical and Electrical Specifications for specific requirements.
- B. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.8 PROTECTING INSTALLED CONSTRUCTION

- A. Provide for temperature and relative humidity as per manufacturer's written instructions.
- B. Protect installed Work and provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.

1.9 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.

3. Addenda.
 4. Change Orders and other modifications to the Contract.
 5. Reviewed Shop Drawings, Product Data, and Samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
 7. Manufacturer's certificates
 8. Reviewed Submittals
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Label and file Record Documents in accordance with Section number listings in Table of Contents of this Project Specifications Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- E. Record information concurrent with construction progress, not less than weekly.
- F. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- G. Record Drawings and Shop Drawings: Provide felt tip pens, maintaining separate colors for each major system, for recording information. Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.
 6. Changes made by Addenda and modifications.
 7. References to related shop drawings and modifications.
- H. Submit two copies of documents to Architect/Engineer prior to or on Substantial Completion inspection.
1. Transmit with cover letter listing:
 - a. Date
 - b. Project title and number
 - c. Contractor's name, address, and telephone number.
 - d. Number and title of each Record Document.
 - e. Signature of Contractor or authorized representative.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable covers.

- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - 1) For equipment having a make, model and serial number, it shall be recorded in the O&M manuals.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.
- F. Submit two copies of documents to Architect/Engineer prior to or on Substantial Completion inspection.
 - 1. Transmit with cover letter listing:
 - a. Date
 - b. Project title and number
 - c. Contractor's name, address, and telephone number.
 - d. Number and title of each Record Document.
 - e. Signature of Contractor or authorized representative.

1.11 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

- C. Submit one copy of completed volumes 15 days prior to substantial completion. Draft copy will be reviewed and returned with Architect/Engineer comments. Revise content of document sets as required prior to substantial completion.
- D. Submit two sets of revised final volumes in final form before or on date of substantial completion
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. [Include information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.12 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit a preliminary digital draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review and return a digital copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit a digital copy of completed volumes 15 days prior to substantial completion Draft copy will be reviewed and returned with Architect/Engineer comments. Revise content of document sets as required prior to substantial completion.
- D. Submit one (1) digital and one (1) hardcopy set of revised final volumes in final form prior to or on date of substantial completion inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.

- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.
- S. Additional Requirements: As specified in individual product specification sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.13 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to or on substantial completion inspection.

1.14 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- F. Submit prior to or on substantial completion inspection.
- G. For equipment or components parts of equipment put into service during construction or For items of Work for which acceptance is delayed beyond Date of Substantial Completion refer to the Building General Conditions.

1.15 SUBSTANTIAL COMPLETION

- A. **Preliminary Procedures:** Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.

14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
15. Complete work on items listed on Punch Lists.

- B. **Inspection:** Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.16 FINAL COMPLETION

- A. **Preliminary Procedures:** Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. **Inspection:** Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.17 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. **Preparation:** Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A or form acceptable to the Owner and Architect.
1. Organize list of spaces in sequential order, starting with exterior areas first.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.18 COMPLETED FINAL PUNCHLIST INSPECTION

- A. Correct or complete all items on the punch list before requesting final payment. Unless otherwise agreed upon, the contractor has seven (7) days of receipt of final punch list. When the final punch list is complete and the Contract is fully satisfied according to Contract Documents, a certificate establishing the date of Final Completion will be issued.
- B. Refer to the Building General Conditions for Owner's right to complete the work in the event the contractor does not complete the final punch list.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 31 23 17
TRENCHING – SPECIFICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK:

- A. Furnish all labor, materials, tools, equipment and incidentals necessary to accomplish the required trenching to complete the project as shown on the drawings and as specified herein.
- B. The standards and requirements listed in this specification shall govern the trenching for all types of buried utilities, including water, wastewater, and electrical. Refer also to plans, notes, and details in the project drawings for additional requirements.

1.2 REFERENCES:

- A. TDH - Texas Department of Health, Water System Regulations
- B. TXDOT - Texas Department of Transportation, "Standard Specifications for Construction of Highways, Streets and Bridges." 1993
- C. TMUTCD - Texas Manual on Uniform Traffic Control Devices.

1.3 PROTECTION OF EXISTING FACILITIES:

- A. Prior to beginning any earthwork operations, protect existing and permanent objects including existing utilities, poles, guys, and roadways.
- B. The Contractor shall be responsible for locating all existing underground utilities prior to starting excavation operations.

1.4 PAVING REPAIRS:

- A. The Contractor shall repair all paved areas that are cut when trenching or damaged as a result of machinery or operations by the Contractor or Subcontractors. The fill shall be completed and compacted a minimum of 4 inches below the undisturbed paving surface. New compacted base shall be a minimum of 2 inches, and new paving shall be a minimum of 2 inches. See Texas Department of Transportation, "Standard Specifications for Construction of Highways, Streets and Bridges" for specific paving requirements.

1.5 SUB-SURFACE CONDITIONS:

- A. No subsurface borings have been made in the areas where trenching is to be accomplished. Bidders are responsible for ascertaining pertinent site conditions and subsurface conditions prevalent in the area of work.

PART 2 - PRODUCTS

2.1 SAND:

- A. Where use of sand is designated in these specifications or on the drawings, material shall be clean, granular material composed mainly of mineral matter free of mud, salt, clay lumps, vegetation, or debris. Sand as defined here shall be Class II, Soil Group SW (Well-graded sands and gravelly sands; little or no fines), but shall pass 100 percent through a 3/8 inch (9.5 mm) Sieve, and less than 5 percent through a No. 200 (0.075 mm) Sieve.

2.2 FILL:

- A. Where use of fill is designated on the drawings, excess excavated materials or materials from other locations on the project site may be used, or the Contractor may obtain approved fill material from a source outside the premises.
- B. Fill material shall be free of vegetation, debris, rocks, and boulders exceeding 2 1/2 inches in their greatest dimension. The "fines" resulting from the use of a trenching machine may be used as fill and/or bedding if the Owner inspects and approves the materials.
- C. Fill material used under all pavement crossing repairs shall be cement stabilized with a 2- sack mix prepared with Portland cement and sand with a 7 to 9 slump. This mixture may be delivered or mixed on site with approved fill material

2.3 HOT MIX, COLD LAID ASPHALTIC CONCRETE:

- A. The Contractor shall notify the Owner's representative of the source of his asphaltic concrete and submit its composition for approval. See Texas Department of Transportation, "Standard Specifications for Construction of Highways, Streets and Bridges" for specific requirements.

2.4 CRUSHED STONE:

- A. Where use of crushed stone is designated on the drawings, material shall consist of angular material containing hard durable particles or fragments of stone or gravel.
- B. The material shall be free from vegetation of all kinds, loam lumps or excessive amounts of clay, rocks or boulders exceeding 2 inches in their greatest dimension, and other foreign substances.
- C. Approval of the material shall be obtained from the Inspector and/or Project Engineer prior to use for the project.

PART 3 - EXECUTION

3.1 FACILITY OPERATIONS:

- A. The Contractor shall be responsible for public safety and security around the construction sites. All temporary fencing, barricades, warning lights, signs and flagmen shall be provided and maintained by the Contractor, and shall provide protection of the public from open excavations, trenches, etc., in addition to all other construction operations. The Contractor shall comply with TXDOT "Standard Specifications for Construction of Highways, streets and Bridges," Item 502,
- B. and TMUTCD (Texas Manual on Uniform Traffic Control Devices).

3.2 EXCAVATION AND TRENCH PROTECTION:

- A. The walls and faces of excavations and excavated trenches more than 5 feet deep or with evident hazardous ground movement in which workers are exposed to danger from moving ground shall be guarded by shoring system, trench boxes or trench shields, sloping of the ground, or other equivalent means.
- B. The determination of the angle of repose and the design of the supporting system shall be based on careful evaluation of the depth of the cut, material, changes in material, water content variations, and external loadings. The minimum requirements for determining the angle of repose and for the shoring of excavations or trenches, shall be in accordance with the latest edition of Part 1926, Subpart P, Excavations, of the Occupational Safety and Health Administration's (OSHA) "OSHA Safety and Health Standards (29 CFR 1926/1910)". Existing vegetation shall not be damaged or removed to accomplish a required angle of repose unless previously approved by the Owner in writing.
- C. Shields, boxes or shoring shall be used when the location of the excavation is in a restricted area or within close proximity to other utility lines or structures. Shoring walls shall be used where necessary.

3.3 EXCAVATION FOR TRENCHING:

- A. The Contractor shall mark the limits proposed for clearing for approval by the Owner prior to starting any work. The Contractor shall not perform clearing outside the approved clearing limits without the prior written consent of the Owner.
- B. Individual trees, groups of trees, and other vegetation outside the clearing limits shall be thoroughly protected from damage incident to construction operations by the erection of barriers or by such other means, as the circumstances require, as approved by the Owner. All trees including low hanging limbs within the immediate area of construction shall be adequately protected to prevent damage from the construction operations and/or equipment. All excavation within the outermost limb radius of all trees shall be accomplished with extreme care. All roots located within this outermost limb radius shall be brought to the attention of the Owner before they are cut or damaged in any way. The Owner will give immediate guidance concerning how to proceed.
- C. Where excavation requires the opening of existing walks, streets, drives, other existing pavement, or planted areas, such surfaces shall be cut as required to install new lines and to make new connections to existing lines. The sizes of the cut shall be held to a minimum, consistent with the work to be accomplished. After the installation of the new work is completed and the excavation has been backfilled and flooded as specified, the area shall be patched, using materials to match those removed or disturbed. The patches shall thoroughly bond with the original surfaces shall be level with them, and shall meet all of the requirements established by the authorities having jurisdiction over such areas.
- D. Trenches shall be open cut trenches with vertical sides. Excavated material shall be piled in a manner that will not endanger the work. Excavation shall include removal of all materials encountered.
- E. The Contractor shall excavate trenches with a minimum width of the diameter of the piping plus 12 inches. Maximum width of trench shall be the diameter of the piping plus 24 inches. The trenches shall be excavated true to line so that a clear space not less than 6" nor more than 12" in width is provided on each side of the pipe.
- F. The bottom of trenches shall be accurately graded to provide proper uniform bearing and support for each section of the pipe on a minimum of 4" of sand fill at every point along its entire length, except for portions of the pipe sections where it is necessary to excavate for bell holes for the proper sealing of pipe joints.

- G. Bell holes shall be dug after the trench bottom has been graded. Bell holes for pipe joints shall be 12" in depth below the trench bottom and shall extend from a point 6" back of the face of the bell. Such bell holes shall be of sufficient width to provide ample room for pipe assembly. Bell holes for water pipe shall be excavated only to an extent sufficient to permit accurate work in the making of the joints and to insure that the pipe, for a maximum of its length, will rest upon the prepared bottom of the trench. Depressions for joints other than bell-and-spigot shall be made in accordance with the recommendations of the joint manufacturer for the particular type of joint used.
- H. Except at locations where excavation of rock from the bottom of trenches is required, care shall be taken not to excavate below the depths required. Where rock excavation is required, the rock shall be excavated to a minimum overdepth of 6" below the trench depths specified. The overdepth rock excavation and all excess trench excavation shall be backfilled with sand.
- I. Whenever wet or otherwise unstable soil is incapable of properly supporting the pipe is encountered in the trench bottom, such soil shall be removed to a depth and for the trench lengths required, and then backfilled to trench bottom grade, as hereinafter specified, with sand.
- J. The Contractor shall perform all excavations to the depths indicated on the Drawings and/or required for the installation of piping, utility systems, etc. All exterior lines shall be installed with a minimum cover of 18", including sand and fill, unless noted otherwise. Generally, more cover shall be provided if grade will permit.
- K. All grading in the vicinity of the excavations shall be controlled to prevent surface ground water from flowing into the excavations. Any water accumulated in the excavations shall be removed by pumping or other acceptable method.
- L. During excavation, material suitable for backfilling shall be stacked in an orderly manner a sufficient distance back from edges of trenches to avoid overloading and prevent slides or cave-ins. Material unsuitable for backfilling shall be wasted and removed from the job site as specified herein.
- M. All trenching is unclassified. Contractor shall be responsible for trenching in all materials.

3.4 DISPOSAL:

- A. All material cleared from the site and all excess and unsuitable materials excavated during construction operations shall become the property of the Contractor.
- B. Remove material that is excess and unsuitable from the site and dispose of it.

3.5 SLEEVES:

- A. All pipes shall be sleeved where routed under roads. Piping routed under walkways does not require sleeving. Sleeves shall be Schedule 80 PVC. Sleeve shall be 2 diameters larger than the nominal pipe diameter.
- B. Install sleeves after excavation of pavement or boring under road. Coordinate sleeving for water pipes and electrical conduits that cross roads at the same locations.

3.6 CUTTING PAVEMENT:

- A. The Contractor shall stake each proposed trench route that passes through paved areas and cut pavement with a clean, even cut using a pavement saw.
- B. Pavement surface shall be pre-cut slightly wider than the width of the trench prior to trench excavation.
- C. All loose pavement shall be removed by hand, leaving all base material undisturbed in order to prevent any undermining of adjacent pavement surface during trenching operation.
- D. See Texas Department of Transportation, "Standard Specifications for Construction of Highways, Streets and Bridges" for additional requirements.

3.7 FILL AND BACKFILL:

- A. Trenches shall not be backfilled until all required tests are performed and until the piping, utilities systems, etc., as installed are certified by the Owner's inspector to conform to the requirements specified hereinafter. Trenches shall not be backfilled beyond a depth of 4 inches without the inspection and approval of the Owners representative. In the event that a trench is backfilled without the specified inspection and testing, then the Contractor shall excavate the trench, exposing the pipe, dispose of the excavated material, allow for the inspection, perform the specified tests, and then proceed to backfill the trench as specified.
- B. Complete fill and backfill to grades indicated on drawings or to match the grades existing prior to excavation. The Contractor shall be responsible for providing sufficient backfill material to insure completed work will not have ruts, holes, or depressions over backfilled trenches. Top of backfilled trench shall be slightly mounded above surrounding grade to allow for settlement, except for backfilled trenches in pavement cuts.
- C. All non-metallic piping systems shall be installed with a minimum 6-gage solid copper wire centered and strapped on the top of the pipe. The wire shall be securely held in place so that it will not be moved out of position by the sand backfill and compaction operation. The wire shall be installed along the entire length of the pipe, and shall be electrically continuous. The ends of discontinuous wire shall be joined using electrical brass clamps. The wire may be insulated, however insulation is not required.
- D. Trenches shall be carefully backfilled with sand to a minimum depth of 6 inches above the top of the pipe unless noted otherwise. The next layer and subsequent layers of backfill may be excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand and gravel, soft shale, or other approved materials free from large clods of earth or stones larger than 1" in diameter, flooded until the pipe has cover of not less than one foot. The remainder of the backfill material shall then be placed into the trenches, moistened, and tamped or flooded in one-foot layers. Blasted rock, broken concrete or pavement, and large boulders shall not be used as backfill material. Any trenches improperly backfilled, or where settlement occurs, shall be reopened to completely expose the pipe, and then backfilled in strict accordance with these specifications.
- E. Compaction: Clean, washed sand shall be bedded around all water piping and placed in the trench as shown on the drawings. This sand backfill shall be water-tamped by flooding this portion of the trench with water and allowing the sand to settle as the water recedes or is absorbed.
- F. Compacting equipment and method of compaction for fill shall be such that uniform density will be obtained over the entire area and depth of material being compacted. Hand tamping shall be done with mechanical hand tamper. Compact areas to a density equal to the surrounding undisturbed soil unless noted otherwise. Backfill shall be compacted in 6" lifts.

3.8 PATCHING PAVEMENT:

- A. The Contractor shall prepare the pavement surface on either side of the trench by removal of all excavated soil, gravel and debris from the adjacent pavement surfaces. The pavement edge of the trench shall be a straight, clean edge at least 3" back from the walls of the trench. If pavement edge is damaged during trenching or backfill, the edge shall be re-cut to obtain a clean, even edge.
- B. The stabilized backfill material for pavement crossings shall be allowed to cure for a minimum of 24 hours prior to preparation for pavement patching. Each crossing shall be primed over the entire surface with type RC-30 asphalt. The edges of the existing pavement shall also be tacked with type RC-30 asphalt. This tack shall be allowed to cure long enough to allow excess RC-30 to soak in but tack material should still be "sticky" so that cold laid asphalt will adhere to surfaces.
- C. The Contractor shall use a 2" hot mixed, cold laid asphaltic concrete compacted to complete backfilling of the trench. Sufficient asphaltic concrete shall be placed and compacted to insure a level or slightly mounded surface above the existing pavement.
- D. See Texas Department of Transportation, "Standard Specifications for Construction of Highways, Streets and Bridges" for additional requirements.

END OF SECTION

SECTION 32 31 13
CHAIN LINK FENCES AND GATES – SPECIFICATIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Fence framework, fabric and accessories
 - 2. Excavation for post bases
 - 3. Concrete foundation for post
 - 4. Cantilever, V Track gates and related hardware
- B. Related sections:
 - 1. Section 31 23 17 Trenching

1.2 REFERENCES

- A. ASTM INTERNATIONAL(ASTM):
 - 1. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - 5. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
 - 6. ASTM A817 - Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcellled Tension Wire.
 - 7. A1011/A1011M-07 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
 - 8. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 9. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
 - 10. ASTM F552 - Standard Terminology relating to Chain Link Fencing.
 - 11. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
 - 12. ASTM F626 - Standard Specification for Fence Fittings.
 - 13. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric.

14. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
15. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
16. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
17. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
18. ASTM F1183 - Standard Specification for Aluminum Alloy Chain Link Fence Fabric.
19. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
20. ASTM F1345 - Standard Specification for Zinc - 5% Aluminum -Mischmetal Alloy- Coated Steel Chain-Link Fence Fabric.

1.3 QUALIFICATIONS

- A. Installer: Company in performing work of this section must have minimum 3 years documented experience and have any certifications needed to perform work from manufacturer.
- B. The contractor shall provide personnel who are properly licensed (when license is required), qualified and have minimum 3 years documented experience and have any certifications needed to perform work from manufacturer.

1.4 DELIVERY STORAGE AND HANDLING

- A. Deliver materials to site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Provide fencing materials that conform to ASTM A121, ASTM A123/A123M, ATSM A153/A153M, ASTM A392, ASTM A491, ATSM A817, A1011/A1011M-07, ATSM B429/B429M, ATSM C94/C94M, ASTM F552, ATSM F567, ASTM F626, ASTM F668, ASTM F900, ASTM F934, ASTM F1043, ASTM 1083, ASTM F1183, ASTM F1184, ASTM F1345

2.2 ZINC COATING:

- A. Ferrous-metal components and accessories, except as otherwise specified must be hot-dip galvanized after fabrication.
 1. Provide zinc coating of weight not less than 0.90 ounces per square foot.

2.3 FABRIC:

- A. Type I, zinc-coated steel, 9 gauge. Mesh size, 2 inches. Provide selvage twisted and barbed at both selvages. Height of fabric shall be 6 feet.

2.4 POSTS:

- A. All posts shall be Class 1 galvanized steel pipe. Fence line posts; 2 3/8 inch OD, schedule 40, minimum wall thickness schedule 40, with all brace joints welded in place and completely around the joint. End, Corner and brace post 2 7/8' inch OD, minimum wall thickness schedule 40. Line Post: 2 3/8" OD minimum wall thickness schedule 40. Personal gate posts shall be as indicated on the drawings.

2.5 BRACE ASSEMBLY:

- A. Bracing must consist of 1 5/8" inches O.D with minimum wall thickness schedule 40 pipe with adjustable truss rods and turnbuckles.

2.6 BARBED WIRE:

- A. Provide barbed wire conforming to ASTM A 121 zinc – coated, Type Z, Class 3, with 12 gauge wire with 14 gauge, round, 4 – point barbs spaced no more than 5 inches apart. Fence line is to have 3 strands of barbed wire on top.
- B. Install barbed wire as indicated on the drawings and as recommended by the manufacturer. Pull barbed wire taut and attach to the arms with clips or other means that will prevent easy removal. Barbed wire shall be securely fastened at gate post, corner post, and pull posts. All barbed wire shall be stretched and permanently secured to a tension that will not deflect more than 2" when a pull of 20lbs is applied in the center of the span.

2.7 BARBED WIRE SUPPORTING ARM

- A. Pressed steel arms with provisions for attaching 3 rows of barbed wire. Arms shall withstand 250 lb. (113.5 kg) downward pull at outermost end of arm without failure. Provide [45°] [3 strands, single arm] Provide intermediate arms with hole for passage of top rail.

2.8 TOP RAIL

- A. Use material meeting ASTM F1043 Group 1A or 1C for all top rail pipes. Provide 1 5/8" OD top rail (minimum wall thickness .145) manufactured from Group 1A standard weight (Schedule 40) steel pipe weighing 2.72lb/ft per foot. Provide pipe in sections at least 21' long joined with outside steel sleeve couplings at least 6 in. long with a minimum wall thickness of 0.70 in. Use couplings designed to allow for expansion of the top rail.

2.9 TENSION WIRE

- A. Wire must be galvanized, No. 7 – gage, coil spring wire, with a minimum breaking strength of 1,950 lb. provided at the bottom of the fabric only.

2.10 STRETCHER BARS

- A. Provide bars that have one – piece lengths equal to the full height of the fabric with a minimum cross section of 3/16" by 3/4", in accordance with ATSM A 116, ASTM A 702 and ASTM F 626.

2.11 POST TOPS

- A. Formed steel, cast malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. Cap to have provision for barbed wire when necessary. Provide top rail on all fencing with tops to permit passage of top rail.

2.12 TENSION AND BRACE BANDS

- A. Provide medium duty bands for securing bars to post spaced not over 15 inches on center. Bands may also be used in conjunction with special fittings for securing rails to post. Provide bands with projecting edges chamfered or eased.

2.13 GATES

- A. Gate to be same design and style to match fence. Gate and all tubing shall be galvanized after welding and before assembly and installation.
- B. All gates to be UL 325 compliant.
- C. Type II, cantilever or V Track as indicated on drawings. Field verify the size for bidding and installation purposes. Framing and bracing member, round of galvanized steel. Each end member of gate frames shall be extended sufficiently above the top member with caps permanently installed to carry 3 strands of barbed wire in horizontal alignment with barbed strands on the fence. Gate frames and braces of minimum sizes listed, top and bottom horizontals 2 3/8" schedule 40, verticals 1 7/8" schedule 40 and diagonals 1 3/8" inches OD. Gate leaves more than 8 feet wide shall have both intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Diagonal cross – bracing consisting of 1 3/8" Galvanized Steel Tubing must be provided where necessary to obtain frame rigidity without sag or twist. Gate fabric shall be as specified for chain – link fabric. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Galvanized Coating for steel latches, nuts, bolts, stops, keepers and accessories. All gate leaves shall have an intermediate member.
- D. Gate shall allow full clearance for drive. Gates shall roll smoothly and easily to be completely clear of the drive when retracted and shall have stops on each end to prevent passing rollers. Cantilever shall have clearance of 3 to 5 inches. Gate shall have a device for locking when closed to secure maintenance yard.
- E. Roller shall be covered nylon roller with sealed bearings and be easy to replace for maintenance. (Weldon WI-CR3-N-TBC or TXDOT approved equal).
- F. V Track gate shall have concrete pour of 24" wide and 12" deep with bolts set to attach V Track to as per drawings. V Track shall be galvanized after welding is completed. Concrete shall have #4" rebar on 4" centers and shall be type F4,200 psi.

2.14 GATE HARDWARE AND ACCESSORIES

- A. Provide gate hardware and accessories that conforms to ASTM A 116, ATSM A 702, ASTM F 626.

2.15 MISCELLANEOUS HARWARE

- A. Provide miscellaneous hot–dip galvanized hardware as required.

2.16 WIRE TIES

- A. All ties to be 9 gauge [0.148” (3.76 mm) aluminum wire spaced 15 inches on center.

2.17 CONCRETE

- A. Provide concrete conforming to ASTM C 94/C 94m. Concrete must obtain a minimum 28-day compressive strength test of 3000 psi for all post and 4200 psi V Track.
- B. Center posts in their footings. Place concrete and compact by tamping or other approved methods. Machine mix all batches of concrete over 1/2 cu. yd. Hand mixing concrete is allowed on batches under 1/2 cu. yd.
- C. Use forms for footings where the ground cannot be satisfactorily excavated to neat lines. Crown the concrete or grout (for solid rock) to carry water from the post. Keep the forms in place for at least 24 hr. Backfill the footing with moistened material as soon as each form is removed, and thoroughly tamp. Cover concrete with at least 4 in. of loose moist material, free of clods and gravel, immediately after placing concrete. No other curing is required.

PART 3 – EXECUTION

Completed installation must conform to ASTM F 567. The work shall include, but not be limited to the following:

3.1 GENERAL

- A. Clear fence line of trees, brush and other obstacles as indicate on plans to install fencing. Establish a fine graded, compacted fence line.
- B. The new fence and gate are to be installed as indicated on the plans. The old fence gates shall be removed and disposed of as indicated on the plan. Unless otherwise directed by TXDOT Project Manager.
- C. Fence to follow grade of the land.

3.2 EXCAVATION

- A. Excavations for post must be augured holes in virgin or compacted soil of minimum sizes as indicated on the plans.
- B. Soil from excavation must be spread uniformly adjacent to the fence line or on areas of TXDOT property as directed. Rock over 1” shall be removed from the hole.
- C. When solid rock is encountered, the contractor must drill to the full depth as indicated on the plans.
- D. Space the line post uniformly at 10’ (3048 mm) on center.

- E. Locate terminal post at each fence termination and change in horizontal or vertical direction of 20' or more.
- F. Brace Posts Not to Exceed 500' and are to be center in fence lines. Fence lines requiring multiple brace posts are to be spaced evenly throughout the fence line.

3.3 SETTING POST

- A. Remove loose and foreign materials from holes and the soil moistened prior to placing concrete.
- B. Set post in concrete. Each most post must be plumb and in line, with tops aligned, and maintained in position during placement and finishing operations.
 - Bollards - 24" Diameter x 48" Deep
 - Gate Posts - 18" Diameter x 48" Deep
 - Terminal/Brace Posts - 12" Diameter x 36" Deep
 - Line Posts - 12" Diameter x 36" Deep
- C. Provide tops of footings that are trowel finished and sloped or domed at least 1" above finished grade to shed water away from post. Set hold – open devices, sleeves, and other accessories in concrete.

3.4 BRACING

- A. Brace gate, corner, end and pull posts to nearest post with a horizontal brace used a compression member, placed at mid height of fence fabric, and a diagonal truss rod and truss tightener used as a tension member.

3.5 BRACE ASSEMBLY

- A. Contractor must provide bracing assemblies at end and gate post and at both sides of corner and pull post, with the horizontal brace located at mid-height of the fabric.
- B. Install Brace assemblies so post is plumb when the diagonal rod is under tension.

3.6 TENSION WIRE INSTALLATION

- A. Install tension wire as indicated on the plans. For tying fabric to tension wire, 9 gauge [0.148" (3.76 mm) hog rings must be spaced 15 inches on center and at each post.

3.7 FABRIC INSTALLATION

- A. Provide Fabric in single lengths between stretch bars placed so that the bottom of the fabric is a nominal distance of 2" above the ground line; however, over irregular ground this distance may vary between 1" and 5" for a distance not to exceed 8'.

- B. The contractor shall install and pull taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Pull fabric taut and tied to posts, rails, and tension wire with wire ties and bands. Fasten fabric to line posts at approximately 15” intervals and fastened to all rails and tension wires at approximately 15” intervals. Fabric must remain under tension after the pulling force is released.
- C. Install fabric on the security side of fence, unless otherwise directed.
- D. Provide fabric continuous between terminal posts; however, runs between terminal posts shall not exceed 500'.

3.8 BARBED WIRE AND SUPPORT ARM INSTALLATION

- A. Install barbed wire supporting arms and barbed wire as indicated on the drawings and as recommended by the manufacturer. Anchor supporting arms to the posts in a manner to prevent easy removal with hand tools. Pull barbed wire taut and attach to the arms with clips or other means that will prevent easy removal. Barbed wire shall be securely fastened at gate posts, corner posts, and pull posts. All barbed wire shall be stretched and permanently secured to a tension that will not deflect more than 2 inches when a pull of 20 pounds is applied in the center of the span.

3.9 STRETCHER BAR INSTALLATION

- A. Thread stretcher bars through or clamped to fabric 4 inches on center and secured to posts with metal bands spaced 15 inches on center.

3.10 GATE INSTALLATION

- A. Gate to be set at 3” maximum clearance from ground or concrete or over curb. Top of gate sections and barbed wire to be straight, plum, square, and level.
- B. Gate shall allow full clearance for drive. Gates shall roll smoothly and easily to be completely clear of the drive when retracted and shall have stops on each end to prevent passing rollers. Cantilever shall have clearance of 4 to 6 inches. Gate shall have a device for locking when closed to secure yard.

3.11 TIE WIRES

- A. Provide tie wires that are U-shaped to the pipe diameters to which attached. Twist ends of tie wires not less than two full turns and bent so as not to present a hazard.

3.12 BOTTOM TENSION WIRE

- A. Install bottom tension wires before installing chain-link fabric and pull wires taut. Place bottom tension wires as indicated on the plans.

3.13 POST CAPS

- A. Install post caps on all vertical posts.

3.14 GROUNDING AND BONDING

A. Ground fencing as indicated and specified:

1. Fences crossed by overhead powerline must be grounded. Electrical equipment attached to the fenced must be grounded. Ground fence on each side of all gates, at each corner, at the closest approach to each building located within 50 feet of the fence, and where fence alignment changes more than 15 degrees. Grounding locations must not exceed 750 feet. Bond each gate panel with a flexible bond strap to its gate post Ground fences crossed by powerlines of 600 volts or more at or near the point of crossing and at distances not exceeding 150 feet on each side of the crossing. Ground conductor must consist of No. 6 AWG solid copper wire. Grounding electrodes must be 5/8 inch by 8 foot long copper-clad steel rod. Drive electrodes into the earth so that the top of the electrode is at least 2 inches above grade. Clamp Ground conductor to the fence and electrodes with bronze grounding clamps top create electrical continuity between fence posts, fence fabric, and ground rods. Total resistance of the fence to the ground must not be greater than 25 ohms. Provide OHM report and detailed As-Built of locations provided.
2. Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
3. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
4. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces. Retain paragraph below if fencing terminates at a building or other structure equipped with lightning protection system.
5. Bonding to Lightning Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning protection down conductor or lightning protection grounding conductor complying with NFPA 780.

3.15 SECURITY

- A. Install new security fencing, remove existing security fencing, and perform related work to provide continuous security for facility. Schedule and fully coordinate work with Project Manager, TXDOT local representative and TXDOT Security.

3.16 CLEAN UP

- A. Remove waste fencing materials and other debris from the work site daily.

PART 4 – SPECIAL NOTICES/PROVISIONS

- A. Company shall furnish and install all materials, accessories, labor, services, equipment, and incidentals required to perform and complete the work specified herein and as shown on the attached drawings. Unless otherwise specified, all materials and equipment incorporated under this Contract shall be new.

- B. Company is strongly encouraged to visit/inspect the site prior to estimate and submitting a bid. The Company is responsible for ascertaining pertinent existing conditions, verifying existing dimensions(s) or areas, determining all material quantities required and labor requirements. The Company shall become familiar with the site and have any questions answered and issues resolved to their satisfaction prior to submitting a bid; failure to do so, will not relieve the Company from the responsibility for successfully performing and completing the work without additional expense to the State.
- C. This facility shall remain in operation throughout the duration of the work specified herein.
- D. Contractor to provide, as necessary, barriers, to close the area and protect employees and the public.
- E. Contractor shall notify TxDOT 48 hours in advance of work starting. TxDOT shall be notified of any work performed during TxDOT's normal working hours. For this contract, TxDOT's normal working hours shall be defined as Monday through Thursday, 8:00 am to 5:00 p.m.
- F. The contractor shall be responsible for all of the surrounding area and traffic during gate installation.
- G. The contractor shall be responsible for all damages incurred as a result of construction activities.
- H. Alcohol & Drugs. The contractor shall not allow the possession of or consumption of any alcoholic beverages or illegal drugs on TxDOT property by his employees or sub-contractors.
- I. Smoking is not allowed within 20 feet of any TxDOT building.
- J. TxDOT's Standard Specification Item 550, Chain Link Fence will supersede when disputed.

END OF SECTION

SITE SURVEYS – PROJECT LOCATION

Lubbock SE MNT Surveys
Lubbock County, TEXAS
Site No: 059003

Survey Plat

Fence & Gate location

Survey notes

Survey notes