CITY OF IRVINE

ORANGE COUNTY, CALIFORNIA

NOTICE INVITING BIDS, PROPOSAL, CONTRACT AND SPECIAL PROVISIONS FOR

PORTOLA SPRINGS COMMUNITY PARK INDIGENOUS INTERPRETIVE SPACE – PHASE 1 IRVINE, CALIFORNIA CIP 372501 BID NO. PK-26-0041

CITY OF IRVINE
17101 ARMSTRONG AVE
IRVINE, CALIFORNIA 92614

PREPARED BY:
KIMLEY-HORN AND ASSOCIATES, INC.
1100 TOWN & COUNTRY RD. SUITE 700
ORANGE, CA 92688

DECEMBER 2025

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
IRVINE, CALIFORNIA
CIP 372501

THE SPECIAL PROVISIONS CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER THE DIRECTION OF:

CIVIL:



12/18/2025

Barsin Bet Govargez, P.E.
Registered Civil Engineer No. 81751

Date

LANDSCAPE:



12/18/2025

Mattew Durham
Licensed Landscape Architect No. 4840

Date

APPROVED BY:



12/18/2025

Lincoln Lo, P. E.
Deputy Director/City Engineer

Date

TABLE OF CONTENTS

NOTICE INVITING BIDS i
INSTRUCTIONS TO BIDDERS, PROPOSAL REQUIREMENTS AND CONDITIONS ... 1
BIDDER'S PROPOSAL 13
SCHEDULE OF WORK 14
INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS 15
INFORMATION REQUIRED OF BIDDERS 17
LIST OF SUBCONTRACTORS 24
NON-COLLUSION DECLARATION-CONTRACTOR 25
FORM OF BID BOND 26
FALSE CLAIMS 28
CIVIL LITIGATION AND ARBITRATION HISTORY 29
CRIMINAL CONVICTIONS 30
VIOLATION OF LAW OR A SAFETY REGULATION 31
CONSTRUCTION CONTRACT 33
PERFORMANCE BOND (SAMPLE) 39
PAYMENT BOND (SAMPLE) 41
SPECIAL PROVISIONS 43
PART 1 – GENERAL PROVISIONS 44
SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS 44
SECTION 2 – SCOPE OF THE WORK 48
SECTION 3 – CONTROL OF THE WORK 56
SECTION 4 – CONTROL OF MATERIALS 91
SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES 96
SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK 109
SECTION 7 – MEASUREMENT AND PAYMENT 124
SECTION 8 – FACILITIES FOR AGENCY PERSONNEL 135
PART 2 – CONSTRUCTION MATERIALS 136
SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS 136
SECTION 202 – CONCRETE REINFORCING 137
SECTION 203 – CAST IN PLACE CONCRETE 141
SECTION 204 – DRY PLACED STONE 146
SECTION 205 – METAL FABRICATIONS 149
SECTION 206 – CONCRETE PAVING FOR LANDSCAPE FLATWORK 153
SECTION 207 – AGGREGATE SURFACING 166
SECTION 208 – EXCAVATION AND FILL FOR LANDSCAPE 169
SECTION 209 – LANDSCAPE GRADING 174
PART 3 – CONSTRUCTION METHODS 184
SECTION 300 – EARTHWORK 184
PART 4 – EXISTING IMPROVEMENTS 185
SECTION 400 – PROTECTION AND RESTORATION 185
SECTION 402 – UTILITIES 187

PART 6 – TEMPORARY TRAFFIC CONTROL 193
SECTION 600 – ACCESS *193*
SECTION 601 – TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES *196*
PART 8 – LANDSCAPING AND IRRIGATION 205
SECTION 800 – MATERIALS *205*
SECTION 801 – INSTALLATION *211*
SECTION 802 – TEMPORARY TREE AND PLANT PROTECTION *222*
SECTION 803 – OPERATION AND MAINTENANCE OF PLANTING *227*
SECTION 804 – LANDSCAPE MAINTENANCE – 90 DAY *239*
PART 9 – SITE FURNISHINGS *241*
APPENDICES 245
APPENDIX A 246
COMMUNITY WORKFORCE AGREEMENT ATTACHMENTS *246*
APPENDIX B 1
STANDARD PLANS *1*
APPENDIX C 1
GEOTECHINCAL REPORTS *1*

CITY OF IRVINE, CALIFORNIA
NOTICE INVITING BIDS
BID NO. PK-26-0041

NOTICE IS HEREBY GIVEN that sealed bids with online bid price submittal will be received by the Purchasing Representative of the City of Irvine, California, for furnishing all labor services, materials, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary therefore, as provided in the contract documents for Portola Springs Community Park Indigenous Interpretive Space – Phase 1 together with appurtenances thereto, in strict accordance with the specifications on file at the Department of Public Works and Sustainability, 17101 Armstrong Ave, Irvine, California 92614.

DATE OF OPENING BIDS: Bid prices for each line item of the Schedule of Work must be entered and all other required documents for the bid proposal packet pages 13, 18-72 and CWA Letter of Assent (Appendix A, Community Workforce Agreement, Attachment A) must be uploaded to the BidsOnline system in accordance with the instructions beginning on page 16 no later than **10:00** a.m. on **January 22, 2026**. No late bids will be accepted. No other method of bid submittal will be accepted.

Bids will be made publicly available via BidsOnline at the date and time specified above.

LOCATION OF THE WORK: The work to be performed hereunder is located in the City of Irvine, County of Orange, on 900 Tomato Springs, Irvine, CA 92618.

DESCRIPTION OF WORK: The work to be performed shall include, but not be limited to:

This project includes the construction of three (3) picnic tables, six (6) stone seating, stepping stone and bridge, dry creek, landscaping, irrigation, storm drain improvements. The existing trail path will be redesigned and rerouted to accommodate the circular spaces, and other items not mentioned here, but are required by the plans and the Special Provisions. The Engineer's construction cost estimate for the project is above $ 1,450,000 (rounded to the nearest ten thousand).

LICENSE REQUIREMENT: **Prime Contractor must possess a valid Class A or C27 license.** At the time of submitting the bid, the Bidder shall be licensed as a contractor in accordance with the provisions of California Business and Professions Code Chapter 9, Division 3.

DEBARRED CONTRACTORS: The City of Irvine Municipal Code Section 2-12-101 *et seq.* sets forth procedures to debar Contractors from bidding or performing work on City of Irvine contracts at any tier, whether prime, subcontractor, etc. Accordingly, certain Contractors have been debarred and are listed on the City's website at www.cityofirvine.org/purchasing. Click on the link which states: "For a list of Debarred Contractors, please **click here**."

COMPLETION OF WORK AND LIQUIDATED DAMAGES: All work shall be completed in a total of **Ninety (90) Working Days** (excluding plant establishment) and **One hundred Eighty (180) Working Days** (including plant establishment) from the date specified in the Notice to Proceed. Liquidated damages shall be **Four-thousand two hundred Dollars ($4,200) per Calendar Day**, and liquidated damages shall be **Nine hundred Fifty Dollars ($950) per Calendar Day**, for each Calendar Days delay in completing the plant establishment work in excess of the number of Working Days prescribed above. In no case will liquidated damages be assessed at more than **Four-thousand two hundred Dollars ($4,200)** per Calendar Day.

AWARD OF CONTRACT: The award of the Contract, if it is awarded, will be to the lowest responsive and responsible Bidder whose bid complies with all the requirements prescribed. The City reserves the right, after opening bids, to reject any or all bids, to waive any informality in a bid, to make awards in the interest of the City, and to reject all other bids.

PROPOSAL GUARANTEE AND BONDS: Each bid shall be accompanied by a scanned copy of a certified or cashier's check or corporate surety bond issued by a surety company, admitted to do business in the State of California, on the form furnished by the City as guarantee that bidder will, if an award is made to him in accordance with the terms of his bid, promptly secure Workers' Compensation insurance and liability insurance, execute a contract in the required form, and furnish satisfactory bonds for the faithful performance of the contract ("Performance Bond") and for the payment of claims of materialmen and laborers thereunder ("Payment Bond"). Said check or bidder's bond shall be in an amount of not less than ten percent (10%) of the amount of the bid. **Bidders with the three lowest responsive bids shall deliver an original hard copy of the certified check, cashier's check or surety bond to the Purchasing Representative at 1 Civic Center Plaza, Irvine, CA 92606 within five business days of the bid opening date. Failure to submit the original check or bidder's bond may result in the bid being declared non-responsive.** The Performance and Payment Bonds shall be not less than one hundred percent (100%) of the total amount of the bid price named in the contract. Only bonds issued by companies admitted to do business in the State of California will be accepted in accordance with the Code of Civil Procedure Section 995.311. Failure to submit acceptable Payment and Performance Bonds as required shall result in a rejection of the bid and a forfeiture of the proposal guarantee.

PREVAILING RATES OF WAGES: **Prevailing wage requirements apply to public works projects with a value exceeding $1,000.00. The definition of "public works" is found at Labor Code Section 1720, *et seq.***

The CITY is subject to the provisions of law relating to public contracts in the State of California. It is agreed that all provisions of law applicable to public contracts are a part of this Agreement to the same extent as though set forth herein, and will be complied with by CONTRACTOR. CONTRACTOR shall abide by all applicable Sections of the California Labor Codes including Sections 1770 - 1781, *et seq*. In accordance with the provisions of Section 1773 of the California Labor Code, the general prevailing rates of per diem wages and holiday and overtime work in the locality in which the Work is to be performed shall be

in accordance with the rates posted on the Department of Industrial Relations website, found at http://www.dir.ca.gov/dirdatabases.html**.** The CONTRACTOR, and any subcontractor under him, shall pay not less than the specified prevailing rates of wages to all workers employed in the execution of this Agreement.

The CITY reminds all contractors and subcontractors of the adoption of Senate Bill 96 – Amendments to California Prevailing Wage Law Requires Additional Measures by Public Agencies, Contractors and Subcontractors, and encourages them to understand and comply with the requirements as set forth on the Department of Industrial Relations (DIR) website at http://www.dir.ca.gov/Public-Works/PublicWorks.html**.** All contractors and subcontractors who plan to bid on a public works project when the project is for construction, alteration, demolition, installation, or repair work with a value exceeding $25,000.00 must first be registered and pay an annual fee with the DIR. Additionally, all contractors and subcontractors who plan to bid on public works projects involving maintenance work with a value exceeding $15,000.00 must first be registered and pay an annual fee with the DIR. The CITY requires all contractors and subcontractors to be registered with the DIR prior to submitting a bid meeting these parameters. Subject to the exceptions set forth in Labor Code Section 1725.5, bids from contractors that are not currently registered will be deemed nonresponsive. Further, the CITY will not award a contract to and no contractor or subcontractor will be allowed to work on a CITY public works project meeting these parameters unless they are registered with the DIR pursuant to Labor Code Section 1725.5. Please visit the DIR website for further information.

A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

LABOR REGULATIONS: The Contractor shall comply with all applicable requirements of the California Labor Code and the City of Irvine Municipal Code.

COMMUNITY WORKFORCE AGREEMENT: This project is subject to the Community Workforce Agreement (CWA) between the City and the Los Angeles/Orange County Building and Construction Trades Council (Trades Council). The CWA establishes labor relations policies and procedures for the Contractor and subcontractors of all tiers – including a local hire goal, payment of employee fringe benefits through a union trust fund and registering employees through a union hall. A signed Letter of Assent must be submitted with Bid proposal packet. The City of Irvine will utilize a CWA Administrator who will work with the Contractors and the Trades Council to oversee the provisions of the CWA. A copy of the CWA is included in Appendix A.

Prior to any work being done on the project, Contractors that are not signatory with one of the unions that are signatory to the CWA shall register each of their own workers (Core

Employees) with the appropriate union hall and must provide a listing (Core Employees List, see Appendix A) of their Core Employees to the CWA Administrator. The CWA contains a local hiring goal of 30%, calculated based on total hours worked. The local hire provision requires best efforts to utilize qualified workers first residing in the Local Zip Code List (see Appendix A), then to Veterans residing in Orange County, then to graduates from the Building Trades Multi-Craft Core Curriculum (MC3 Graduates) residing in Orange County, and finally other residents of Orange County. When requesting workers from the union hiring hall, the Contractor shall use the Craft Request Form (see Appendix A). This form must be sent to the union hiring hall 48 hours prior to when the worker is needed. The Contractor must hold a Pre-Job Conference that is to be attended by all subcontractors and those attending will disclose their scope of work and union assignments to the Building Trades. The Contractor must fill out the Pre-Job Conference Form (see Appendix A) and submit to the CWA Administrator a week prior to scheduling the Pre-Job Conference.

PLANS AND SPECIFICATIONS: A full set of bid documents consisting of Notice Inviting Bids, Proposal, Contract, Special Provisions and Contract Plans are available for inspection without charge at the Department of Public Works and Sustainability, 17101 Armstrong Avenue, Irvine, California 92614.

To obtain a copy of the bid documents, please visit the City of Irvine's website at **www.cityofirvine.org/purchasing**. Click on the "Supplier Registration and Bid Opportunities" link and review the information about our online system. Next, click on the "BidsOnline" link. If you are not currently registered with the City of Irvine, please click on the "New Vendor Registration" button and then complete the electronic supplier registration process, including selecting Category Code(s) describing the goods and/or services you provide, as well as entering your Contractors State License information. After registering your firm, click on the "Bid Opportunities" button to view and download the Bid Documents. Interested firms must be registered on the City's website and download the Bid Documents in order to submit a bid. Firms must also check the website periodically for addenda information as failure to download any and all addenda will result in bid disqualification.

SECURITY FOR COMPLETION OF WORK: The Contract Documents establish a provision for monthly progress payments based upon the percentage of work completed as determined by the Engineer. The City will retain a portion of each progress payment as security for completion of the balance of the work. At the request and expense of the successful bidder, the City will pay the amount so retained upon compliance with the requirements of California Public Contract Code § 22300 and the provisions of the Contract Documents, Special Provisions Subsection 9-3.2.2 pertaining to "Substitution of Securities."

PROJECT ADMINISTRATION: All questions relative to this project prior to opening bids must be submitted via PlanetBids no later than five (5) business days prior to the bid opening date as this would not allow time to respond to all plan holders. No verbal requests or requests made in any other format will be accepted. Questions must be submitted individually and not in a paragraph format nor combined in a single submission.

Requests submitted for City's consideration of proposed terms and conditions, including modifications to the City's IFB and/or Contract terms and conditions must be submitted by the deadline for questions. Such requests should include an attachment in Word or PDF format on formal company letterhead that shows the requested modifications.

Significant interpretations or clarifications and responses to questions received by the deadline will be addressed via addenda to this FIB, which will be released and posted on PlanetBids under the "Addenda/Emails" tab.

General process questions may be directed to the following:

Michelle Cardona
Purchasing Representative
mcardona@cityofirvine.org

CITY OF IRVINE

Published by:	OC Register, Irvine World News
Publication Date:	December 19, 2025 December 25, 2025

INSTRUCTIONS TO BIDDERS, PROPOSAL REQUIREMENTS AND CONDITIONS

1. CONTRACT DOCUMENTS: The Contract Documents shall consist of:

   a) Permits and Agreements

   b) Contract

   c) Addenda

   d) Instructions to Bidders, Proposal Requirements and Conditions

   e) Special Provisions

   f) Contract Plans

   g) Standard Plans

   h) Standard Specifications

   i) Reference Specifications

   all of which are on file at the City of Irvine in the Department of Public Works and Sustainability, 17101 Armstrong Avenue, Irvine, California 92614, and are hereby referred to and made a part hereof.

2. BID PROPOSALS: To be considered, bids shall be made in accordance with the following instructions:

   a) For the convenience of bidders, the “SCHEDULE OF WORK” has been posted on the City’s BidsOnline system. Bidders must enter their unit price information online in accordance with the INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS included herein. Unit prices must be entered online and then the extended prices and total bid price will be automatically calculated.

   b) Bids shall be submitted only on bid items stated in the Bid Documents; bids on other bases will not be considered. Bids that are not submitted on the prescribed forms, and in accordance with the INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS may be rejected.

   c) Unless called for, additive bids will not be considered.

   d) Pursuant to the provisions of Public Contract Code § 4101 to 4108, inclusive, every Bidder shall set forth in its bid:

      1) The Bidder shall list the name, license number, and location of the place of business of each subcontractor performing work in an amount in excess of one-half of one percent (1/2%) of the prime contractor's total bid, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%)

of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater.

2) The bid item numbers and the percentage of the bid item subcontracted.

e) In the event additive bids are called for and the Bidder intends to use different or additional subcontractors on the additive(s), the Bidder shall fill out additional forms of the list of subcontractors and shall identify such forms with relation to whether they apply to the base or additive bids.

f) If the Bidder fails to specify a subcontractor for any portion of the work to be performed under the contract in excess of one-half of one percent (1/2%) of the Bidder's total bid, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%) of the Bidder's total bid or ten thousand dollars ($10,000), whichever is greater, the Bidder agrees to perform that portion of work himself. The successful Bidder shall not, without the consent of the City, either:

1) Substitute any person, firm or corporation as subcontractor in place of the subcontractor designated in the original bid, or

2) Permit any subcontract to be assigned or transferred or allow the work to be performed by anyone other than the original subcontractor listed in the bid.

g) If required in the Notice Inviting Bids, bids shall be accompanied by a certified or cashier's check or an acceptable corporate bid bond on the form furnished by the City for an amount not less than ten percent (10%) of the bid, made payable to the order of the City of Irvine. The check or bid bond shall be a guarantee that the Bidder will enter into a contract and provide all required insurance and bonds if awarded the work; and in case of refusal or failure to enter into the contract, the check or bid bond shall be forfeited. The City will return Bidder's check if the project is not awarded to Bidder.

Only bonds issued by companies admitted to do business in the State of California will be accepted, in accordance with Code of Civil Procedure § 995.311 and Insurance Code § 12090.

h) Before submitting a bid, bidders shall carefully examine the work site, the Contract Documents and the form of Contract and shall fully inform themselves about all existing conditions and limitations. Bidders shall include in their bids a sum to cover the cost of all work included in the Contract.

i) Bid prices must be entered and the bid proposal packet must be uploaded to the BidsOnline System on or before the day and hour set for the bid opening in the Notice Inviting Bids. No other method of bid submittal will be accepted. Bidders with the three lowest responsive bids shall deliver an original hard copy of the certified check, cashier's check or surety bond to the Purchasing

Representative at 1 Civic Center Plaza, Irvine, CA, 92606 within five business days of the bid opening date.

j) A bid may be considered non-responsive if it does not comply with the requirements set forth in these bid documents. A responsive bid is one that complies with the solicitation in all acceptability and material respects and contains no material defects.

3. WITHDRAWAL OF BIDS: Bids may be withdrawn at any time before the bid deadline, by going back into the BidsOnline system and selecting “Withdraw.”

4. INTERPRETATION OF DRAWINGS AND DOCUMENTS; REQUESTS FOR CLARIFICATION: If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the plans and specifications, or other proposed Contract Documents, or finds discrepancies in, or omissions from, the drawings or specifications, he shall submit to the Purchasing Representative a written request for all interpretations or corrections thereof via email to the Project Manager and Purchasing Representative prior to the deadline for submitting questions, as set forth in the Notice Inviting Bids section herein. Any clarification or correction of the proposed documents will be made only by Addendum duly issued, with notice provided to all firms who downloaded the bid documents from the City’s website. The City is not responsible for any other explanations or interpretations of the proposed documents.

5. ADDENDA TO THE CONTRACT DOCUMENTS: Any addenda issued during the time of bidding, or forming a part of the Contract Documents after the Bidder has downloaded the bid documents from the City’s website, shall be taken into account in the bid and shall be made a part of the Contract.

   Addenda may be issued by the City of Irvine for any reason, including but not limited to, clarifying or correcting the Notice Inviting Bids, Special Provisions, Plans, or Bid.

   Bidders will be notified of such Addenda during the period of advertising either by email or posting on the City’s website, provided however, each Bidder shall be solely responsible for obtaining any such Addenda.

   The Bidder shall acknowledge the receipt of Addenda on the City’s BidsOnline system.

6. BIDDER RESPONSIVENESS: Failure of the Bidder to provide requested information in a complete and accurate manner may be considered non-responsive resulting in rejection of the bid. The use of “N/A” or “n/a” in response to any request for information without an explanation as to why that abbreviation is being used may render the bid non-responsive.

7. BIDDER RESPONSIBILITY: Bidders are hereby notified that, in accordance with the City of Irvine Municipal Code § 2-12, the City may make a determination that

the Contractor is non-responsible if the hearing officer finds evidentiary support that the Bidder has committed any of the following: (1) violated a term of a contract, present or past, with the City or other entity; (2) committed an act or omission which negatively reflects on the Contractor's quality, fitness, or capacity to perform a contract with the City or any other entity or engaged in a pattern or practice which negatively reflects on the same; (3) committed an act or omission which evidences a lack of business integrity or business honesty; (4) made or submitted a false claim against the City or any other entity; or (5) received a fine or citation for performing work in an unsafe manner; or (6) violated a condition, rule, regulation, permit, or standard applicable to a contract with the City or any other entity. In arriving at his or her determination, the hearing officer may consider Bidder's past conduct on City projects or on any other public or private projects upon which Bidder performed work.

8. BIDDER DEBARMENT: Bidders are hereby notified that, in accordance with the City of Irvine Municipal Code § 2-12, the City may make a determination that the Bidder shall be debarred if the hearing officer finds evidentiary support that the Bidder has committed any of the following: (1) violated a term of a contract, present or past, with the City or other entity; (2) committed an act or omission which negatively reflects on the Contractor's quality, fitness, or capacity to perform a contract with the City or any entity or engaged in a pattern or practice which negatively reflects on the same; (3) committed an act or omission which evidences a lack of business integrity or business honesty; (4) made or submitted a false claim against the City or any other entity; (5) received a fine or citation for performing work in an unsafe manner; or (6) violated a condition, rule, regulation, permit, or standard applicable to a contract with the City or any other entity. In arriving at his or her determination, the hearing officer may consider past conduct of the Contractor on City projects or on any other public or private projects which Contractor performed work.

9. OPENING BIDS: Bids will be publicly available via BidsOnline at the time and date set in the Notice Inviting Bids.

10. BID PROTEST PROCEDURES:

    a) BASIS FOR PROTEST: It is the policy of the City to ensure that free and open competition takes place in all procurement activities. If, in the course of a procurement action, an interested party has reason to believe that these conditions do not exist, the interested party may file a protest in accordance with the provisions of these procedures with the City of Irvine Purchasing Representative requesting a review of the claim and a timely resolution of the issue. Any bidder on a project for which it submitted a timely bid may protest the contract award for that project; however, subcontractors, suppliers or other third parties may not protest contract awards. Moreover, complaints about alleged ambiguity of the bid documents and/or estimates are not appropriate subject matters for bid protests.

b) BID PROTEST CONTENTS: The bid protest shall be submitted in writing via email to the attention of the Purchasing Representative. The written protest shall include:

   1) The solicitation number and project description.

   2) The name, address, phone number, and email address of the protesting party.

   3) A detailed statement of all the legal and factual grounds for the protest and all relevant, supporting documentation (including all written documentation). The grounds for protest must be fully supported.

   4) Statement of the form of relief requested from the City.

   5) Signature of an authorized representative of the protesting party.

c) DEADLINE TO SUBMIT BID PROTESTS: Bid protests must be filed within five (5) business days after the deadline for receiving bids.

d) WHERE TO FILE: All protests are to be directed to the City of Irvine Purchasing Representative. Protests must be submitted in writing via email to**:** mcardona@cityofirvine.org. A copy of the email must also be sent to the project manager whose email address is set forth in the bid documents. (A document is considered filed on a particular calendar day when it is received via email by the City of Irvine Purchasing Representative by 5:00 p.m., Pacific Standard Time, on that calendar day.) Although not required, in addition to submitting a protest via email, an original protest letter may be sent via United States Postal Service to: Attn: Purchasing Agent, City of Irvine, P.O. Box 19575, Irvine, CA 92623-9575.

e) BID PROTEST REVIEW: Upon receipt, the Purchasing Representative shall consider the protest and may give notice of the protest and its basis to other persons including bidders involved in or affected by the protest. A protest shall be dismissed for failure to comply with any of the requirements set forth in the “Bid Protest Contents” section above. The Purchasing Representative shall review all material submitted with the protest. No additional material will be accepted for consideration from the protesting party unless specifically requested by the Purchasing Representative. If additional material is requested, it must be submitted by the requested date. The Purchasing Representative shall respond to the protesting party via email within ten (10) business days after receipt of the protest. Final determinations shall be binding, except as otherwise provided below.

f) RECONSIDERATION OF PROTEST DECISION: A protesting party may request the Purchasing Representative’s reconsideration of a decision prior to contract award only if one or both of the following conditions are met:

1) New information becomes available that was not previously known, or could not have been reasonably known, at the time of the original protest; and/or

2) The Purchasing Representative's decision contains an error of law.

Any request for reconsideration of a protest decision must be submitted in writing via email to the Purchasing Representative within three (3) business days from the date of issuance of the initial decision. The request must include a detailed explanation of the basis for reconsideration as set forth above. The Purchasing Representative shall respond to the request for reconsideration within seven (7) business days from receipt of the request.

g) CONTRACT AWARD: At its discretion, the City may delay the execution of any proposed agreement pending the resolution of a protest unless one or both of the following conditions are present:

1) The project or service being procured is urgently required; and/or

2) Failure to make prompt award will otherwise cause undue harm to the City.

h) REMEDIES: There shall be no limitation on remedies selected by the City. Nothing contained herein shall be considered to either act as a limitation on the City's choice of remedies or confer any right upon any interested party to a remedy. In determining the appropriate remedy, the City shall consider all the circumstances surrounding the solicitation, the contract selection, and/or the contract award, including, but not limited to: the seriousness of any deficiency found to exist in the contracting process; the effect of the action of the competitive process; any urgency surrounding the contract requirement; and the effect that implementing the remedy will have on the City's overall ability to accomplish its mission. If the City determines that the award or proposed award was not made in accordance with the applicable City statutes, regulations, policies, and procedures, the City may, in its sole discretion, grant any of the following or any other remedy it deems appropriate: If pre-award, reject all bids and issue a new solicitation, make a new contractor selection or award a contract consistent with applicable statutes, regulations, policies, and procedures; or if post-award, refrain from extending the term of the contract or awarding task orders under an existing task order agreement; or at its sole discretion, take no further action.

11. AWARD OR REJECTION OF BIDS AND EXECUTION OF CONTRACT: The award of the Contract will be as of the date specified in the Notice of Award issued by the City. The award of the Contract shall not constitute a binding obligation on City until the Contract has been lawfully executed by all parties and the Contractor has submitted all required insurance certificates and bonds to the City.

The Contractor shall not commence work in advance of the execution of the Contract, the delivery of the bonds and insurance certificates, as specified above and purchase order issuance.

The award of the Contract, if it is awarded, will be to the responsive and responsible Bidder who submitted the lowest Bid complying with these Proposal Requirements and Conditions and with the Notice Inviting Bids. The lowest bid shall be the lowest bid price on the base contract without consideration of the Additive Bid Items. Such award, if made, will be made within ninety (90) Calendar Days after the opening of the proposals. The ninety (90) Calendar Days period shall be subject to extension for such further period as may be agreed upon in writing between the City and the Bidder(s) concerned. All bids will be compiled on the basis of the estimated quantities of work to be done as shown in the Proposal. However until an award is made, the City of Irvine reserves the right to reject any and all bids or to waive any informality in bids received, if doing so is deemed to best serve the interest of the City.

12. CONTRACT AND BONDS: The Contract, which the successful Bidder, as Contractor, will be required to execute, is included in the Contract Documents and should be carefully examined by the Bidder.

    The successful Bidder, simultaneously with his execution of the Contract, will be required to furnish a Payment Bond and a Performance Bond. Said bonds shall be in the form of the two (2) sample bonds included in these Contract Documents and based upon conditions specified in the Standard Specifications Section 2-4, "Contract Bonds," and as specified in the Special Provisions and shall be secured from a surety company satisfactory to the City.

    Only bonds issued by companies admitted to do business in the State of California will be accepted, in accordance with Code of Civil Procedure § 995.311 and Insurance Code § 12090. Failure to submit acceptable Payment and Performance Bonds as required shall result in rejection of bid and forfeiture of the proposal guarantee.

    All alterations, extensions of time, extra and additional work, and other changes authorized by the Contract Documents will be made without securing the consent of the surety or sureties on the Contract bonds.

    The Contract shall be signed by the successful Bidder, and delivered to the City together with the Contract bonds within ten (10) days of the date specified in the Notice of Award issued by the City, not including Saturdays, Sundays, and legal holidays. The Contractor shall submit insurance certificates electronically in accordance with 7-3 of the Standard Specifications and as set forth in the Contract Documents. The executed Contract, together with the required bonds, will be filed with the Clerk of the City of Irvine.

Failure of the lowest responsive and responsible Bidder to execute the Contract and file acceptable insurance certificates and bonds as provided herein within ten (10) days of award of the Contract, not including Saturdays, Sundays and legal holidays, shall be just cause for the forfeiture of the bid bond. The successful Bidder may file with the City a written notice, signed by the Bidder or his authorized representative, specifying that the Bidder will refuse to execute the Contract if presented to him. The filing of such notice shall have the same force and effect as the failure of the Bidder to execute the Contract and furnish acceptable certificates of insurance and bonds within the time herein before prescribed.

13. SPECIAL NOTICE: Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the Work will be performed, and the Contractor must employ, so far as possible, such methods and means in the carrying out of this work as will not cause any interruption or interference with any other contractor.

14. BIDDERS INTERESTED IN MORE THAN ONE BID: No person, firm or corporation shall be allowed to make or file or be interested in more than one bid as prime contractor for the same work.

15. BIDS TO BE LEFT ON DEPOSIT: No Bidder may withdraw its bid for a period of ninety (90) Calendar Days after the time set for opening thereof. However, the City will return all certified checks within fifteen (15) days, not including Saturdays, Sundays, and legal holidays, after the award of the Contract or rejection of the bids, as the case may be, to respective Bidders whose bids are not accepted.

16. NON-COLLUSION DECLARATION: All Bidders shall submit with their bids an executed non-collusion declaration on the form provided in the bidding documents. Failure to provide completed form shall result in the bid being deemed non-responsive.

    The U.S. Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is 800-424-9071. The service is available 24 hours 7 days a week and is confidential and anonymous. The hotline is part of the DOT’s effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

17. SUBSTITUTIONS: Where the Specifications or drawings specify any material, product, thing, or service by one or more brand names, whether or not "or equal" is added, and a Bidder wishes to propose the use of another item as being equal, he shall request approval therefor as set forth in 4-6 of the Standard Specifications and Special Provisions.

18. REPORTING SUSPECTED IMPROPRIETY, GROSS WASTE, FRAUD AND OTHER ACTS: Any City and/or Great Park official, employee, and/or contractor who suspects any type of impropriety relating to purchasing or contracting activities,

or gross waste, fraud, or abuse of City and/or Great Park funds or resources, a gross abuse of authority, a specified and substantial danger to public health or safety due to any act or omission of any City and/or Great Park official, employee, or contractor, or the use of a City and/or Great Park office or position, or of City and/or Great Park resources for personal gain, should report the act by calling the City's Integrity Line at 866-428-1509. All such reports shall remain anonymous if desired by the reporting party. Suspected fraudulent activities include bid rigging, product substitution, theft, overcharging, false certifications and representations, and the like. Any allegations of bribery, kickbacks, gratuities, and conflicts of interest involving City employees should also be reported.

19. ASSIGNMENT OF CONTRACT: No assignment by the Contractor of any Contract to be entered into hereunder or of any part thereof, or of funds to be received thereunder by the Contractor, will be recognized by the City unless such assignment has had the prior written approval of the City and the surety has been given due notice of such assignment in writing.

20. OTHER REQUIREMENTS: Before entering into a Contract, the Bidder to whom the Contract has been awarded shall satisfy all insurance requirements per Section 7-3 of the Standard Specifications and Special Provisions and such insurance shall be maintained in full force and effect at its own expense during the life of this Contract.

    Upon request, the successful Bidder shall furnish to the City a statement of its financial condition and previous construction experience or such other evidence of his qualifications.

21. LABOR CODE:

    PUBLIC WORKS CONTRACTOR REGISTRATION PROGRAM

    All contractors and subcontractors who plan to bid on a public works project (the definition of "public works" is found at Labor Code Section 1720, *et seq.*) when the project is for construction, alteration, demolition, installation, or repair work with a value exceeding $25,000.00 must first be registered and pay an annual fee with the DIR. Additionally, all contractors and subcontractors who plan to bid on public works projects involving maintenance work with a value exceeding $15,000.00 must first be registered and pay an annual fee with the DIR. The CITY requires all contractors and subcontractors to be registered with the DIR prior to submitting a bid meeting these parameters. By submitting a bid for City of Irvine Department of Public Works and Sustainability project, the contractor acknowledges the above requirements and agrees to maintain a valid Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project.

    a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform

public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

b) Pursuant to Labor Code Section 1771.4, all bidders are hereby notified that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

In addition to the requirement for submittal of certified payroll records **to the City,** contractors and subcontractors shall furnish electronic certified payroll records to the Labor Commissioner **(State of California, Division of Labor Standards Enforcement).**

Contractors and subcontractors shall be responsible for complying and staying current with all DIR requirements and regulations. More information can be found at http://www.dir.ca.gov/Public-Works/PublicWorks.html.

Attention is directed to Labor Code § 1735 of which reads as follows:

> No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in the Government Code §12940, and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter.

The Contractor shall abide by the provisions of the California Labor Code § 1770-1781, *et seq*. In accordance with the provisions of the California Labor Code § 1773, the general prevailing rates of per diem wages and holiday and overtime work in the locality in which the work is to be performed has been obtained from the Director of the Department of Industrial Relations, a copy of which is on file in the office of the City Clerk of the City of Irvine and will be made available to any interested party upon request. The Contractor shall post a copy of the prevailing rate of per diem wages at the job site. The Contractor, and any subcontractor under him, shall pay not less than the specified prevailing rates of wages to all workers employed in the execution of the contract.

Failure to comply with the subject sections will subject the Contractor to penalty and forfeiture provisions of the Labor Code § 1775.

In accordance with of the Labor Code § 1773.1, the Contractor must make travel and subsistence payments to each worker employed in the execution of the Contract.

The City will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his bid, and will not under any circumstances be considered as the basis of a claim against the City on the Contract.

The Contractor shall familiarize itself with the provisions of the Labor Code § 1777.5 regarding employment of apprentices, and shall be responsible for compliance therewith, including compliance by his subcontractors.

The Contractor and subcontractors shall comply with Labor Code § 1777.6 which stipulates that it shall be unlawful to refuse to accept otherwise qualified employees as registered apprentices solely on the grounds of race, religious creed, color, national origin, ancestry, sex, or age except as provided in Labor Code § 3077, of such employee.

The Contractor and subcontractors shall comply with Labor Code § 1810 and § 1811 which stipulates that eight hours labor constitutes a legal day's work, and § 1812 which stipulates that the Contractor and subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work performed under the terms of the Contract. Failure to comply with these sections of the Labor Code will subject the Contractor to penalty and forfeiture provisions of the Labor Code § 1813.

22. RESERVATION OF RIGHTS:

The City reserves the right to:

a) Disqualify any Bidder in accordance with the instructions herein.

b) Reject any bids, at its discretion, including bids found to be conditional or incomplete, contain irregularities, contain any interlineations or alterations, or found to be not responsive to this Invitation for Bids (IFB).

c) Investigate the qualifications of any Bidder under consideration.

d) Require confirmation or clarification of information furnished by the Bidder.

e) Require additional evidence of Bidder’s ability to perform the Work described in these bid documents.

f) Contact the submitted references to confirm information provided in the bid.

g) Postpone or cancel the entire IFB or a portion thereof.

h) Postpone the bid opening or award for its own convenience.

i) Award a Contract in part or in combination of items.

j) Issue subsequent IFB.

k) Seek the assistance of outside technical experts to review the bids.

l) Disqualify a bid upon evidence of collusion, with intent to defraud, or other illegal practices on the part of the Bidder.

m) Waive any errors or informalities in any bid to the extent permitted by law.

n) Require bidder to provide proof as to the equality, substitutability, and compatibility of any items proposed as alternates or equals.

o) Determine, at the City's sole discretion, the equality, substitutability, and compatibility of any items proposed as alternates or equals.

p) Exercise any other rights under the City's charter or municipal code.

The City has no obligation to consider any bid unless it is responsive to this IFB and conforming in all respects to the Form of Contract. This IFB does not commit the City to enter into a Contract.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

BIDDER'S PROPOSAL

HONORABLE MAYOR AND MEMBERS OF THE CITY COUNCIL
CITY HALL
IRVINE, CALIFORNIA

THE UNDERSIGNED, HAVING CAREFULLY EXAMINED ALL OF THE CONTRACT DOCUMENTS; PERMITS ISSUED BY JURISDICTIONAL REGULATORY AGENCIES; CONTRACT; CONTRACT ADDENDA; INSTRUCTIONS TO BIDDERS; PROPOSAL REQUIREMENTS AND CONDITIONS; SPECIAL PROVISIONS; THE PLANS; STANDARD PLANS; STANDARD SPECIFICATIONS; REFERENCE SPECIFICATIONS; AND ALL OTHER INFORMATION PROVIDED BY THE AGENCY FOR THE CONSTRUCTION LISTED ABOVE IN AND FOR THE CITY OF IRVINE, IS FAMILIAR WITH THE CONDITIONS, HAVING PERSONALLY VISITED THE SITE OF THE WORK, AND HEREBY PROPOSES TO FURNISH ALL LABOR, MATERIALS AND EQUIPMENT, AND ALL INCIDENTAL WORK NECESSARY TO DELIVER ALL THE IMPROVEMENTS COMPLETE, IN PLACE AND IN STRICT CONFORMITY WITH THE CONTRACT DOCUMENTS, FOR THE UNIT PRICES NAMED IN THE FOLLOWING SCHEDULE OF WORK, ENTERED THROUGH THE BIDSONLINE SYSTEM.

_____
Bidder's Company Name (please print or type)

_____
Signature of Bidder

_____
Print Name

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

SCHEDULE OF WORK

All applicable sales taxes, State and/or Federal taxes, and any other special taxes, patent rights or royalties are included in the prices quoted in this Proposal.

BID ITEM NO.	BID ITEM DESCRIPTION	UNIT	EST. QTY.
1	**MOBILIZATION/DEMOBILIZATION** – PURSUTANT TO PROJECT PLANS, SPECIAL PROVISIONS, SECTION 7-6.1	LS	1
2	**SITE IMPROVEMENTS** – PURUSANT TO PROJECT PANS, SPECIAL PROVISIONS, AND SECTION 7-6.2	LS	1
3	**SITE FURNITURE** – PURUSUANT TO PROJECT PLANS, SPECIAL PROVISIONS, AND SECTION 7-6.3	LS	1
4	**LANDSCAPE/IRRIGATION IMPROVEMENTS** – SHALL BE CONSTRUCTED PER PROJECT PLANS, SPECIAL PROVISIONS, AND SECTION 7-6.4	LS	1
5	**MAINTENANCE AND PLANT ESTABLISHMENT** – SHALL BE CONSTRUCTED PER PROJECT PLANS, SPECIAL PROVISIONS, AND SECTION 7-6.5	LS	1

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

INSTRUCTIONS FOR ENTERING ELECTRONIC BIDS

In order to access the BidsOnline system and ensure successful online submission of your bid prices, follow these steps:

a) Go to https://www.planetbids.com/portal/portal.cfm?CompanyID=15927#

b) On the Vendor Portal page, log into the system (lower right-hand corner of screen) with your assigned username and password. (You must be registered in order to download documents and submit a bid.)

c) Click on "Bid Opportunities" and then on the Bid # and Description that you wish to bid on. The selected bid will open to allow you to access all tabs, documents, and the pricing sheet.

d) Click on the “Documents & Attachment” tab to be sure you have downloaded all documents that are part of this bid.

- *If you have not already downloaded all bid documents, you must download them now, in order to submit your bid. The screen will indicate which documents you've already downloaded.*

e) Click on the tab "Addenda & Emails" to be sure you have read and acknowledged all addenda that have been issued for this bid.

- *The screen will display "yes" or "no" next to each addendum to indicate whether you have viewed and acknowledged it. If you have not previously acknowledged an addendum, do so now by clicking on the addendum to open and read it, then click on the "Acknowledge" button on the lower left-hand corner of screen.*

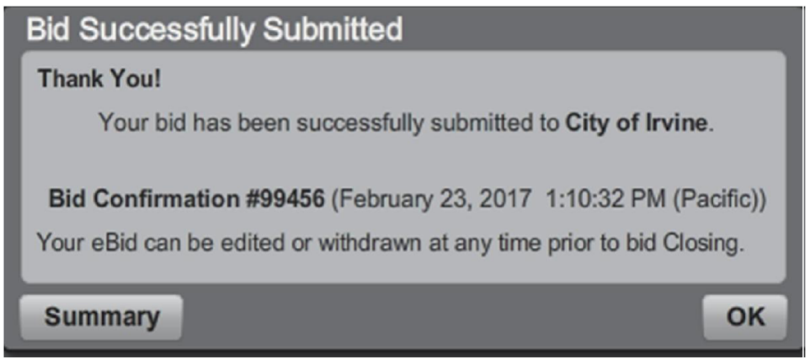
f) To begin entering your bid, click on "Place eBid" on the lower right corner of the screen. The bid "Terms and Conditions" will pop up with a button for you to click "Accept" to acknowledge your agreement to the terms of the bid.

g) Enter the Respondee information on the “Detail” tab.

h) Click the “Attach” button on the “Attachments” tab, browse to your scanned Bid Submittal Documents, and upload all Bid Submittal Documents as a single PDF file.

i) Go to the "Line Items" tab and enter your unit prices on each line. The system will calculate the extended costs and grand total for you.

j) When you have finished entering all pricing and attachments, click on the "Save" button. This saves your bid as a draft for you to review or revise as needed anytime up to the bid submittal deadline. When you are ready to submit your bid, click the "Submit" button. You will receive a confirming message that looks like this:



Note: E-Bids are sealed and cannot be viewed by the City until the closing date and time. As noted in the screen print above, if you need to withdraw your bid, you may do so any time before the bid deadline, by going back into the system and selecting "withdraw".

Please begin entering your bid in sufficient time to complete and submit it prior to the stated deadline. The official closing time for the bid is determined, and controlled, by the electronic clock in the bid management system. Once the deadline is reached, the system will not allow any bids to be submitted, and any in process that are not completed will be rejected. The amount of time required to enter and submit your bid depends on the complexity of the bid and the processing speed of your server and internet connections.

Technical Support
In the event you encounter technical difficulties during the uploading process, please contact the Planet Bids, BidsOnline system team as shown below (M-F from 8 a.m. to 5 p.m.):

support@planetbids.com or call 818-992-1771, ext. 0

Bid prices must be entered and the bid proposal packet must be uploaded to the BidsOnline system no later than the date and time indicated in the Notice Inviting Bids. No late bids will be accepted. No other method of bid submittal will be accepted.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

INFORMATION REQUIRED OF BIDDERS

In determining the lowest "responsible" bidder, consideration will be given to the general competency of the bidder in regard to the work covered by the Bid Proposal. To this end, each proposal shall be supported by a statement of the Bidder's experience on this form. **Failure of the Bidder to provide requested information in a complete and accurate manner shall render the bid non-responsive**. Additionally, the City reserves the right to disqualify or refuse to consider a proposal if a Bidder is determined to be non-responsible in accordance with Irvine Municipal Code § 2-12-103 "Determination of Contractor Non-Responsibility."

The Bidder shall supply the following information. Use additional sheets as necessary.

1. Contact person name:_____ Email:_____

   Address: _____

   Telephone: (___)_____Fax: (___)_____

2. Type of firm (Individual, Partnership, or Corporation): _____
3. State Contractor's License Number and Classification:_____
4. DIR Registration Number: _____ Expiration Date_____
5. Number of years your firm has operated as a contractor: _____
6. Number of years your firm operated under its present business name: _____
7. List the **names and addresses** of all principals or officers authorized to bind your firm.

Name:	**Address:**

8. List any project(s) your firm has **failed to complete** within the last five years due to a termination of contract. For each project, list the type of project, client's name,

contact person, current telephone number, email address, and provide a brief description of the grounds for the termination.

Check appropriate box: None ☐ See list below ☐

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

Type of Project	Client Name	Contact Person	Contact Phone No. and email address
Description:			

9. List projects of similar nature to the **PORTOLA SPRINGS COMMUNITY PARK INDIGNEOUS INTERPRETIVE SPACE – PHASE 1** your firm is **currently** constructing. For each project, list the type of project, contract amount, client's name, contact person, current telephone number, email address, and a brief description.

Check appropriate box: None ☐ See list below ☐

Type of Project	Contract Amount	Client Name	Contact Person	Contact Phone No. and email address
Description:				

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

Type of Project	Contract Amount	Client Name	Contact Person	Contact Phone No. and email address
Description:				
Type of Project	**Contract Amount**	**Client Name**	**Contact Person**	**Contact Phone No. and email address**
Description:				

10. List projects of a similar nature to the **PORTOLA SPRINGS COMMUNITY PARK INDIGNEOUS INTERPRETIVE SPACE – PHASE 1** your firm has **completed** within the last five years. For each project, list the type of project, contract amount, date of completion, client's name, contact person, current telephone number, email address, and a brief description.

Check appropriate box: None ☐ See list below ☐

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address
Description:					

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address
Description:					

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

Type of Project	Contract Amount	Date of Completion	Client Name	Contact Person	Contact Phone No. and email address
Description:					

11. List the name of the person(s) **(A MINIMUM OF ONE)** who inspected the site of the proposed work for your firm.

Name:	Date of Inspection:

12. Complete the following in conformance with Labor Code Section 1725.5:

Name of Subcontractor	Registered with DIR?	DIR Registration No.
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	
	Yes __ No __	

13. If requested by the City, the Bidder shall furnish a notarized financial statement, financial data, or other information and references sufficiently comprehensive to permit an appraisal of its current financial condition or ability to perform the work.

    Failure to furnish information upon request will render the bid nonresponsive.

    All of the above statements regarding Contractor's experience and financial qualifications are submitted in conjunction with the Bid Proposal, as a part thereof, and the truthfulness and accuracy of the information is guaranteed by the Bidder.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

THE CITY OF IRVINE RESERVES THE RIGHT TO REJECT ALL BIDS

The undersigned understands the contract time limit allotted for the completion of the work required by the Contract is **Ninety (90) Working Days** (excluding plant establishment) and **One Hundred Eighty (180) Working Days** (including plant establishment.)

The undersigned agrees, if awarded the Contract, to sign the Contract and furnish the necessary insurance certificates and bonds within ten (10) days of the date specified in the Notice of Award of Contract, not including Saturdays, Sundays, and legal holidays, and to begin work within ten (10) Working Days from the date specified in the City's Notice to Proceed. Contract time accounting shall begin on the date shown in the Notice to Proceed.

Accompanying this Bid Proposal is **(check appropriate box)**:

☐ **Cashier's Check** ☐ **Certified Check** ☐ **Bid Bond**

Sign Here if Individual:

Signature: _____

Print Name: _____

Address: _____

_____

Affix notary's acknowledgement

(Signature blocks continue on the following page)

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

Sign Here if Co-Partnership or LLC:

Co-Partnership/LLC Name of Firm: _____

Address: _____

_____

Members Signing:

Signature: _____ Print Name: _____

Address: _____

_____

Signature: _____ Print Name: _____

Address: _____

_____

Affix notary's acknowledgement

Sign Here if Corporation:

Name of Corporation: _____

Address: _____

_____

Officers of Corporation Signing:

Signature: _____ Print Name: _____

Address: _____

_____

Signature: _____ Print Name: _____

Address: _____

_____

If executed by other than President and Secretary of the Corporation, attach a certified copy of resolution authorizing signature on behalf of the Corporation.

Affix notary's acknowledgement

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

LIST OF SUBCONTRACTORS

The Bidder shall list each subcontractor performing work in an amount in excess of one-half of one percent (1/2%) of the prime contractor's total bid, or, in the case of bids for the construction of streets or highways, including bridges, in excess of one-half of one percent (1/2%) of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater. Complete columns (1) and (2) and submit with the bid. Complete columns (3) and (4) and submit with the bid or email to **Purchasing@cityofirvine.org** within 24 hours after the bid opening. Failure to provide complete information in columns (1) through (4) within the time specified shall render the bid non-responsive.

Subcontractors listed must not be debarred from performing the designated work.

Information must be typed or clearly printed.

BUSINESS NAME AND LOCATION (1)	CONTRACTOR LICENSE NUMBER (2)	BID ITEM NUMBER (SUBCONTRACTORS PROVIDING WORK TO MULTIPLE BID ITEMS OF WORK SHOULD BE LISTED FOR EACH BID ITEM SEPARATELY) (3)	PERCENTAGE OF BID ITEM PRICE SUBCONTRACTED AND DESCRIPTION OF THE PORTION OF BID ITEM WORK TO BE PERFORMED BY SUBCONTRACTOR (4)*
Sample: XYZ Contractors	XXXXXX	2	50% of Bid Item #2; Excess soil export
Sample: XYZ Contractors	XXXXXX	3	20% of Bid Item #3; Topsoil import

*** If you are subcontracting a whole bid item, insert one hundred percent (100%); if less, insert actual percentage.**

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

NON-COLLUSION DECLARATION-CONTRACTOR
To be Executed by Bidder and Submitted with Bid

The undersigned declares:

I am the _____ [title] of _____[company name], the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

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

_____
Signature

_____
Print Name

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

FORM OF BID BOND

(10% of the Proposal Amount)

KNOW ALL PERSONS BY THESE PRESENTS that we _____ _____ as Principal, and _____ _____ as Surety, are held and firmly bound unto City of Irvine, hereinafter called the City in the sum of _____ Dollars ($___ _____), for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the Principal submitted to the City a certain Bid Proposal, attached hereto and hereby made a part hereof, to enter into a contract in writing for the **PORTOLA SPRINGS COMMUNITY PARK INDIGENOUS INTERPRETIVE SPACE – PHASE 1, CIP 372501** and will furnish all required certificates of insurance and bonds as required by the Contract.

NOW THEREFORE, if said Bid Proposal shall be rejected; or in the alternate, if said Bid Proposal shall be accepted, and the Principal shall execute and deliver a contract in the prescribed Form of Contract, shall deliver certificates evidencing that the required insurance is in effect and shall execute and deliver Performance and Payment Bonds in the forms prescribed, and shall in all other respects perform the Contract created by the acceptance of said Bid Proposal, then this obligation shall be void; otherwise this obligation shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated. In the event suit is brought upon this bond by City and judgment is recovered, Surety shall pay all costs incurred by City in said suit, including a reasonable attorney's fee to be fixed by the court.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall in no way be impaired or affected by an extension of the time within which the City may accept such a Bid Proposal; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this ____ day of _____, 20____, the name of each party being hereto written below and these presents duly signed by each party’s undersigned representative, pursuant to authority of its governing body. This bond shall be authenticated by way of notarized acknowledgment, including a copy of the power of attorney, for the Surety.

ATTEST:

(Principal) _____

(Address) _____

_____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

_____

(By) _____

(Title) _____

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

FALSE CLAIMS

Bidder shall complete the **False Claims Act Certification** below or in the alternative, provide the information requested under **False Claims Act Violations** below. **Failure to certify or provide the requested information shall render the bid non-responsive.**

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

FALSE CLAIMS ACT CERTIFICATION

I _____ hereby certify that neither
Print name

_____
Contractor name

nor _____
Name of qualifying person licensed by Contractors State License Board

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

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

Executed this _____ day of _____ at _____
(Month and year) **(City and State)**

By _____
(Signature of owner, officer, manager or licensee responsible for submission of Bid Proposal)

FALSE CLAIMS ACT VIOLATIONS

With regard to any determinations by a tribunal or court of competent jurisdiction that the False Claims Act, as defined above, has been violated by (1) the Contractor submitting this Bid Proposal or (2) the qualifying person licensed by the State Contractors License Board to perform the work described in this Bid Proposal, shall provide on a separate sheet the following information: (1) the date of the determination of the violation, (2) the identity of the tribunal or court, (3) the identity of the government contract or project involved, (4) the identity of the government department involved, (5) the amount of fine imposed, and (6) any exculpatory information of which the Agency should be aware.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

CIVIL LITIGATION AND ARBITRATION HISTORY

Bidder shall provide the certification or information requested below. **Failure to certify or provide such certification or information shall render the bid non-responsive**.

For five (5) years preceding the submittal date of this Bid Proposal, identify civil litigation and arbitration arising out of the performance of a construction contract within the State of California in which the (1) Contractor submitting this bid proposal or (2) the qualifying person licensed by the State Contractors Licensing Board to perform the work described in this Bid Proposal was a named as a party in a lawsuit brought by or against the project owner or any action to confirm, vacate or modify an arbitration award involving an owner.

CIVIL LITIGATION AND ARBITRATION CERTIFICATION

If the Bidder has no civil litigation and arbitration history to report as described above, complete the following:

I _____ certify that neither
Print name

_____
Contractor name

nor _____
Name of qualifying person licensed by Contractors State License Board

has been involved in civil litigation and arbitration as described above.

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

Executed this _____ day of _____ at _____
(Month and year) **(City and State)**

By _____
(Signature of owner, officer, manager or licensee responsible for submission of Bid Proposal)

Do not include litigation and arbitration which are limited solely to enforcement of mechanics' liens or stop notices. Provide on a separate sheet (1) the name and court case identification number of each case, (2) the jurisdiction in which it was filed, and (3) the outcome of the litigation, e.g. whether the case is pending, a judgment was entered, a settlement was reached, or the case was dismissed.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

CRIMINAL CONVICTIONS

Bidder shall provide the certification or information requested below. **Failure to certify or provide such certification or information shall render the bid non-responsive.**

CRIMINAL CONVICTION CERTIFICATION

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

I _____ hereby certify that neither
Print name

_____
Contractor name

nor _____
Name of qualifying person licensed by Contractors State License Board

has been convicted of a criminal violation as described above.

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

Executed this _____ day of _____ at _____
(Month and year) **(City and State)**

By _____
(Signature of owner, officer, manager or licensee responsible for submission of Bid Proposal)

For the five (5) years preceding the date of this Bid Proposal is due, identify on a separate sheet any criminal conviction in any jurisdiction in the United States for a violation of law arising out of the performance of a construction contract (1) by the Contractor submitting this Bid Proposal or (2) by the qualifying person licensed by the State Contractors License Board to perform the work described in the Bid Proposal.

Provide on the following page labeled “Criminal Convictions Information.” (1) the date of conviction, (2) the name and court case identification number, (3) the identity of the law violated, (4) the identity of the prosecuting agency, (5) the contract or project involved, (6) the punishment imposed, and (7) any exculpatory information of which the Agency should be aware.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

VIOLATION OF LAW OR A SAFETY REGULATION

Has the Bidder, any officer of the Bidder, or any employee who has proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of a law or a safety regulation?

☐ **Yes** ☐ **No**

If the answer is yes, explain the circumstances in the following space.

Name of bidder (print)	Signature
Address	State Contractors' License No. & Classification
City Zip Code	Telephone

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
CIP 372501
BID NO. PK-26-0041

CONSTRUCTION CONTRACT
FOR CAPITAL IMPROVEMENTS

This Contract is made and entered into March 01, 2026 by and between the CITY OF IRVINE, a municipal corporation of the State of California, hereinafter referred to as "CITY" and TBD, a California corporation hereinafter referred to as "CONTRACTOR."

W I T N E S S E T H:

That the CITY and the CONTRACTOR, for the consideration hereinafter named, mutually agree as follows:

1. The complete Contract includes all of the Contract Documents, which are incorporated herein by this reference, to wit:

a. Permits and Agreements
b. Contract
c. Addenda
d. Instructions to Bidders, Proposal Requirements and Conditions
e. Special Provisions
f. Contract Plans
g. Standard Plans
h. Standard Specifications
i. Reference Specifications

The Contract Documents are complementary, and that which is required by one shall be as binding as if required by all.

2. CONTRACTOR shall provide and furnish all labor, materials, necessary tools, expendable equipment, and all utility and transportation services required for the following work of improvement: Indigenous Interpretive Space.

3. CONTRACTOR agrees to perform all the said work and furnish all the said materials at his own cost and expense that are necessary to construct and complete in strict conformance with Contract Documents and to the satisfaction of the Engineer, the work hereinafter set forth in accordance with the Contract therefore adopted by the City Council and as prepared by Kimley-Horn and Associates, Inc., 1100 Town and Country Rd, Suite 700, Orange, CA 92868.

Contractor Information

Address for Notices and Payments:
TBD
TBD

Attn:
Telephone: TBD
Email:

4. CITY agrees to pay and CONTRACTOR agrees to accept in full payment for performance of this work of improvement as described, the stipulated sum of $TBD the "Contract Price".

CITY agrees to make progress payments and final payment in accordance with the method set forth in the Special Provisions.

5. CONTRACTOR agrees to commence construction of the work provided for herein within ten (10) Calendar Days after the date specified in the Notice to Proceed, and to continue diligently in strict conformance with Contract Documents and without interruption, and to complete the construction thereof within 90 Working Days after the date specified in the Notice to Proceed.

The CONTRACTOR shall diligently prosecute all the work (including plant establishment) to completion before the expiration of 180 Working Days from the date specified in the Notice to Proceed.

6. Time is of the essence of this Contract, and it is agreed that it would be impracticable or extremely difficult to ascertain the extent of actual loss or damage which the CITY will sustain by reason of any delay in the performance of this Contract. It is, therefore, agreed that CONTRACTOR will pay as liquidated damages to the CITY the following sum: $4,200 per Calendar Day, for each and every Calendar Days delay in finishing the Work, except plant establishment work, in excess of the number of Working Days prescribed above. The CONTRACTOR shall pay to the CITY the sum $950 per Calendar Day, for each and every Calendar Days delay in completing the plant establishment work in excess of the number of Working Days prescribed above. In no case will liquidated damages be assessed more than $4,200 per day. If liquidated damages are not paid, as assessed by the CITY, the CITY may deduct the amount thereof from any money due or that may become due the CONTRACTOR under this Contract in addition to any other remedy available to CITY. By executing this Contract, CONTRACTOR agrees that the amount of liquidated damages is reasonable and shall not constitute a penalty.

7. CONTRACTOR will maintain and will require all subcontractors to maintain valid and current Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project. CONTRACTOR shall notify the CITY in writing immediately, and in no case more than twenty-four (24) hours, after receiving any information that CONTRACTOR'S or any of its subcontractor's DIR registration status has been suspended, revoked, expired, or otherwise changed.

8. CONTRACTOR will pay, and will require all subcontractors to pay, all employees on said Contract a salary or wage at least equal to the prevailing salary or wage established for such work as set forth in the wage determinations and wage standards applicable to this work, a copy of which is on file in the office of the City Clerk of the City of Irvine. Federal prevailing wage rates apply for federally funded projects. Travel and subsistence pay shall be paid in accordance with Labor Code § 1773.1.

9. CONTRACTOR shall be subject to the penalties in accordance with Labor Code of § 1775 for each worker paid (either by him or by any subcontractors under him) less than the prevailing rate described above on the work provided for in this Contract.

10. CONTRACTOR and subcontractors shall comply with Labor Code § 1810 and § 1811 which stipulates that eight hours labor constitutes a legal day's work, and § 1812 which stipulates that the CONTRACTOR and subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work performed under the terms of the Contract. Failure to comply with these sections of the Labor Code will subject the CONTRACTOR to penalty and forfeiture provisions of the Labor Code § 1813.

11. CONTRACTOR will comply with the provisions of Labor Code § 1777.5 and CWA Article 14 pertaining to the employment of apprentices to the extent applicable to this Contract. The Contractor shall ensure that all apprentices performing work on the project work under the direct supervision of a journeyworker from the trade in which the apprentice is indentured.

12. The City of Irvine will be using the eComply Solutions software for managing certified payrolls on this project. Accordingly, Contractor shall register in, attend training for, and use the eComply Solutions software for submitting certified payrolls and related tasks as deemed appropriate by the City of Irvine. When the project commences, you will be contacted by an eComply Solutions representative regarding this process. Further information will be provided via a separate communication at that time.

13. CONTRACTOR, by executing this Contract, hereby certifies:

> "I am aware of, and will comply with the Labor Code § 3700 by securing payment for, and maintaining in full force and effect for the duration of the contract, complete Workers' Compensation Insurance, and shall furnish a Certificate of Insurance to the Agency before execution of the Contract. The CITY, its officers, or employees, will not be responsible for any claims in law or equity occasioned by failure of the CONTRACTOR to comply with this paragraph."

CONTRACTOR further agrees to require all subcontractors to carry Workers' Compensation Insurance as required by the Labor Code of the State of California.

CONTRACTOR acknowledges that this project is subject to the City's CWA. Contractor agrees that it and all of its subcontractors will abide by the terms and conditions of the CWA, including submittal of a Letter of Assent prior to the start of work.

14. CONTRACTOR shall, concurrent with the execution of this Contract, furnish two bonds approved by the CITY, one in the amount of One Hundred Percent (100%) of the Contract Price, to guarantee the faithful performance of the work "Performance Bond", and one in the amount of One Hundred Percent (100%) of the Contract Price to guarantee payment of all claims for labor and materials furnished "Payment Bond." This Contract shall not become effective until such bonds are supplied to and approved by the CITY.

CONTRACTOR will comply with CWA Section 3.8, which requires contractors that are not signatory with one of the unions that are signatory to the CWA to register each of their own workers (Core Employees) with the appropriate union hall prior to them performing work ion the project. The contractor must provide a listing of their Core Employees to the CWA administrator and the union prior to start of work. To qualify as a Core Employee, each employee must have been on the contractor's active payroll for sixty (60) of the on hundred (100) working days prior to project award and have worked at least two thousand (2,000) hours in the craft that they are employed within the previous four (4) years. Core Employees are to be used in a one-to-one ration with referred workers from the union hall.

15. CONTRACTOR shall, prior to commencing work, furnish certificates evidencing compliance with all requirements of the Contract Documents pertaining to insurance.

CONTRACTOR will pay all craft employee fringe benefits to the appropriate Union Trust Fund in the amounts designated in the Union MLA as required by CWA Section 5.2. Employee fringe benefit contributions paid to other funds or direct to the employee do not count towards this requirement.

16. Any amendments to any of the Contract Documents must be in writing executed by the CONTRACTOR and the CITY. Any time an approval, time extension, or consent of the CITY is required under the Contract Documents, such approval, extension, or consent must be in writing in order to be effective.

17. This Contract contains all of the agreements and understandings of the parties and all previous understandings, negotiations, and contracts are integrated into and superseded by this Contract.

18. In the event that any one or more of the phrases, sentences, clauses, paragraphs, or sections contained in this Contract shall be declared invalid or unenforceable by a valid judgment or decree of a court of competent jurisdiction, such invalidity or unenforceability shall not affect any of the remaining phrases, sentences, clauses, paragraphs, or sections of this Contract which are hereby declared as severable and shall be interpreted to carry out the intent of the parties hereunder.

19. The persons executing this Contract on behalf of the parties hereto warrant that they are duly authorized to execute this Contract on behalf of said parties and that, by so executing this Contract, the parties hereto are formally bound to the provisions of this Contract.

20. This Contract shall be binding upon and shall inure to the benefit of the parties hereto and their respective heirs, personal representatives, successors, and assigns.

21. In performing its obligations and duties under this Contract, each party shall comply with all applicable local, state, and federal laws, regulations, rules, standards, and ordinances.

22. In the event any action is brought between the parties hereto relating to this Contract or the breach thereof, the prevailing party in such action shall be entitled to recover from the other party reasonable expenses, attorneys' fees, and costs in connection with such action or proceeding.

23. This Contract may be executed by the parties in counterparts, which counterparts shall be construed together and have the same effect as if all of the parties had executed the same instrument.

24. This Contract is to be governed by the laws of the State of California.

(Signatures on following page)

IN WITNESS WHEREOF, the parties have executed and entered into this Agreement as of the date first set forth above.

CITY OF IRVINE

By:

Luis Esteves
Its: Director of Public Works & Sustainability

By:
Sean Crumby
Its: City Manager

Attest:

By:
Carl Petersen
Its: City Clerk

APPROVED AS TO FORM:
RUTAN & TUCKER, LLP

By:

Jeffrey Melching

TBD

By:

Its: TBD

By:
Its: TBD

CITY OF IRVINE

INDIGENOUS INTERPRETIVE SPACE
CIP 372501
BID NO. PK-0041

PERFORMANCE BOND (SAMPLE)

KNOW ALL PERSONS BY THESE PRESENTS that we _____ _____, as Principal, and _____ as Surety, are held and firmly bound unto City of Irvine, hereinafter called the City in the sum of _____ _____($_____ _____) (this amount being not less than one hundred percent (100%) of the total bid price of the contract awarded by the owner to the Principal), for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the Principal entered into a contract attached hereto, with the City of Irvine.

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said Contract during the original terms thereof, and any extensions thereof that may be granted by the Owner with or without notice of the Surety, and during the life of any guarantee required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, then this obligation shall be void otherwise this obligation shall remain in full force and effect.

Further, the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or modifications of the Contract Documents and/or of the Work to be performed thereunder shall in any way affect its obligations on this bond; and it hereby waives notice of any and all such changes, extensions of time, and alterations or modifications of the contract documents and/or of the work to be performed thereunder.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorneys' fees, incurred by the City in successfully enforcing such obligation, and all to be taxed as costs and included in any judgment rendered by a court of law.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this ____ day of _____, 20____, the name of each party being hereto written below, and these presents duly signed by each party's undersigned representative, pursuant to authority of its governing body. This bond shall be authenticated by way of notarized acknowledgment, including a copy of the power of attorney, for the Surety.

ATTEST:

(Principal) _____

(Address) _____

_____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

_____

(By) _____

(Title) _____

CITY OF IRVINE

INDIGENOUS INTERPRETIVE SPACE
CIP 372501
BID NO. PK-0041

PAYMENT BOND (SAMPLE)

KNOW ALL PERSONS BY THESE PRESENTS that we _____ _____, as Principal, and _____ as Surety, are held and firmly bound unto City of Irvine, hereinafter called the City in the sum of _____ _____($_____) (this amount being not less than one hundred percent (100%) of the total bid price of the contract awarded by the owner to the Principal), for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The conditions of this obligation are such that whereas the Principal entered into a contract, attached hereto, with the City of Irvine.

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of each contract that may hereafter be made, then this obligation shall be void, otherwise this obligation shall remain in full force and effect.

The condition of this obligation is such that, if said Principal or his subcontractors, or heirs, executors, administrators, successors, or assigns thereof, shall fail to pay any of the persons named in the Civil Code § 9100 for any material used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or shall fail to pay any amount due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant or any amount required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of employees of the Contractor and his subcontractors with respect to such work and labor, then said Surety will pay and, also, in case suit is brought upon the bond, will pay a reasonable attorney's fee to be fixed by the court. This bond shall inure to the benefit of all persons named in the aforesaid Civil Code § 9100 to give a right of action to them or their assigns in any suit brought upon the bond.

Further, the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or modification of the Contract Documents or of the Work to be performed thereunder shall in any way affect its obligations on this bond; and it hereby waives notice of any and all such changes, extensions of time, and alterations or modifications of the Contract Documents and/or of the work to be performed thereunder.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument this ____ day of _____, 20____, the name of each party being hereto written below and these presents duly signed by each party’s undersigned representative, pursuant to authority of its governing body. This bond shall be authenticated by way of notarized acknowledgment, including a copy of the power of attorney, for the Surety.

ATTEST:

(Principal) _____

(Address) _____

_____

(By) _____

(Title) _____

ATTEST:

(Surety) _____

(Address) _____

_____

(By) _____

(Title) _____

SPECIAL PROVISIONS

A. THESE ADDITIONS, DELETIONS, AND AMENDMENTS MODIFY THE SPECIFICATIONS IN THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2024 EDITION AND CURRENT 2025 SUPPLEMENT.

B. THESE ADDITIONS, DELETIONS, AND AMENDMENTS SHALL TAKE PRECEDENCE IN THE EVENT OF A CONFLICT WITH ANY STANDARD SPECIFICATIONS.

C. AS A CONVENIENCE, THESE ADDITIONS, DELETIONS, AND AMENDMENTS HAVE BEEN ARRANGED IN A FORMAT THAT PARALLELS THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2024 EDITION AND CURRENT SUPPLEMENT.

PART 1 – GENERAL PROVISIONS

SECTION 1 – TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

REVISE as follows:

1-1 GENERAL. *ADD the following term:*

The word *provide* shall mean furnish and install.

1-2 TERMS AND DEFINITIONS*. MODIFY to ADD the following:*

Acceptance, Final Acceptance – Formal action by the Agency acknowledging the Work is complete.

Agency/Board/City – The City of Irvine, a municipal corporation.

Agency Representative – The person or engineering/architectural firm Agency authorizes to represent it during the performance of the Work by the Contractor and until Final Acceptance. The Agency Representative means the Agency Representative or his assistants.

Calendar Day – The 24-hour day denoted on the calendar.

Calendar Month – The period including the first through the last day of a month.

City – See Agency.

Clarification – Verbal or written interpretation of Contract Documents by the Agency Representative to clarify intent, procedures, materials or processes with no change in contract sum or time.

REPLACE the definition for "Engineer" with the following:

Engineer – The City Engineer acting either directly or through the Agency Representative.

Field Order – Authorization by Agency Representative to proceed with Change Order work after completion of negotiations, but before the issuance of the Change Order.

Invitation for Bids – Comprised of the NOTICE INVITING BIDS, and all CONTRACT DOCUMENTS, referenced or provided in the project bid package, detailed in paragraph 1 of the INSTRUCTIONS TO BIDDERS, PROPOSAL REQUIREMENTS AND CONDITIONS, included herein.

Laboratory – The laboratory authorized by the Agency or the Agency Representative to test material and work involved in the project.

Major Bid Item – A single Contract item constituting ten percent (10%) or more of the original Contract Price.

Request for Quotation – Contemplated revision of Contract Documents by the Agency requesting detailed information from the Contractor on impacts to contract sum or contract time.

State Standard Specifications – Standard Specifications issued by the State of California, Department of Transportation, 2024.

Traffic Control Devices – All signs, signals, markings, and other devices used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway, by authority of the Engineer.

1-3 ABBREVIATIONS.

1-3.2 Common Usage. *MODIFY to ADD the following:*

Abbreviation	Word or Words
CSMP	Construction Site Monitoring Program
DBE	Disadvantaged Business Enterprise
ESA	Environmentally Sensitive Area
HMA	Hot Mix Asphalt
NOI	Notice of Intent
SWMP	Storm Water Management Plan
SWRCB	State Water Resources Control Board
WPCP	Water Pollution Control Program
WDID	Waste Discharge Identification Number

DELETE the abbreviation of MUTCD and SUBSTITUTE with the following:

MUTCD	California Manual on Uniform Traffic Control Devices

1-3.3 Institutions. *MODIFY to ADD the following:*

Abbreviation	Word or Words
AI	The Asphalt Institute
AIA	American Institute of Architects
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance of Way Association
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
CRSI	Concrete Reinforcing Steel Institute
NFPA	National Fire Protection Association
PCA	Portland Cement Association
UBC	Uniform Building Code, Pacific Coast Building Officials Conference of the International Conference of Building Officials

DELETE the institution of SSPC and SUBSTITUTE with the following:

SSPC	Steel Structures Painting Council

1-6 BIDDING AND SUBMISSION OF THE BID.

1-6.2 Subcontractor Listing

ADD the following:

If the Contractor subcontracts any part of this Contract, the Contractor shall be as fully responsible to the Agency for the acts and omissions of his subcontractor as he is for the acts and omissions of persons directly employed by him. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the Agency. The Contractor shall bind every subcontractor to be bound by the terms of the Contract Documents as applicable to his work.

Debarred contractors shall not be employed on the Work pursuant to the provisions of Labor Code § 1777.1 and the City of Irvine Council Ordinance No. 08-10. The Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations website: **https://www.dir.ca.gov/dlse/debar.html**

The City will not conduct business with an individual, firm or organization, and the Contractor shall not employ or otherwise use any subcontractor, supplier, or equipment vendor at any tier that is on the City's debarment list, the Department of Industrial Relations debarment list, or on the US General Services Administration "List of Parties Excluded from Federal Procurement and Non Procurement Programs."

A list of individuals, firms and organizations debarred, suspended or who have voluntarily excluded themselves from Federal Procurement and Non-Procurement Programs is maintained by the US General Services Administration. This excluded parties list is available from the website: **https://sam.gov/content/home**

The Contractor and each of its subcontractors shall maintain a valid and current Department of Industrial Relations (DIR) Public Works Contractor registration during the term of this project.

Prior to including a subcontractor's name on the bid, the Contractor shall be responsible for verifying that each of its subcontractors are properly licensed and not debarred from performing the designated work.

This requirement shall be enforced as follows: Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the Contract.

If any subcontractor or person employed by the Contractor is deemed by the Engineer to be incompetent or to act in an improper manner, at the request of the Engineer, they shall be dismissed immediately from the job and shall not be employed again on the Work.

A copy of each subcontract is required to be filed with the Agency before the subcontractor begins work. Each subcontract shall contain a reference to the Contract between the Agency and the Contractor, and the terms of that Contract, and all parts thereof shall be made a part of such subcontract insofar as applicable to the work covered thereby. Each subcontract shall provide for its annulment by the Contractor at the order of the Agency if in the Agency's opinion the subcontractor fails to comply with the requirements of the Contract.

SECTION 2 – SCOPE OF THE WORK

REVISE as follows:

2-1 WORK TO BE DONE.

ADD the following after the 1st paragraph:

The Contractor shall leave the Work area in a neat condition. Any work not shown in the Plans or Specifications but necessary to complete the Work according to law and governmental codes and regulations shall be performed by the Contractor as if in the Plans and Specifications.

The Contractor shall remove and dispose of all structures, debris, or other obstructions of any character necessary to accommodate the Work. Where such obstructions consist of improvements not required by law to be removed by the Agency thereof, all such improvements shall be removed, maintained, and permanently replaced by the Contractor at his expense.

2-2 PERMITS.

DELETE in its entirety and SUBSTITUTE with the following:

2-2 PERMITS AND LICENSES. Except as otherwise specified in the Special Provisions, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary, and incidental to the due and lawful prosecution of the Work. These permits and licenses shall be obtained in sufficient time to prevent delays to the Work. The Contractor shall maintain a copy of all permits on the site. The Contractor shall furnish the Agency with copies of permits and licenses within one (1) Working Day of obtaining them. The Contractor shall comply with all rules and regulations included in permits. Should the Contractor fail to conform to said rules and regulations, the Agency reserves the right to perform the work necessary to conform to the rules and regulations and the cost of such work will be deducted from any monies due or to become due to the Contractor.

The Contractor and all subcontractors shall obtain within five (5) Calendar Days of executing the Contract, a current City of Irvine Business License and maintain such license(s) throughout the term of the Contract.

In the event that the Agency has obtained permits, licenses or other authorizations applicable to the Work, the Contractor shall obtain a rider, pay all fees and comply with the provisions of said permits, licenses, and other authorizations.

2-3 RIGHT OF WAY.

DELETE the 1st sentence and SUBSTITUTE with the following:

Rights of way, easements, agreements, licenses, or rights of entry (all referred to as right of way) for the Work have been provided by the Agency. Temporary right-of-way to construct one or more portions of the Work may also have been acquired by the Agency. If temporary right of way was acquired, the documents or their contractual terms and obligations are included in the Contract Documents. The Contractor shall comply with all the terms and

obligations related to the physical use of the temporary right of way and its eventual return of the property to the owner. The Contractor shall schedule the Work that may include landscape establishment, maintenance periods, and final acceptance within the temporary right of way to start and finish within the time allotted in each temporary right of way agreement. Should the Work be delayed through no fault of the Agency, the Contractor shall be responsible for all costs incurred by the Agency to extend use of the temporary right of way.

MODIFY to ADD the following:

Work in the public right of way shall be done in accordance with the requirements of the permit issued by the public agency in whose right of way the Work is located in addition to conforming to the Contract Documents. If a permit or traffic control plan is not required, the Work shall conform to the standards set forth in the MUTCD.

The Contractor shall not allow his employees to use private property for any reason or to use water or electricity from such property without providing the City written permission from the owner. The Contractor shall comply with all applicable federal, state and local laws, ordinances, codes, and regulations in performing any work or doing any activity on lands outside the public rights of way.

The Contractor shall hold harmless, indemnify, and defend the Agency, the Agency Representative and each of their officers, employees, and agents from all claims or suits for damages occasioned by such work or activity, whether done according to this section and with permission from the Agency or in violation of this section without permission from the Agency. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claims or suits.

The Contractor shall comply with City of Irvine Municipal Code § 5-9-521 Construction Site and Vacant Property Security, and be fully responsible for locating and obtaining permission to use equipment yards or material storage site(s). The Contractor shall assume full responsibility and costs for property rental, site preparation, maintenance and cleanup in a manner satisfactory to the City and the property owner.

If, through the failure of the Agency to acquire or clear right of way, the Contractor sustains loss which could not have been avoided by the judicious handling of forces, equipment and plant, the Contractor will be paid an amount as the Engineer may find to be a fair and reasonable compensation for such part of the Contractor's actual loss as, in the opinion of the Engineer, was unavoidable, determined as follows:

Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment used in the performance of extra work paid for as provided in 2-8 with the following exceptions:

a) The right of way delay factor for each classification of equipment shown in the State of California, Department of Transportation publication entitled “Equipment Rental Rates and Labor Surcharge,” current edition at the time of bid opening will be applied to such equipment rental rate.

b) The time for which such compensation will be paid will be the actual normal working time during which such delay condition exists, but in no case will exceed eight (8) hours in any day.

c) The days for which compensation will be paid will be the Calendar Days, excluding Saturdays, Sundays, and legal holidays, during the existence of such delay.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of men, cost of extra moving of equipment, and cost of longer hauls. Compensation for idle time of equipment will be determined, as provided herein, and compensation for idle time of men will be determined as provided in 2-8.

If the performance of the Contractor's work is delayed as a result of the failure of the City to acquire or clear right of way, an extension of time determined pursuant to the provisions in 6-4 will be granted.

2-4 COOPERATION AND COLLATERAL WORK.

DELETE in its entirety 4th paragraph and SUBSTITUTE with the following:

Nothing in the Contract shall be interpreted as granting to the Contractor exclusive occupancy of the site of the project. The Contractor must ascertain to his own satisfaction the scope of the project and the nature of any other contracts that have been or may be awarded by the Agency in the construction of the project, to the end that the Contractor may perform this Contract in the light of such other constraints, if any.

The Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on or adjacent to the project. If the performance of any Contract for the project is likely to be interfered with by the simultaneous performance of some other contract or contracts, the Engineer will decide which contractor shall cease work temporarily and which contractor shall continue or whether the work under the contracts can be coordinated so that the Contractors may proceed simultaneously. On all questions concerning conflicting interest of Contractors performing related work, the decision of the Engineer shall be binding upon Contractors concerned. The Agency, the Engineer, the Agency Representative, and each of their officers, employees, and agents shall not be responsible for any damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award of performance or attempted performance of any other contract or contracts on the project or caused by a decision or omission of the Engineer respecting the order of precedence in the performance of the contracts.

If, through acts of neglect on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage on the Work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Agency, the Engineer, the Agency Representative, or their consultants on account of any damage alleged to have been so sustained, the Agency will notify the Contractor. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of the assertion of any such claims or liabilities against the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents against any such claim.

2-5 THE CONTRACTOR'S EQUIPMENT AND FACILITIES.

2-5.1 General. *MODIFY to ADD the following:*
The Contractor shall render its machinery and equipment inoperable at all times except during actual construction. The Contractor shall be responsible for construction means, controls, techniques, sequences, procedures, and construction safety.

ADD:

2-5.1.1 Equipment. Contractor shall stencil or stamp at a clearly visible location on each piece of equipment, except hand tools, an identifying number and:

a) On compacting equipment, its make, model number, and empty gross weight that is either the manufacturer's rated weight or the scale weight.

b) On meters and on the load-receiving element and indicators of each scale, the make, model, serial number, and manufacturer's rated capacity.

The Contractor shall submit a list describing each piece of equipment and its identifying number before commencement of the Work.

Upon request, the Contractor shall submit manufacturer's information that designates portable vehicle scale capacities.

The Contractor's measuring devices shall be tested and approved under California Test 109 in the Agency's presence or by any of the following:

a) County Sealer of Weights and Measures

b) Certified Scale Service Agency

c) Division of Measurement Standards Official

2-5.2 Temporary Utility Services. *DELETE in its entirety and SUBSTITUTE with the following:*

The Contractor shall, at its own expense, make all arrangements to furnish, install and maintain temporary water, electricity, telephone, and sanitary facilities for construction needs throughout construction period. Materials may be new or used, but must be adequate for the purposes intended, and must not violate requirements of applicable codes, specifications or standards.

The Contractor shall maintain systems to provide continuous services, modify, and extend services, as work progress requires. The Contractor shall completely remove temporary materials and equipment when construction needs can be met by use of permanent utility facilities.

The Contractor shall clean and repair damage caused by installation or use of temporary facilities, restore existing facilities used for temporary services to original or better condition, and restore permanent facilities used for temporary services to original condition.

For water, the Contractor shall:

a) Provide adequate supply of water suitable for construction usage and needs.

Water Source: Irvine Ranch Water District (IRWD)

a) Obtain meter, inspections, and approvals prior to use of existing system.

b) Comply with IRWD requirements.

Conservation:

a) Minimize water use whenever possible.

b) Maintain watering equipment in good working order.

c) Repair leaks promptly.

When necessary to maintain pressure, provide temporary pumps, tanks, and compressors.

For electricity, the Contractor shall:

a) Provide portable power plants and/or connection to existing system for construction needs.

b) Source of existing power: Southern California Edison Company (SCE). Prior to connecting to existing system:

    1) Obtain permit from City of Irvine, Community Development Department for installation of temporary power pole and/or system.

    2) Arrange for required inspections and coordinate temporary meter installation with City and SCE.

For sanitary facilities, the Contractor shall:

a) Furnish and maintain portable toilet units in a clean, operable, and sanitary condition for use by construction personnel.

b) Place units in conformance with applicable laws, codes, and regulations.

Pay all fees and charges for applications, non-City permits and inspections, installations, temporary meters, utility usage, service charges, maintenance, removals, and restoration.

Contractor shall use standard products of service companies. At Contractor's option with prior approval by the Agency, patented specialty devices may be used, when in compliance with applicable codes and service company requirements.

2-6 CHANGES REQUESTED BY THE CONTRACTOR.

ADD the following:

The Contractor may initiate changes by submitting a written Change Order Request to the Engineer containing:

a) Description of the proposed changes.

b) Statement of the reason for making the changes.

c) Reference applicable specifications sections and specific plans in support of the request.

d) Statement of the effect on the Contract Price and Contract time.

e) Statement of the effect on the work of separate subcontractors.

f) Documentation supporting any change in Contract Price or Contract time as appropriate.

2-7 CHANGES INITIATED BY THE AGENCY.

2-7.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The Agency may issue a Change Order for modifications of Work including, but not limited to, the Plans, Specifications, character, quantity or time of Work. Change Orders shall be in writing, on a form substantially conforming to the sample Contract Change Order Form provided in section 2-7.2 below, and state the dollar value of the change or establish the method of payment, and any adjustment in the Contract time of completion.

The Engineer may order minor changes in the Work not involving an increase or decrease in the contract amount, nor involving a change in the time for completion, but consistent with the purposes for which the works are being constructed. If the Contractor believes that any order for minor changes in the work involves changes in the Contract Price or time of completion, the Contractor shall not proceed with the minor changes so ordered and shall immediately, upon the receipt of such order, notify the Engineer in writing of his estimate of the changes in the Contract Price and time of completion he believes to be appropriate.

No payment for changes in the Work will be made and no change in the time of completion by reasons of changes in the Work will be made, unless the changes are covered by a written Change Order approved by the Agency in advance of the Contractor's proceeding with the changed work.

Once a Change Order is finalized and executed by both parties, the Contractor waives its right to seek any additional compensation for the work covered by the Change Order or any project impacts. The Contractor agrees that all Change Orders constitutes full payment for the work covered by the Change Orders, including all direct and indirect overhead expenses.

Notwithstanding any other provision in the Contract Documents, the Agency’s issuance of a Change Order shall not constitute a waiver by the Agency of, or preclude the Agency in any way from, asserting any claim with respect to the same, including but not limited to, a claim of breach of contract or claim that the issued Change Order covers work included in the Scope of Work set forth in the Contract Documents for which the Contractor was not entitled to any additional funds.

A Change Order is approved when the Agency signs the Change Order.

A Contract Change Order approved by the Engineer may be issued to the Contractor at any time. Should the Contractor disagree with any terms or conditions set forth in an approved Contract Change Order not executed by the Contractor, the Contractor shall proceed with the Change Order work in accordance with 2-10 of the Standard Specifications and submit a written protest to the Engineer within fifteen (15) days after the receipt of the approved Contract Change Order. The protest shall state the points of disagreement citing the Specification

references, quantities, and costs involved. If a written protest is not submitted, payment will be made as set forth in the approved Contract Change Order, and that payment shall constitute full compensation for all work included therein or required thereby. Unprotested approved Contract Change Orders will be considered as executed Contract Change Orders.

The Engineer may initiate changes by submitting a Request for Quotation to Contractor. Such request will include detailed description of the change, products, and location of the change in the Work, supplementary or revised Plans and Specifications. Such request is for information only and is not an instruction to execute the changes, or to stop work in progress.

The Contractor shall support each quotation for a lump-sum proposal, and for each unit price that has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.

On request, the Contractor shall provide additional data to support time and cost computations, labor required, equipment required, products required, recommended source of purchase and unit cost, and quantities required, taxes, insurance and credit for work deleted from Contract, similarly documented, justification for any change in Contract time.

The Contractor shall support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information as follows:

a) Name of the Agency Representative who ordered the work, and date of the order.

b) Dates and times work was performed, and by whom.

c) Time record, summary of hours worked, and hourly rates paid.

d) Receipts and invoices for equipment used, listing dates and times of use, products used, listing of quantities, and subcontracts.

In lieu of a Request for Quotation, the Engineer may issue a written Field Order for the Contractor to proceed with a change for subsequent inclusion in a Contract Change Order. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Price and any change in Contract time. Agency Representative will sign and date the Field Order as authorization for the Contractor to proceed with the changes. Contractor may sign and date the Field Order to indicate agreement with the terms therein. Contractor shall proceed with the work so ordered prior to actual receipt of an approved Contract Change Order.

ADD:

2-7.2 Contract Change Order Form

CITY OF IRVINE **Sheet** 1 **of** X

Contract Change Order

Change Requested by: Engineer ☐ **Contractor** ☒

CCO No.	CIP No.	Description	Federal Number(s)

To Contractor

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time.

Total Cost: $_____

Estimated Cost: Decrease ☐ Increase ☐

Revised Contract Amount: $_____

By reason of this order, the time of completion will be adjusted as follows: Working Days
The revised completion date is:

Submitted by

Signature	(Print name & title) Insert Name - SENIOR PROJECT MANAGER	Date

Reviewed by

Signature	(Print name & title) Insert Name – MANAGER OF PROJECT DELIVERY	Date

Approval by

Signature	(Print name & title) Insert Name – DEPUTY DIRECTOR/CITY ENGINEER	Date

We, the undersigned Contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefore the prices shown above, including, but not limited to, direct and indirect overhead expenses.

Notwithstanding any other provision in the Contract Documents, the City's issuance of a change order shall not constitute a waiver by the City of, or preclude the City in any way from, asserting any claim with respect to the same, including but not limited to, a claim of breach of contract or claim that the issued change order covers work included in the Scope of Work set forth in the Contract Documents for which the Contractor was not entitled to any additional funds.

Contractor Acceptance by: Contractor's name

Signature	(Print name & title)	Date

cc: Contractor, Finance, Inspection, File

2-8 EXTRA WORK.

DELETE in its entirety and SUBSTITUTE with the following:

When the price for the extra work cannot be agreed upon prior to the commencement of the work, the Agency will pay for the extra work based on the accumulation of costs as provided herein.

SECTION 3 – CONTROL OF THE WORK

REVISE as follows:

3-1 ASSIGNMENT.

Modify to add the following:

The performance of the Contract may not be assigned, except upon the written consent of the Agency. Consent will not be given to any proposed assignment that would relieve the original Contractor or its Surety of their responsibilities under the Contract, nor will the Agency consent to any assignment of any part of the Work under the Contract.

Assignment of this Contract shall contain a provision that the funds to be paid to the assignee under the assignment are subject to a prior lien for services rendered or materials supplied for performance of the work called for under the Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials.

3-2 SELF PERFORMANCE.

DELETE in its entirety and SUBSTITUTE with the following:

When an item of work is designated as (S) or (S-F) in the "Schedule of Work," that item of work shall be the considered a "Specialty Item."

The Contractor shall perform, with its own organization, Contract work amounting to at least 15 percent of the Contract Price on building/facility contracts, and at least 50 percent of the Contract Price on all other Public Works contracts except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the Contract Price before computing the amount required to be performed by the Contractor with its own organization. "Specialty Items" will be identified by the Agency in the Bid or Proposal. Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the Contract Unit Price. This will be determined from information submitted by the Contractor, and subject to approval by the Engineer.

The provisions in 3-2 of these Special Provisions require that the Contractor shall perform with the Contractor's own organization contract work amounting to not less than 50 percent of the original Contract Price is not changed by the Federal Aid requirement specified under "Required Contract Provisions Federal Aid Construction Contracts" of these Special Provisions that the Contractor perform not less than 30 percent of the original contract work with the Contractor's own organization.

3-4 AUTHORITY OF THE BOARD AND THE ENGINEER.

MODIFY TO ADD THE FOLLOWING:

The Contractor is subject to the provisions of Government Code § 8546.7, which provides that this Contract and related documents are subject to the examination and audit of the State

Auditor, at the request of the Agency or as part of any audit of the Agency, for a period of three (3) years after final payment under the Contract.

The Agency reserves the right to audit the Contractor's books, records, and documents related to the Contractor's performance and the Contractor's compliance with all of the terms and conditions of this Contract at any time. Upon request by Agency, Contractor shall prepare and submit to Agency any reports concerning Contractor's performance of the services rendered under this Contract. With 72 hours advance written notice delivered to Contractor, Agency shall have access to the books, records, and documents of Contractor related to Contractor's performance of this Contract in the event any audit is requested.

All drawings, documents, and other materials prepared by Contractor in the performance of this Contract:

a) Shall be the property of Agency and shall be delivered at no cost to Agency upon request of Agency or upon the termination of this Contract, and

b) Are confidential and shall not be made available to any individual or entity without prior written approval of the Agency.

3-5 INSPECTION.

DELETE in its entirety and SUBSTITUTE with the following:

Inspection of the Work will be conducted by an Agency Representative and will include monitoring and enforcing compliance of materials, equipment, installations, workmanship, methods, and requirements of the Contract Documents.

The Agency Representative shall, at all times, have safe access to the Work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship, and character of materials and equipment used and employed in the Work.

Whenever the Contractor varies the work hours in which inspection is required, the Contractor shall give at least two (2) Working Days written notice to the Agency Representative so that inspection may be made.

All installations which are to be backfilled or otherwise covered will be inspected by the Agency Representative prior to backfilling or covering. The Contractor shall give the Agency Representative a minimum of two (2) days advance notice prior to backfilling or covering any part of the Work.

Work or materials concealed or performed without the prior notice specified above, will be subject to such tests or exposure as may be necessary to prove to the satisfaction of the Engineer, that all materials used and the work done are in strict conformity with the Contract Documents. All labor and equipment necessary for exposing and testing shall be furnished and paid for by the Contractor. The Contractor shall replace, without additional cost to the Agency, any materials or work damaged by exposure or testing.

Defective work shall be made good at the Contractor's expense including any unsuitable materials and equipment that may have been previously inspected by the Agency Representative, and/or that payment therefore has been included in an estimate for payment.

Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all requirements of the Contract.

All submittals and correspondence between the Agency and the Contractor, related to inspection of the Work of this Contract, shall be directed to the Engineer.

ADD:

3-5.1 Inspection Requirements. The Contractor shall notify the Agency Representative a minimum of 48 hours before inspection is required.

a) Unless specified elsewhere in the Special Provisions, inspection of the Work will be provided by the Agency between the hours of 7:00 a.m. and 3:30 p.m., Monday through Friday, exclusive of Agency holidays. Any inspections requested by or made necessary as a result of the actions of the Contractor beyond the hours stated above shall be paid for by the Contractor at the prevailing rate of 1-1/2 times the regular hourly wage rate, plus 21% for overhead costs.

   The Contractor shall submit a request to the Engineer for approval, a minimum five (5) Calendar Days, in advance of inspections requested by or made necessary as a result of the actions of the Contractor on Saturdays, Sundays or Agency and/or Federal holidays. The Contractor shall pay for these inspections at the prevailing rate of 1-1/2 times for Saturdays and 2 times the regular hourly wage rate for Sundays or Agency and/or Federal holidays plus associated overhead costs.

   For purposes of this section, the following holidays are observed by the Agency:

   New Year's Day
   Martin Luther King Jr. Day
   Presidents' Day
   Memorial Day
   Juneteenth
   Independence Day
   Labor Day
   Veterans Day
   Thanksgiving Day
   Day after Thanksgiving
   Christmas Eve
   Christmas Day

   A construction calendar showing the days that each of the above holidays will be observed is available upon request from the Engineer.

b) The Contractor shall telephone the designated Agency Representative at least two (2) Working Days prior to starting construction or resuming construction following suspension of the Work for any reason.

   Prior to commencing any work on the Contract, the Contractor shall submit a completed Inspection Overtime Permit form provided by the City of Irvine.

c) In addition to any inspection required by Codes and/or Ordinances or Contract Documents, Contractor shall notify the Engineer a minimum of 2 days prior to the permanent concealment of any materials or work. The following list is typical, but not all inclusive of such required inspections:

1) Foundation/subgrade material, footing, and slab beds
2) Reinforcing for concrete, masonry, and plaster
3) Contact surface of concrete forms
4) Concrete and masonry surfaces
5) Piping and conduit
6) Finish grade prior to paving, seeding or planting
7) All soil mixes prior to installation
8) All chemicals and amendments prior to installation or application

3-6 THE CONTRACTOR'S REPRESENTATIVE.

DELETE the 3rd sentence in the 1st paragraph and SUBSTITUTE with the following:

Said authorized representative shall be present at the site of the Work at all times while Work is actually in progress on the Contract. When Work is not in progress and during periods when Work is suspended, arrangements acceptable to the Agency Representative shall be made for any emergency work, which may be required.

ADD the following after the last sentence of the 1st paragraph:

Whenever the Contractor or his authorized representative is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Agency Representative, which shall be received and obeyed by the superintendent or supervisor who may have charge of the particular work in reference to which the orders are given.

The Agency reserves the right to approve the Contractor's Superintendent. Once approved, the Superintendent shall remain on the project for the duration of the project so long as he is in the employment of the Contractor.

3-7 CONTRACT DOCUMENTS.

3-7.1 General. ADD the following after the 2nd paragraph:

All work of the Contract including, but not limited to, the general nature and character of the work area and conducting of Contractors' operations shall be performed in accordance with the Standard Specifications for Public Works Construction, 2024 edition, and all supplements thereto, except as modified in these Special Provisions and as follows:

Work to be performed which is directly related to the construction and/or modification of traffic, striping, signing, markings or signals; work within State right of way; and, work which is directly related to the construction of bridges and bridge appurtenances

shall be performed in accordance with the State Standard Specifications, current edition as of bid date.

As applicable, unless modified elsewhere in these Special Provisions, Work of the Contract shall conform to current editions of: Uniform Building, Plumbing, Mechanical Codes; Uniform Fire Code; National Electrical Code; and, City of Irvine amendments thereto.

All work shall be performed in accordance to the Standard Specification for Public Works Construction “Greenbook” (2024 Edition, with all current supplements), the California Building Code (2022 Edition) with City Amendments, the California Electrical Code (2022 Edition) with City Amendments, the California Plumbing Code (2022 Edition) with key amendments, California Green Building Standards Code (2022 Edition), Building Energy Efficiency Standards (2022 Edition), California Playground Safety Regulations; All City of Irvine Codes & Ordinances, City of Irvine’s Grading Manual, City of Irvine’s Standards and Design Manual; City of Irvine’s Park/Public Facility Standards; City of Irvine’s Construction Site Security Requirements, Americans with Disabilities Act (ADA), Chapter 11B Title 24 of the California Code of Regulations; California Public Contract Laws; these Specifications, Attachments, and the Construction Drawings, and all applicable requirements.

DELETE last paragraph in its entirety and SUBSTITUTE with the following:

If the Contractor, either before commencing work or in the course of the work, finds any discrepancy between the Specifications and the Plans or between either of them and the physical conditions at the site of the work or finds any error or omission in any of the Plans or in any survey, the Contractor shall promptly notify the Agency of such discrepancy, error, or omission. If the Contractor observes that any plans or specifications are at variance with any applicable law, ordinance, regulation, order, or decree, he shall promptly notify the Agency in writing of such conflict.

The Agency, on receipt of any such notice, will investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work done by the Contractor after its discovery of such an error, discrepancy, or conflict that is directly or indirectly affected by such error, discrepancy, or conflict, will be at its own risk and it shall bear all cost arising therefrom.

The Agency will provide, free of charge, three (3) copies of Plans and Special Provisions for the Contractor and one (1) copy of Plans and Special Provisions for each subcontractor listed in the Bidder's Proposal. Any Plans or Special Provisions required by the Contractor/subcontractor in addition to the above can be provided by Agency at Contractor's expense. The Contractor shall keep one set of Plans and Special Provisions in good order and available to the Agency Representative at the site of the Work.

3-7.2 Precedence of Contract Documents. *DELETE the order of precedence and SUBSTITUTE with the following:*

a) Permits and Agreements

b) Change Orders and/or Supplemental Agreements; whichever occurs last

c) Contract

d) Addenda

e) Instructions to Bidders, Proposal Requirements and Conditions

f) Bid/Proposal

g) Special Provisions

h) Contract Plans

i) Standard Plans

j) Standard Specifications

k) Reference Specifications

ADD:

3-7.2.1 Interpretation of Plans and Specifications. Figured dimensions on Plans shall govern, but work not dimensioned shall be as directed. Work not particularly shown or specified shall be the same as similar parts that are shown or specified. Specifications shall govern as to materials, workmanship, and installation procedures. Plans and Specifications requiring higher quality material or workmanship shall prevail. In the event of any discrepancy between any drawings and the figures thereon, the figures shall be taken as correct. In the event of any doubt or question arising respecting the true meaning of the Specifications, reference shall be made to Engineer whose decision thereon shall be final.

3-8 SUBMITTALS.

3-8.1 General. *MODIFY to ADD the following:*

The review period begins anew upon each submittal or resubmittal.

In providing specified submittals, the Contractor certifies that they are complete in all respects and all materials, equipment, and other work shown thereon conforms to the Contract Documents.

Where a manufactured item is designed or engineered by the manufacturer, fabricator, subcontractor, consultant or designee, the drawings, and supporting calculations shall be stamped and signed by an engineer registered by the State of California executing the design within the scope of his registration. Unless otherwise accepted by the Engineer, data shall be submitted only by the prime Contractor. Data that, in the opinion of the Engineer, are incomplete or have not been checked by the prime Contractor or are illegible will be considered as not complying with the Contract requirements and will be returned to the Contractor for resubmittal in the proper form. The City may make this determination at any time during the review period.

Data shall be submitted in a format similar to the arrangement of the applicable section(s) of the Specifications unless otherwise specified. Any submittal not following the format specified, and not conforming to the requirements listed below, will be returned for resubmittal without review.

a) Data shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and operation of component materials and

devices, the external connections, anchorages, and supports required, performance characteristics, dimensions needed for installation and correlation with other materials and equipment, and all additional information as required in the detailed section(s) of the Contract Documents. Identify field dimensions; show relation to adjacent or critical features, work or products.

b) Calculations to support the adequacy of the design in meeting specified performance ratings or requirements shall be submitted when required by the Specifications.

c) Each drawing or data sheet shall be clearly marked with the name of the project, the Contractor's name, and references to applicable Specification paragraphs and Plan sheets. Submittals containing multiple drawings or data sheets shall be collated prior to submittal for review.

d) Data sheets, catalog cuts or drawings showing more than the particular item under consideration shall be marked to cross out all but the applicable information. Submit only pertinent pages; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

e) Data submitted shall include drawings showing wiring and/or pipe layouts. Any changes proposed by the Contractor shall be stated in a cover letter and essential details of such changes shall be clearly shown in the data submitted.

f) Present in a clear and thorough manner. Title each drawing with project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

g) Provide manufacturer's preparation, assembly, and installation instructions.

h) Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Engineer's selection.

i) Submit samples to illustrate functional characteristics of products, including parts and attachments. Label each sample with identification required for transmittal letter. Approved samples which may be used in the Work are indicated in the Specification section.

j) Provide field samples of finishes for the Work, at location acceptable to Agency Representative, as required by individual Specifications section. Install each sample complete and finished. Finishes in place that have been accepted by the Agency Representative may be retained in completed work.

Submittals shall be accompanied by a letter of transmittal listing the contents of the submittal. Drawings shall show the name of the project, the name of the Contractor, and, if any, the names of suppliers, manufacturers, and subcontractors. Shop drawings shall be submitted with sufficient time for Agency's review and in orderly sequence in accordance with the progress schedule to cause no delay in prosecution of the Work. Drawings shall be submitted

on 11”x17” or 24”x36” sheet sizes only. Any submittal not accompanied by such a transmittal, or where all applicable items on the form are not complete, will be returned for resubmittal.

A separate letter of transmittal shall be used for each specific item or class of materials or equipment for which a submittal is required. Transmittal of shop drawings on various items using a single letter of transmittal will be permitted only when the items taken together constitute a manufacturer’s “package” or are so functionally related that expediency indicates review of the group or package as a whole. Submittals transmitted by facsimile will not be accepted.

The Agency will return any submittal sent (1) without a transmittal letter, (2) with an incomplete form, or (3) by facsimile.

The Contractor shall assign a unique sequential number to each submittal package, which shall be clearly written in the space provided on the transmittal letter. This number shall be used in all correspondence to the Agency when referencing to a particular submittal. The Contractor shall be responsible for ensuring the same submittal number is not assigned to different submittal packages.

Resubmittals shall incorporate the original submittal number followed by the revision number (i.e., the first resubmittal of submittal #1 is numbered 1R1, the second 1R2, etc.). The Agency will return improperly numbered submittals without review. The Contractor shall indicate on the transmittal letter that either no exceptions to the Contract Documents are taken or deviations are submitted. All deviations indicated shall be listed on the transmittal letter and the Contractor shall be solely responsible for any omitted deviations. If any deviations are omitted, the Agency will return the submittal and the engineering data without review for resubmittal. Any consequences from the resulting delay shall be fully borne by the Contractor.

The Engineer’s review of the Contractor’s submittals will cover only general conformity to the Contract Documents. The Engineer’s acceptance of drawings returned marked NO EXCEPTION TAKEN or RESUBMITTAL NOT REQUIRED (CORRECTIONS ARE NOTED) shall not constitute a blanket approval of dimensions, qualities, and details of the materials, equipment, device, or item shown, and does not relieve the Contractor from any responsibility for errors, omission or deviations from conforming to the Contract Documents. The Agency reserves the right to subsequently reject any previously accepted equipment, material, and/or construction method that deviates from the Contract Documents. When the drawings and data are returned marked CORRECT AND RESUBMIT, the corrections shall be made as noted thereon and as instructed by the Engineer, resubmittal shall be made in the same manner as the original submittal.

If the Engineer rejects the submittals, the Contractor is responsible for any subsequent time delays at no additional compensation from the Agency. Subject to these requirements, drawings and data, after final processing by the Engineer, shall become a part of the Contract Documents, and the work shown or described thereby shall be performed in conformity therewith unless otherwise required by the Engineer. In the event of conflict between accepted submittals and the other Contract Documents, the most stringent requirements shall apply unless the Agency has agreed in writing to less stringent requirements in response to a deviation listed on a submittal letter of transmittal.

No portion of the work requiring a submittal shall be commenced until the submittal has been reviewed by the Engineer and returned to the Contractor with a notation indicating that resubmittal is not required.

The review by the Engineer is only of general conformance with the design concept of the project, and general compliance with the Contract Documents and shall not be construed as relieving the Contractor of these full responsibilities for providing materials, equipment, and work required by the Contract; the proper fitting and construction of the Work; the accuracy and completeness of the submittals; selecting fabrication processes and techniques of construction; and performing the Work in a safe manner.

3-10 SURVEYING.

3-10.1 General. *DELETE the 1st sentence in the 1st paragraph and SUBSTITUTE with the following:*

Any and all surveying necessary to complete this project shall be in accordance with Section 3-10 of the Greenbook Specification and shall be provided by the Contractor and be performed by a registered Civil Engineer licensed prior to January 1, 1982 or licensed Land Surveyor in the State of California at the Contractor's expense. Any and all costs, including adjustment of well monuments and restoration of corner records prescribed by the Greenbook Specifications and these Special Provisions relative to Surveying shall be included in the various items of work requiring construction staking/surveying and no additional compensation will be allowed therefor.

The Agency will engage a licensed land surveyor or civil engineer registered in the State of California to perform surveying and calculations required for quality assurance surveying only.

DELETE the last sentence in the 1st paragraph and SUBSTITUTE with the following:

Staking will be in accordance with Chapter 12 "Construction Surveys" of the State of California, Department of Transportation "Survey Manual." A copy of the Manual is available at **http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/12_Surveys.pdf.**

Any construction stakes required in addition to those listed in the "Survey Manual", or any re-staking required by loss of stakes, or additional costs encountered by significant delays or conditions which cause the use of more difficult survey methods during field operations and which are, in the judgment of the Agency, caused by interference of Contractor's operations, equipment or materials, are also the Contractor's responsibility.

The Contractor shall submit to the Agency Representative a construction staking form 48 hours in advance of staking operations, with an assigned sequential number, description of specific items, locations, and date to be staked, together with supplemental drawings and/or data as necessary to facilitate the Agency's quality assurance surveying as required.

If additional quality assurance surveying by the Agency's surveyor is necessary due to re-staking attributed to the loss of stakes caused by the Contractor's operations, the Agency shall be compensated by the Contractor at the hourly rate schedule of the Agency's surveyor. Costs shall be deducted from any monies due or to become due the Contractor and any delays due to the replacement or restoration of stakes shall be the responsibility of the Contractor.

ADD:

3-10.3 Conformity with Contract Documents. The Work shall conform to the lines, grades, dimensions, tolerances, and material and equipment requirements shown on the Contract Documents. Although measurement, sampling, and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the work or materials deviate from the Contract Documents and his decision as to any allowable deviations therefrom shall be final.

If specific lines, grades, and dimensions are not shown on the Plans, those furnished by the Engineer shall govern.

3-12 WORK SITE MAINTENANCE.

MODIFY to ADD the Following:

Section 3-12 includes specifications for performing work site maintenance, including spill prevention and control, material management, waste management, water pollution control, and nonstormwater management.

Projects are required to comply with the City of Irvine Ordinance No. 07-18, which establishes requirements for recycling and diversion of construction and demolition waste.

The Contractor shall implement effective handling, storage, usage, and disposal practices to control material pollution and manage waste and nonstormwater at the job site before they come in contact with storm drain systems and receiving waters.

Linear sediment barriers must comply with 3-12.6.2 of the Standard Specifications and the Contract Special Provisions.

ADD:

3-12.1.1 Construction Cleaning. The Contractor shall:

a) Initiate and maintain a daily program to prevent accumulation of debris on-site and along access roads and haul routes. Maintain areas under Contractor's control free of waste materials, debris, weeds 6” high, and rubbish. Maintain site in a clean and orderly condition.

b) Provide suitable covered containers for deposit of debris and rubbish. Dispose of accumulation of extraneous materials, prohibit overloading of trucks to prevent spillages on access and haul routes and provide daily inspection of haul routes to enforce requirements.

c) The Contractor shall supply self-loading motorized street sweepers equipped with a functional water spray system as part of his daily program.

d) Schedule at a minimum, weekly collection and disposal of debris. Provide additional collections and disposals of debris whenever the weekly schedule is inadequate to prevent accumulation.

The Contractor shall remove debris from closed or remote spaces prior to closing the space, control cleaning operations to minimize dust and other particulates and immediately remove

clay and earth which adhere to the paved surface of the roadway. Remove by hand scraping, washing, sweeping, and/or other method(s) which will leave a clean non-skid surface without impairing, injuring or loosening the surface.

The Contractor shall remove waste materials, debris, vegetation, other rubbish, and non-recyclable materials as required by the Contract Documents, and dispose of off-site in an approved disposal site or recycling center.

Unless otherwise specified in the Special Provisions, all concrete, asphalt, aggregate or sand base material, cement block, trees, shrubs, bushes, and all other recyclable material generated during cleaning, demolition, clearing, and grubbing or other phases of the work is to be disposed of at appropriate recycling centers. The Contractor shall be responsible for removing reinforcing steel, wood, or other deleterious materials as required by the recycling center for acceptance of recycled materials. The Contractor shall supply proof of disposal at a recycling center. The proof of disposal shall include verification of tonnage by certified weigh masters tickets. If weigh masters tickets are not feasible, the Contractor and Agency Representative shall estimate the tonnage prior to disposal at the recycling centers.

Known recycling centers:

Ewles Materials
16081 Construction Circle West
Irvine

The Contractor is required to control dust throughout the life of the Contract. The control may be required by job conditions or Agency Representative. In any case, the Contractor shall use water or other means to control the dust. No chemical agents may be used without written authorization from the Agency. The Contractor shall be solely responsible for safety problems, accidents or any other complications or claims arising from inadequate dust control.

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor's performance of the Work, or by public traffic, either inside or outside the right of way. Full compensation for such dust control will be considered as included in the price paid for the various items of work involved.

No separate payment will be made for any work performed or material used in cleaning the project. Full compensation for such cleaning shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

ADD:

3-12.1.2 Final Cleaning. The Contractor shall execute cleaning prior to inspection for completion of the Work. The Contractor shall use materials which will not create hazards to health or property, and which will not damage surfaces, remove debris from and otherwise clean exposed-to-view surfaces, remove temporary protection and labels not required to remain, clean finishes free of foreign substances, remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean, clean other exterior surfaces, and where applicable:

a) Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

b) Vacuum clean carpeted and similar soft surfaces.

c) Clean resilient and hard surface floors.

d) Clean surfaces of equipment; remove excess lubrication.

e) Clean plumbing fixtures to a sanitary condition.

f) Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.

g) Clean light fixtures and lamps.

h) Remove waste, foreign matter, and debris from roofs, gutters, areaways, and drainage systems.

ADD:

3-12.4.3 Material Management.

3-12.4.3.1 General. The Contractor shall minimize or eliminate discharge of material into the air, storm drain systems, and receiving waters while taking delivery of, using, or storing the following materials:

a) Hazardous chemicals, including acids, lime, glues, adhesives, paints, solvents, and curing compounds

b) Soil stabilizers and binders

c) Fertilizers

d) Detergents

e) Plaster

f) Petroleum materials, including fuel, oil, and grease

g) Asphalt and concrete components

h) Pesticides and herbicides

The Contractor's employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals.

The Contractor shall use less hazardous materials if practicable.

The following activities must be performed at least 100 feet from concentrated flows of stormwater, drainage courses, and inlets if within the floodplain and at least 50 feet if outside the floodplain, unless otherwise authorized:

a) Stockpiling materials

b) Storing pile-driving equipment and liquid waste containers

c) Washing vehicles and equipment in outside areas

d) Fueling and maintaining vehicles and equipment

3-12.4.3.2 Material Storage. If materials are stored by the Contractor, he shall:

a) Store liquids, petroleum materials, and substances listed in 40 CFR 110, 117, and 302 and place them in secondary containment facilities as specified by USDOT for storage of hazardous materials.

b) Ensure that secondary containment facilities are impervious to the materials stored there for a minimum contact time of 72 hours.

c) Cover secondary containment facilities during nonworking days and whenever precipitation is forecasted. Secondary containment facilities must be adequately ventilated.

d) Keep secondary containment facilities free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, collect accumulated liquid and place it into drums within 24 hours. Handle the liquid as hazardous waste in accordance with subsection 3-12 of the Standard Specifications and these Special Provisions.

e) Not store incompatible materials, such as chlorine and ammonia, in the same secondary containment facility.

f) Store materials in their original containers with the original material labels maintained in legible condition. Immediately replace damaged or illegible labels.

g) Ensure that secondary containment facilities have the capacity to contain precipitation from a 24-hour-long, 25-year storm, plus 10 percent of the aggregate volume of all containers or the entire volume of the largest container within the facility, whichever is greater.

h) Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during nonworking days and whenever precipitation is forecasted.

i) Provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas must be kept clean, well-organized, and equipped with cleanup supplies appropriate for the materials being stored.

j) Repair or replace perimeter controls, containment structures, covers, and liners as necessary. Inspect storage areas before and after precipitation, and at least weekly during other times.

3-12.4.3.3 Stockpile Management. The Contractor shall minimize stockpiling of materials at the job site.

The Contractor shall implement water pollution control practices within 72 hours of stockpiling material or before a forecasted storm event, whichever occurs first. If stockpiles are being

used, do not allow soil, sediment, or other debris to enter storm drains, open drainages, and watercourses.

Active and inactive soil stockpiles must be:

a) Covered with soil stabilization material or a temporary cover

b) Surrounded with a linear sediment barrier

Stockpiles of asphalt concrete and PCC rubble, HMA, aggregate base, or aggregate subbase must be:

a) Covered with a temporary cover

b) Surrounded with a linear sediment barrier

Stockpiles of pressure-treated wood must be:

a) Placed on pallets

b) Covered with impermeable material

Stockpiles of cold mix asphalt concrete must be:

a) Placed on an impervious surface

b) Covered with an impermeable material

c) Protected from stormwater run-on and runoff

The Contractor shall control wind erosion year-round.

The Contractor shall repair or replace linear sediment barriers and covers as needed to keep them functioning properly. Whenever sediment accumulates to 1/3 of the linear sediment barrier height, remove the accumulated sediment.

3-12.5.3 Spill Prevention and Emergency Response Plan.

ADD:

3-12.5.3.1 Spill Prevention and Control. The Contractor shall keep material or waste storage areas clean, well-organized, and equipped with enough cleanup supplies for the material being stored.

The Contractor shall implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site. Whenever the Contractor spills or leaks chemicals or hazardous substances at the job site, he is responsible for all associated cleanup costs and related liability.

The Contractor shall report minor, semi significant, and significant or hazardous spills to the WPC manager and the WPC manager must notify the Engineer immediately.

As soon as it is safe, the Contractor shall contain and clean up spills of petroleum materials and sanitary and septic waste substances listed under 40 CFR, parts 110, 117, and 302.

ADD:

3-12.5.3.2 Minor Spills. Minor spills consist of quantities of oil, gasoline, paint, or other materials that are small enough to be controlled by a first responder upon discovery of the spill.

The Contractor shall clean up a minor spill using the following procedures:

a) Contain the spread of the spill

b) Recover the spilled material using absorption

c) Clean the contaminated area

d) Dispose of the contaminated material and absorbents promptly and properly

ADD:

3-12.5.3.3 Semi Significant Spills. Semi significant spills consist of spills that can be controlled by a first responder with help from other personnel.

The Contractor shall clean up a semi significant spill immediately using the following procedures:

a) Contain the spread of the spill.

b) On paved or impervious surfaces, encircle and recover the spilled material with absorbent materials. Do not allow the spill to spread widely.

c) If the spill occurs on soil, contain the spill by constructing an earthen dike and dig up the contaminated soil for disposal.

d) If the spill occurs during precipitation, cover the spill with 10-mil plastic sheeting or other material to prevent contamination of runoff.

e) Dispose of the contaminated material promptly and properly.

ADD:

3-12.5.3.4 Significant or Hazardous Spills. Significant or hazardous spills consist of spills that cannot be controlled by job site personnel.

The Contractor shall immediately notify qualified personnel of a significant or hazardous spill and take the following steps:

a) Do not attempt to clean up the spill until qualified personnel have arrived.

b) Notify the Engineer and follow up with a report.

c) Obtain the immediate services of a spill contractor or hazardous material team.

d) Notify local emergency response teams by dialing 911 and county officials by using the emergency phone numbers retained at the job site.

e) Notify the California Emergency Management Agency State Warning Center at 916-845-8911.

f) Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under 40 CFR 110, 119, and 302.

g) Notify other agencies as appropriate, including:

1) Fire Department

2) Department of Public Works and Transportation

3) Coast Guard

4) Highway Patrol

5) City Police or County Sheriff's Department

6) Department of Toxic Substances

7) California Division of Oil and Gas

8) Cal/OSHA

9) Regional Water Resources Control Board

The Contractor shall prevent a spill from entering stormwater runoff before and during cleanup activities and shall not bury or wash the spill with water.

ADD:

3-12.5.4 Waste Management.

3-12.5.4.1 Paint Waste. The Contractor shall clean water-based and oil-based paint from brushes or equipment within a contained area in a way that does not contaminate soil, receiving waters, or storm drain systems. Handle and dispose of the following as hazardous waste: paints, thinners, solvents, residues, and sludges that cannot be recycled or reused. When thoroughly dry, dispose of the following as solid waste under: dry latex paint, paint cans, used brushes, rags, absorbent materials, and drop cloths.

3-12.5.4.2 Concrete Waste. The Contractor shall use practices to prevent the discharge of asphalt concrete, PCC, and HMA waste into storm drain systems and receiving waters.

The Contractor shall collect and dispose of asphalt concrete, PCC, and HMA waste at locations where:

a) Concrete material, including grout, is used.

b) Concrete dust and debris result from demolition.

c) Saw cutting, coring, grinding, grooving, or hydro-concrete demolition creates a residue or slurry.

d) Concrete trucks or other concrete-coated equipment is cleaned at the job site.

3-12.5.4.3 Sanitary and Septic Waste. The Contractor shall not bury or discharge wastewater from a sanitary or septic system anywhere at the site of Work. A sanitary facility

discharging into a sanitary sewer system must be properly connected and free from leaks. The Contractor shall place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines.

The Contractor shall comply with local health agency provisions if using an on-site disposal system.

3-12.5.4.4 Liquid Waste. The Contractor shall use practices that will prevent job-site liquid waste from entering storm drain systems and receiving waters. Liquid wastes include the following:

a) Drilling slurries or fluids

b) Grease-free and oil-free wastewater and rinse water

c) Dredgings, including liquid waste from cleaning drainage systems

d) Liquid waste running off a surface, including wash or rinse water

e) Other nonstormwater liquids not covered by separate permits

The Contractor shall hold liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks.

Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills, and leaks.

The Contractor shall store containers at least 50 feet from moving vehicles and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps in accordance with 3-12 of the Standard Specifications and these Special Provisions. Liquid waste may require testing to determine hazardous material content before disposal.

The Contractor shall dispose of drilling fluids and residue.

If an authorized location is available within the job site, fluids and residue exempt under 23 CA Code of Regs § 2511(g) may be dried by evaporation in a leak-proof container. The Contractor shall dispose of the remaining solid waste in accordance with 3-12 of the Standard Specifications and these Special Provisions.

ADD:

3-12.5.5 Nonstormwater Management.

3-12.5.5.1 Water Control and Conservation. The Contractor shall manage water used for work activities in a way that will prevent erosion and the discharge of pollutants into storm drain systems and receiving waters. Obtain authorization before washing anything at the job site with water that could discharge into a storm drain system or receiving waters. Report discharges immediately.

The Contractor shall implement water conservation practices if water is used at the job site. Inspect irrigation areas. Adjust watering schedules to prevent erosion, excess watering, or runoff. Shut off the water source to broken lines, sprinklers, or valves and repair breaks within

24 hours. Reuse water from waterline flushing for landscape irrigation if practicable. Sweep and vacuum paved areas. Do not wash paved areas with water.

The Contractor shall direct runoff water, including water from water line repair, from the job site to areas where it can infiltrate into the ground. Do not allow runoff water to enter storm drain systems and receiving waters. Do not allow spilled water to escape filling areas for water trucks. Direct water from off-site sources around the job site if practicable. Minimize the contact of off-site water with job site water.

3-12.5.5.2 Illicit Connection and Illegal Discharge Detection and Reporting. Before starting work, the Contractor shall inspect the job site and the job site's perimeter for evidence of illicit connections, illegal discharges, and dumping. After starting work, inspect the job site and perimeter on a daily schedule for illicit connections and illegal dumping and discharges.

Whenever illegal connections, discharges, or dumping are discovered, The Contractor shall notify the Engineer immediately, should take no further action unless ordered and assume that unlabeled or unidentifiable material is hazardous.

The Contractor shall look for the following evidence of illicit connections, illegal discharges, and dumping:

a) Debris or trash piles

b) Staining or discoloration on pavement or soils

c) Pungent odors coming from drainage systems

d) Discoloration or oily sheen on water

e) Stains and residue in ditches, channels, or drain boxes

f) Abnormal water flow during dry weather

g) Excessive sediment deposits

h) Nonstandard drainage junction structures

i) Broken concrete or other disturbances at or near junction structures

3-12.5.5.3 Vehicle and Equipment Cleaning. The Contractor shall limit vehicle and equipment cleaning or washing at the job site except for what is necessary to control vehicle tracking or hazardous waste. The Contractor shall notify the Engineer before cleaning vehicles and equipment at the job site with soap, solvents, or steam, and contain and recycle or dispose of resulting waste under 5-7.4. The Contractor shall not use diesel to clean vehicles or equipment and minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. The Contractor may wash vehicles in an outside area if the area is:

a) Paved with asphalt concrete, HMA, or PCC

b) Surrounded by a containment berm

c) Equipped with a sump to collect and dispose of wash water

The Contractor shall use as little water as practicable whenever washing vehicles and equipment with water and hoses used must be equipped with a positive shutoff valve.

The Contractor shall discharge liquid from wash racks to a recycling system or to another authorized system. Remove liquids and sediment as necessary.

3-12.5.5.4 Vehicle and Equipment Fueling and Maintenance. If practicable, the Contractor shall perform maintenance on vehicles and equipment off-site.

If fueling or maintenance must be done at the job site, the Contractor shall assign a site or sites, and obtain authorization before using them. The Contractor shall minimize mobile fueling and maintenance activities. The Contractor's fueling and maintenance activities must be performed on level ground in areas protected from stormwater run-on and runoff.

The Contractor shall use containment berms or dikes around fueling and maintenance areas. Keep adequate quantities of absorbent spill-cleanup material and spill kits in the fueling or maintenance area and on fueling trucks. The Contractor shall dispose of spill-cleanup material and kits immediately after use and use drip pans or absorbent pads during fueling or maintenance.

The Contractor shall not leave fueling or maintenance areas unattended during fueling and maintenance activities. The Contractor's fueling nozzles must be equipped with an automatic shutoff control. The Contractor shall use equipment with vapor-recovery fueling nozzles where required by the Air Quality Management District, secure nozzles in an upright position when not in use and shall not top off fuel tanks.

The Contractor shall recycle or properly dispose of used batteries and tires.

If leaks cannot be repaired immediately, the Contractor shall remove the vehicle or equipment from the job site.

3-12.5.5.5 Material and Equipment Used Over Water. The Contractor shall place drip pans and absorbent pads under vehicles and equipment used over water, keep an adequate supply of spill-cleanup material with vehicles and equipment, place drip pans or plastic sheeting under vehicles and equipment on docks, barges, or other surfaces over water whenever vehicles or equipment will be idle for more than one (1) hour.

The Contractor shall furnish watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools and shall secure material to prevent spills or discharge into the water due to wind.

The Contractor shall report discharges to receiving waters immediately upon discovery and shall submit a discharge notification.

3-12.5.5.6 Structure Removal Over or Adjacent to Water. The Contractor shall not allow demolished material to enter storm drain systems and receiving waters, use authorized covers and platforms to collect debris, use attachments on equipment to catch debris during small demolition activities and empty debris-catching devices daily and dispose of debris in accordance with 3-12 of the Standard Specifications and these Special Provisions.

3-12.5.5.7 Paving, Sealing, Saw Cutting, Grooving, and Grinding Activities. The Contractor shall prevent material from entering storm drain systems and receiving waters including:

a) Cementitious material

b) Asphaltic material

c) Aggregate or screenings

d) Saw cutting, grooving, and grinding residue

e) Pavement chunks

f) Shoulder backing

g) Methacrylate

h) Sandblasting residue

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill receiving waters until paving, sealing, saw cutting, grooving, and grinding activities are completed and excess material has been removed and cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

Whenever precipitation is forecasted, the Contractor shall limit paving, saw cutting, and grinding to places where runoff can be captured.

The Contractor shall not start seal coat, tack coat, slurry seal, or fog seal activities whenever precipitation is forecasted during the application and curing period and shall not excavate material from existing roadways during precipitation.

The Contractor shall use a vacuum to remove slurry immediately after slurry is produced and shall not allow the slurry to run onto lanes open to traffic or off the pavement.

The Contractor shall collect the residue from PCC grooving and grinding activities with a vacuum attachment on the grinding machine. The Contractor shall not leave the residue on the pavement or allow the residue to flow across pavement.

The Contractor shall not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

The Contractor shall park paving equipment over drip pans or plastic sheeting with absorbent material to catch drips if the paving equipment is not in use.

3-12.5.5.8 Thermoplastic Striping and Pavement Markers. The Contractor shall not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets and receiving waters.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets and receiving waters.

The Contractor shall collect and dispose of bituminous material from the roadway after removing markers.

3-12.5.5.9 Pile Driving. The Contractor shall keep spill kits and cleanup materials at pile driving locations; park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material; protect pile driving equipment by parking on plywood and covering with plastic whenever precipitation is forecasted.

The Contractor shall store pile driving equipment on level ground and protect it from stormwater run-on when not in use. Use vegetable oil instead of hydraulic fluid if practicable.

3-12.5.5.10 Concrete Curing. The Contractor shall not overspray chemical curing compounds and shall not allow runoff of curing compounds.

The Contractor shall minimize the drift by spraying as close to the concrete as practicable, cover drainage inlets before applying the curing compound, and minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when concrete is curing.

3-12.5.5.11 Concrete Finishing. The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting, collect and dispose of sand and solid waste from sandblasting. Before sandblasting, the Contractor shall cover drainage inlets within 50 feet of sandblasting, and shall minimize the drift of dust and blast material by keeping the nozzle close to the surface of the concrete. If the character of the blast residue is unknown, the Contractor shall test it for hazardous materials and dispose of it properly.

The Contractor shall inspect containment structures for concrete finishing for damage before each day of use and before forecasted precipitation and remove liquid and solid waste from containment structures after each work shift.

3-12.5.5.12 Sweeping. The Contractor shall sweep by hand or mechanical methods, such as vacuuming, and shall not use methods that use only mechanical kick brooms.

The Contractor shall sweep paved roads at construction entrance and exit locations and paved areas within the job site:

a) During clearing and grubbing activities

b) During earthwork activities

c) During trenching activities

d) During pavement structure activities

e) When vehicles are entering and leaving the job site

f) After soil-disturbing activities

g) After observing off-site tracking of material

h) As deemed necessary by the Engineer

The Contractor shall monitor paved areas and roadways within the project and sweep within:

a) 1 hour whenever sediment or debris is observed during activities that require sweeping.

b) 24 hours whenever sediment or debris is observed during activities that do not require sweeping.

The Contractor shall remove collected material, including sediment, from paved shoulders, drain inlets, curbs and dikes, and other drainage areas, may stockpile collected material at the job site, and shall dispose of collected material at least once per week if stockpiled.

The Contractor shall keep dust to a minimum during street sweeping activities and use water or a vacuum whenever dust generation is excessive or sediment pickup is ineffective.

The Contractor shall remove and dispose of trash collected during sweeping.

3-12.5.5.13 Dewatering. Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

The Contractor shall perform dewatering work as specified for the work items involved, such as temporary active treatment system or dewatering and discharge.

If dewatering and discharging activities are not specified under a work item and the Contractor performs dewatering activities, he shall:

a) Conduct dewatering activities under the Caltrans' *Field Guide for Construction Site Dewatering*.

b) Ensure that any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.

c) Discharge the water within the project limits if approved by the Engineer. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.

d) Not discharge stormwater or nonstormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface.

e) Notify the Engineer immediately upon discovering any such condition.

3-12.6 Water Pollution Control.

3-12.6.1 General. *ADD the following after the last paragraph:*

This project is anticipated to be Risk Level 2.

ADD:

3-12.6.1.1 Definitions and Abbreviations.

Active and inactive areas: (1) Active areas have soil disturbing work activities occurring at least once within 15 days, and (2) Inactive areas are areas that have not been disturbed for at least 15 days.

BMPs: Best Management Practices are water pollution control practices.

Construction phase: Construction phases are (1) Highway Construction including work activities for building roads and structures, (2) Plant Establishment including maintenance on

vegetation installed for final stabilization, and (3) Suspension where work activities are suspended and areas are inactive.

NAL: Numeric Action Level.

NEL: Numeric Effluent Limit.

Normal working hours: The hours the Contractor normally works on this project.

Preparation Manual: The Caltrans' "Storm Water Pollution Prevention Plan and Water Pollution Control Program Preparation Manual."

QSD: Qualified SWPPP Developer.

QSP: Qualified SWPPP Practitioner.

Qualified rain event: A qualified rain event is a storm that produces at least 0.5 inch of precipitation with a 48 hour or greater period between storms.

REAP: Rain Event Action Plan.

SAP: Sampling and Analysis Plan.

SSC: Suspended Sediment Concentration.

SWRCB: State Water Resources Control Board.

WPC: Water Pollution Control.

WPC Manager: The Contractor's Water Pollution Control Manager. The WPC Manager implements water pollution control work described in the SWPPP and oversees revisions and amendments to the SWPPP.

ADD:

3-12.6.1.2 Summary. Section 3-12.6 includes general specifications for preventing, controlling, and abating water pollution in streams, waterways, and other bodies of water.

Information on forms, reports, and other documents can be found in the following Caltrans manuals:

a) Field Guide for Construction Site Dewatering

b) Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

c) Construction Site Best Management Practices (BMP) Manual

d) Construction Site Monitoring Program (CSMP) Guidance Manual

For the above-referenced manuals, go to the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control at

(https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-and-handbooks) or the Caltrans' publication distribution unit.

The Contractor shall not start job site activities until:

a) The WPCP or SWPPP, in accordance with 3-12.6.3 of the Special Provisions, is authorized.

b) The waste discharge identification number is issued if the project requires a SWPPP.

c) WPCP or SWPPP review requirements have been fulfilled. If the RWQCB requires time for review, allow 30 days for the review.

If the Contractor operates a Contractor-support facility, the Contractor shall protect stormwater systems or receiving waters from the discharge of potential pollutants by using water pollution control practices.

Contractor-support facilities include:

a) Staging areas

b) Storage yards for equipment and materials

c) Mobile operations

d) Batch plants for PCC and HMA

e) Crushing plants for rock and aggregate

f) Other facilities installed by the Contractor for his, such as haul roads

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the general waste discharge requirements for *Order No. 97-03-DWQ, NPDES General Permit No. CAS000001*, issued by the State Water Resources Control Board for "*Discharge of Storm Water Associated with Industrial Activities Excluding Construction Activities*" and referred to herein as "General Industrial Permit." For the General Industrial Permit, go to the website for the State Water Resources Control Board.

If the Contractor operates a batch plant to manufacture PCC, HMA, or other material or a crushing plant to produce rock or aggregate, the Contractor shall obtain coverage under the General Industrial Permit. The Contractor must be covered under the General Industrial Permit for batch plants and crushing plants located:

a) Outside of the job site

b) Within the job site that serve 1 or more contracts

If the Contractor obtains or disposes of material at a noncommercially operated borrow or disposal site, the Contractor shall prevent water pollution due to erosion at the site during and after completion of his activities. Upon completion of his work, the Contractor shall leave the site in a condition such that water will not collect or stand therein.

The Agency does not pay for water pollution control practices at Contractor-support facilities and noncommercially operated borrow or disposal sites.

3-12.6.1.3 Submittals. Within 48 hours after the conclusion of a storm event resulting in a discharge, after a nonstormwater discharge, or after receiving a written notice or an order from the RWQCB or another regulatory agency, the Contractor's WPC manager must submit the following information:

a) Date, time, location and nature of the activity and the cause of the notice or order

b) Type and quantity of discharge

c) Water pollution control practices in use before the discharge or before receiving the notice or order

d) Description of water pollution control practices and corrective actions taken to manage the discharge or cause of the notice

The Contractor shall submit water pollution control training records for all employees and subcontractors who will be working at the job site as an informational submittal that includes the training subjects, training dates, ongoing training, and tailgate meetings with the submittal. The Contractor shall submit records for:

a) Existing employees within 5 business days of obtaining SWPPP or WPCP authorization

b) New employees within 5 business days of receiving the training

c) Subcontractor's employees at least 5 business days before a subcontractor starts work

At least Five (5) business days before operating any Contractor-support facility, the Contractor shall submit:

a) A plan showing the location and quantity of water pollution control practices associated with the Contractor-support facility

b) A copy of the notice of intent approved by the RWQCB and the WPCP or SWPPP approved by the RWQCB if the Contractor will be operating a batch plant or a crushing plant under the General Industrial Permit

3-12.6.1.4 Quality Control and Assurance.

Training

The Contractor's employees must receive water pollution control training before starting work at the job site.

For the Contractor's project managers, supervisory personnel, subcontractors, and employees involved in water pollution control work:

a) The Contractor shall provide stormwater training in the following subjects:

    1) Water pollution control rules and regulations

2) Implementation and maintenance for:
    i. Temporary soil stabilization
    ii. Temporary sediment control
    iii. Tracking control
    iv. Wind erosion control
    v. Material pollution prevention and control
    vi. Waste management
    vii. Nonstormwater management

b) The Contractor shall conduct weekly training meetings covering:
    1) Deficiencies and corrective actions for water pollution control practices
    2) Water pollution control practices required for work activities during the week
    3) Spill prevention and control
    4) Material delivery, storage, usage, and disposal
    5) Waste management
    6) Nonstormwater management procedures

Training for personnel who collect water quality samples must include:

a) CSMP review
b) Health and safety review
c) Sampling simulations

3-12.6.1.5 Water Pollution Control Manager.

General

The Contractor's WPC manager must be a QSP if the project requires a WPCP. The Contractor's WPC manager must be a QSD if the project requires a SWPPP.

The Contractor shall assign one (1) WPC manager to implement the WPCP or SWPPP, whichever is applicable for the project.

Qualifications

The Contractor's QSD must:

a) Have completed the stormwater management training described in the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control Information
b) Be registered or certified for at least one of the following:

1) California registered civil engineer
2) California registered professional geologist or engineering geologist
3) California licensed landscape architect
4) Professional hydrologist registered through the American Institute of Hydrology
5) Certified Professional in Erosion and Sediment Control (CPESC)™ registered through Enviro Cert International, Inc.
6) Certified Professional in Storm Water Quality (CPSWQ)™ registered through Enviro Cert International, Inc.
7) Professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET)

The Contractor's QSP must comply with the qualifications for a QSD or must:

a) Have completed the storm water management training described in the Caltrans' website for the Division of Construction, Storm Water and Water Pollution Control Information
b) Be certified for at least one of the following:
    1) Certified Erosion, Sediment and Storm Water Inspector (CESSWI)™ registered through Enviro Cert International, Inc.
    2) Certified Inspector of Sediment and Erosion Control (CISEC) registered through CISEC, Inc.

Responsibilities

The Contractor's WPC manager must:

a) Be responsible for water pollution control work
b) Be the primary contact for water pollution control work
c) Oversee:
    1) Maintenance of water pollution control practices
    2) Inspections of water pollution control practices identified in the SWPPP or WPCP
    3) Inspections and reports for visual monitoring
    4) Preparation and implementation of REAPs
    5) Sampling and analysis
    6) Preparation and submittal of:
        i. NAL exceedance reports

ii. NEL violation reports

iii. SWPPP annual certification

iv. Annual reports

v. BMP status reports

d) Oversee and enforce hazardous waste management practices, including spill prevention and control measures

e) Have authority to mobilize crews to make immediate repairs to water pollution control practices

f) Ensure that all employees have current water pollution control training

g) Implement the authorized SWPPP or WPCP

h) Amend the SWPPP or WPCP if required

i) Be at the job site within 2 hours of being contacted

j) Have the authority to stop construction activities damaging water pollution control practices or causing water pollution

3-12.6.1.6 Construction.

General

The Contractor shall install facilities and devices used for water pollution control practices before performing work activities. The Contractor shall install soil stabilization materials for water pollution control practices in all work areas that are inactive and before storm events.

The Contractor shall repair or replace water pollution control practices within 24 hours of discovering any damage, unless a longer period is authorized.

The Agency will not pay for the cleanup, repair, removal, disposal, or replacement of water pollution control practices due to improper installation or the Contractor’s negligence.

The Contractor shall retain a printed copy of the authorized WPCP or SWPPP at the job site at all times.

Monitoring

The Contractor shall monitor the National Weather Service's forecast on a daily basis. For the National Weather Service's forecast, go to the website for the National Weather Service.

Inspections

The Contractor shall use the *Stormwater Site Inspection Report* form for documenting site inspections.

The Contractor’s WPC manager must oversee:

a) Inspections of water pollution control practices identified in SWPPP or WPCP:

1) Before a forecasted storm event

2) After a qualifying rain event that produces site runoff

3) At 24-hour intervals during extended storm events

4) On a predetermined schedule of at least once a week

b) Daily inspections of:

1) Storage areas for hazardous materials and waste

2) Hazardous waste disposal and transporting activities

3) Hazardous material delivery and storage activities

c) Inspections of:

1) Vehicle and equipment cleaning facilities:

i. Daily if vehicle and equipment cleaning occurs daily

ii. Weekly if vehicle and equipment cleaning does not occur daily

2) Vehicle and equipment maintenance and fueling areas:

i. Daily if vehicle and equipment maintenance and fueling occurs daily

ii. Weekly if vehicle and equipment maintenance and fueling does not occur daily

3) Vehicles and equipment at the job site for leaks and spills on a daily schedule. Verify that operators are inspecting vehicles and equipment each day of use.

4) Demolition sites within 50 feet of storm drain systems and receiving waters daily.

5) Pile driving areas for leaks and spills:

i. Daily if pile driving occurs daily

ii. Weekly if pile driving does not occur daily

6) Temporary concrete washouts:

i. Daily if concrete work occurs daily

ii. Weekly if concrete work does not occur daily

7) Paved roads at job site access points for street sweeping:

i. Daily if earthwork and other sediment or debris-generating activities occur daily

ii. Weekly if earthwork and other sediment or debris-generating activities do not occur daily

iii. Within 24 hours of precipitation forecasted by the National Weather Service

8) Dewatering work:

   i. Daily if dewatering work occurs daily

   ii. Weekly if dewatering work does not occur daily

9) Temporary active treatment system:

   i. Daily if temporary active treatment system activities occur daily

   ii. Weekly if temporary active treatment system activities do not occur daily

10) Work over water:

   i. Daily if work over water occurs daily

   ii. Weekly if work over water does not occur daily

Deficiencies

Whenever the Contractor or the Engineer identify a deficiency in the implementation of the authorized WPCP or SWPPP, The Contractor shall correct the deficiency:

a) Immediately, unless a later date is authorized

b) Before precipitation occurs

The Agency may correct the deficiency and deduct the cost of correcting the deficiency from payment if the Contractor fails to correct the deficiency by the agreed date or before the onset of precipitation.

3-12.6.2 Best Management Practices (BMPs). *MODIFY to ADD the following:*
BMPs shall be maintained and/or added based on any exceedances of Numeric Action Levels (NALs) and Numeric Effluent Limitations (NELs). The Contractor shall make any necessary changes to the SWPPP and implement additional BMPs that will result in effluent levels below that of NALs.

3-12.6.3 Storm Water Pollution Prevention Plan (SWPPP). *DELETE in its entirety and SUBSTITUTE with the following:*

3-12.6.3 Water Pollution Control Plan (WPCP).

3-12.6.3.1 General.

Summary

The Contractor shall prepare a water pollution control plan that includes developing and implementing the WPCP, providing a WPC manager, conducting water pollution control training, and monitoring, inspecting and correcting water pollution control practices.

The Contractor may assign a QSP other than the WPC manager to develop the WPCP.

Submittals

Within 7 days after Contract approval:

a) The Contractor shall submit two (2) copies of his WPCP for review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.

b) The Contractor shall resubmit a revised WPCP within 7 days of receiving the Engineer's comments. The Agency's review resumes when the complete WPCP has been resubmitted.

c) When the Engineer authorizes the WPCP, the Contractor shall submit an electronic copy and 3 printed copies of the authorized WPCP.

d) If the RWQCB requires review of the authorized WPCP, the Engineer submits the authorized WPCP to the RWQCB for its review and comment.

e) If the Engineer orders changes to the WPCP based on the RWQCB's comments, the Contractor shall amend the WPCP within 3 business days.

The WPCP must comply with the Caltrans' *Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Plan (WPCP) Preparation Manual* and must:

a) Show the location of disturbed soil areas, water bodies, and water conveyances

b) Describe the work involved in the installation, maintenance, repair, and removal of temporary water pollution control practices

c) Show the locations and types of water pollution control practices that will be used for:

    1) Stormwater and nonstormwater in areas outside the job site, but related to work activities, including:

        (a) Staging areas

        (b) Storage yards

        (c) Access roads

    2) Activities or mobile activities related to all NPDES permits

    3) Contractor-support facilities

d) Show the locations and types of temporary water pollution control practices that will be used in the work for each construction phase

e) Show the locations and types of water pollution control practices that will be installed permanently under the Contract

f) Include a schedule showing when:

    1) Work activities will be performed that could cause the discharge of pollutants into stormwater

    2) Water pollution control practices associated with each construction phase will be implemented

    3) Soil stabilization and sediment control practices for disturbed soil areas will be implemented

g) Include a copy of any permits obtained by the Agency, including Fish & Game permits, US Army Corps of Engineers permits, RWQCB 401 certifications, aerially deposited lead variance from the Department of Toxic Substance Control, aerially deposited lead

variance notification, and RWQCB waste discharge requirements for aerially deposited lead reuse

The Contractor shall amend the WPCP whenever:

a) Changes in work activities could affect the discharge of pollutants
b) Water pollution control practices are added by Change Order work
c) Water pollution control practices are added at the Contractor's discretion
d) Changes in the quantity of disturbed soil are substantial
e) Objectives for reducing or eliminating pollutants in stormwater discharges have not been achieved
f) Project receives a written notice or order from the RWQCB or any other regulatory agency

The Contractor shall allow the same review time for amendments to the WPCP as for the original WPCP.

3-12.6.3.2 Construction. The Contractor shall manage work activities in a way that reduces the discharge of pollutants to surface waters, groundwater, and separate municipal storm sewer systems.

The Contractor shall monitor and inspect water pollution control practices at the job site.

The Contractor shall notify the Engineer within 6 hours whenever any of the following occurs:

a) The Contractor identifies discharges into receiving waters or drainage systems that are causing or could cause water pollution
b) The Contractor receives a written notice or order for the project from the RWQCB or any other regulatory agency

The Contractor shall continue WPCP implementation during any suspension of work activities.

The Contractor is responsible for delays and must pay all costs associated with submitting a SWPPP due to his actions that result in one of the following:

a) 1 or more acres of soil disturbance on projects without an Erosivity Waiver
b) More than 5 acres of soil disturbance on projects with an Erosivity Waiver
c) Failure to comply with the schedule for soil disturbing activities for projects with an Erosivity Waiver if the delays void the Erosivity Waiver

3-12.6.3.3 Payment. Payment for **WATER POLLUTION CONTROL PROGRAM (WPCP)** shall be per the Lump Sum (LS) price bid and shall include full compensation for furnishing all labor, materials, tools, equipment to perform all the work involved in 7-8.6, including preparing and modifying a WPCP, permitting fees, Agency filing and processing, furnishing, installing, maintaining and removing BMPs, monitoring and reporting, and all incidentals for doing all the work involved as described herein or as otherwise required by the permit process, and shall be included in the contract lump sum price in the bid. No additional compensation shall be allowed therefor.

Payment will be issued by the Agency as follows:

a) 25% - upon WPCP approval.

b) 25% - upon installation of project BMPs

c) 50% - to be paid monthly as a percentage of the total working days expended for monitoring, maintenance, testing, reporting and all other requirements as outlined in these Special Provisions.

3-12.6.4 Dewatering. *MODIFY to ADD the following:*

Submittals

Contractor shall submit a dewatering and discharge work plan to the Engineer before dewatering activities at least 5 days before dewatering begins. The dewatering and discharge work plan must include:

a) Title sheet and table of contents

b) Description of dewatering and discharge activities detailing locations, quantity and quality of water, proposed equipment, and discharge point(s)

c) Estimated schedule for dewatering and discharge start and end dates of intermittent and continuous activities

d) Discharge alternatives, such as dust control or percolation

e) Visual monitoring procedures with inspection log

f) Copy of written approval to discharge into a sanitary sewer system at least 5 business days before starting discharge activities, when appropriate

The Contractor shall submit the following informational submittals:

a) Safety Data Sheet (SDS) at least 5 business days before material is used or stored

b) Monthly inventory records for material used or stored

The Contractor shall submit written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system.

3-12.6.5 Payment. *DELETE in its entirety and SUBSTITUTE with the following:*

Payment for implementation and maintenance of **BMPs and dewatering** shall be included in the Contract Unit Price paid for **WATER POLLUTION CONTROL PROGRAM (WPCP**).

ADD:

3-12.7 Drainage Control. The Contractor shall maintain drainage within and through the work areas. Earth dams will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete, or other acceptable material will be permitted when necessary. Such dams shall be removed from the site as soon as their use is no longer necessary.

The Contractor shall ensure that storm and drainage water does not pond due to the temporary blockage of existing drainage facilities. To this end, the Contractor shall provide

temporary works that allow for the passage of storm and drainage water in a manner equivalent to the existing drainage system.

No separate payment will be made for any work performed or material used in drainage control. Full compensation for such controls shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

ADD:

3-12.8 Graffiti Control. Throughout all phases of Work, including suspension of Work, and until final acceptance, the Contractor shall keep Work, all equipment, field offices, storage facilities, fences, signs, and other facilities free of graffiti. Within twenty-four (24) hours after notification by the Agency Representative, graffiti shall be water blasted and cleaned to original surface or repainted if previously painted.

No separate payment will be made for any work performed or material used in graffiti control. Full compensation for such cleaning shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefor.

3-13.1 Completion. *DELETE in its entirety and SUBSTITUTE with the following:*

When the Contractor considers the Work, or a designated portion of Work, if specified in the Contract Documents, is complete, the Contractor shall submit a written request to the Engineer for inspection. By submittal of such request, Contractor certifies that:

a) Contract Documents have been reviewed by the Contractor.

b) Work has been completed in accordance with Contract Documents and is ready for inspection.

c) Equipment and systems have been tested, adjusted/balanced and are fully operational.

The Contractor shall submit the request a minimum of five (5) Working Days in advance of requested inspection date. Contractor shall be responsible for allowing sufficient time during the Contract period to complete inspections and make any corrections. Each day beyond the time prescribed to complete the Contract will be subject to assessment of liquidated damages in accordance with 6-9.

Should Agency Representative's inspection find Work incomplete, Agency Representative will notify the Contractor in writing, listing observed deficiencies. The Contractor shall remedy listed deficiencies immediately and send a request for final inspection. Failure of the Contractor to remedy deficiencies may, at the Agency's option, result in reinspection(s) of the work to identify additional deficiencies, if any. Agency’s costs associated with reinspection(s) are subject to provisions of 3-13.4.

When the Agency confirms Work is complete and, closeout submittals, as referred to in 3-13.5 have been provided, Agency Representative will notify Contractor of date of completion on the Weekly Statement of Working Days.

ADD:

3-13.4 Reinspections. Should status of completion of Work require reinspection(s) by Agency due to failure of the Contractor to make corrections on initial inspection, Agency may deduct the amount of compensation for reinspection services from final payment to Contractor. Observed deficiencies in excess of ten (10) will be reason for reinspection.

Inspections initiated at the request of the Agency will not be subject to provisions of this Subsection.

ADD:

3-13.5 Closeout Submittals.

Contractor shall submit:

a) Project Record Documents clearly marked with all changes to Plans within thirty (30) Calendar Days of Final Acceptance

b) Operation and Maintenance Data

c) Warranties and Bonds

d) Spare Parts and Maintenance Materials, as specified

e) Evidence of Payment and Release of Stop Payment Notices

f) Other data and materials as may be required in the Contract Documents

SECTION 4 – CONTROL OF MATERIALS

REVISE as follows:

4-1 GENERAL.

ADD the following before the 1st sentence in the 1st paragraph:

The Contractor shall furnish all materials required to complete the Work, except materials that are designated in the Special Provision to be furnished by the Agency.

ADD:

4-1.1 Contractor Equipment and Plants. Only equipment and plants suitable to produce the quality of work and materials required will be permitted to operate on the project. Such equipment and plants shall be maintained in a good state of repair during the process of the Work. No obsolete or badly worn equipment and plants shall be used. Manufacturer's ratings shall not be exceeded.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure a production rate of sufficient material to carry to completion within the time limit(s) specified in the Contract Documents, if any.

The Contractor, when ordered by the Engineer, shall remove unsuitable equipment from the work site and discontinue the operation of unsatisfactory plants and equipment.

ADD:

4-1.2 Adoption or Revision Date for Standards, Codes, and Tests. Whenever reference is made to a standard, code, specification, or test and the designation representing the date of adoption or latest revision thereof is omitted, it shall mean the latest revision of such standard, code; specification or test in effect on the day of the Notice Inviting Bids is dated.

In accordance with the Public Contract Code § 3400, the Contractor shall submit data substantiating requests for substitution of “equal” items within thirty-five (35) days of Contract award or before ten percent of the Contract Working Days have expired, whichever is less. This time is included in the number of Working Days allowed for the completion of the Work. The Engineer’s decision regarding the acceptability of the substitution is final.

Materials, equipment, and supplies provided shall, without additional charge to Agency, fully conform with all applicable local, State and Federal safety laws, rules, and regulations, and orders, and it shall be the Contractor's responsibility to provide only such materials, equipment, and supplies notwithstanding any omission in the Contract Documents therefore on that particular material, equipment or supply as specified.

4-3 INSPECTION.

4-3.1 General. *ADD the following before the 1st paragraph:*

Materials to be used in the Work will be subject to inspection and tests by the Engineer. The Contractor shall furnish without charge such samples as may be required. The Contractor shall furnish the Engineer a list of his sources of materials and the locations at which such

materials will be available for inspection a minimum of twenty (20) Calendar Days in advance of their intended use. The Engineer may inspect, sample or test materials at the source of supply or other locations, but such inspection, sampling or testing will not be undertaken until the Engineer is assured by the Contractor of the cooperation and assistance of both the Contractor and the supplier of the material. The Contractor shall assure that the Engineer has free access at all times to the material to be inspected, sampled or tested. It is understood that such inspections and tests, if made at any point other than the point of incorporation in the Work, in no way shall be considered as a guarantee of acceptance of such material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the Agency shall not relieve the Contractor or his suppliers of responsibility for quality control.

Manufacturers' warranties, guarantees, instruction sheets, and parts lists, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before acceptance of the Contract Work.

Reports and records of inspections made and tests performed when available at the site of the Work, may be examined by the Contractor.

The Engineer may inspect the production of material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The Agency assumes no obligation to inspect materials at the source of supply.

4-4 TESTING.*ADD the following:*

The Contractor shall furnish the Agency Representative with a list of his sources of materials in sufficient time to permit proper inspection and testing of materials to be furnished for such listed sources in advance of their use. The Contractor shall furnish without charge such samples as may be required.

Inspection and tests will be made by the Agency Representative or his designated representative, but it is understood that such inspections and tests, if made at any point other than the point of incorporation in the work, in no way shall be considered as guarantee of acceptance of such materials nor of continued acceptance of materials, presumed to be similar to that upon which inspection and tests have been made.

Tests of materials will be made in accordance with commonly recognized procedures of technical organizations and such special procedures as prescribed in the Contract Documents. Materials will be sampled and tested at such times during the process of the Work as deemed desirable by the Engineer, the Contractor shall cooperate in obtaining the samples.

Add:

4-4.1 Testing Laboratory. The Contractor shall employ and pay for services of an independent testing laboratory, subject to approval by the Agency, to perform other testing and inspections services required by the Contract Documents.

Prior to start of Work, the Contractor shall submit his testing laboratory name, address, and telephone number, and names of full-time registered engineer and responsible officer.

Employment of testing laboratories will in no way relieve Contractor of its obligation to perform the Work in accordance with Contract Documents.

Laboratory field technicians employed by the Agency shall have no authority to release, revoke, alter, or enlarge on requirements of Contract Documents, or to approve, accept or stop any portion of the Work.

The Contractor shall:

a) Cooperate with laboratory personnel, provide access to work, arrange access to manufacturer's operations.

b) Provide the laboratory with preliminary representative samples of materials to be tested, in required quantities.

c) Furnish copies of mill test reports.

d) Provide casual labor and facilities for access to work being tested; obtain and handle samples at the site; facilitate inspections and tests; provide facilities for the laboratory's exclusive use for storage and curing of test samples.

e) Coordinate requests for testing through the Agency Representative. Notify Agency Representative a minimum of three (3) Working Days in advance of operations to allow for assignment of personnel and scheduling of tests.

f) Pay for additional laboratory inspections, sampling, and testing required for Contractor's convenience and when initial tests indicate that work does not comply with Contract Documents.

g) When required by the Contract Documents, submit manufacturer’s certificate, executed by responsible officer, certifying that the product(s) meet or exceed specified requirements. Provide certification in duplicate.

4-6 TRADE NAMES.

ADD the following:

The Contractor shall submit products list in accordance with the following:

a) Within the time specified in 4-1.2 of the Standard Specifications and these Special Provisions, transmit number of copies Contractor needs plus four (4) of a list of major products which are proposed for installation, including name of manufacturer. Tabulate products by specification section number, title, and article number.

b) For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

c) The Engineer will reply in writing, stating whether there is reasonable objection to listed items. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

The following limitations shall apply to substitutions:

a) During the bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this Subsection.

b) Requests for substitutions of products will be considered only within the time period specified in the Contract Documents. Subsequent requests will be considered only in the case of product unavailability or other conditions beyond control of Contractor. Material delivery schedules will not be considered justification for substitution.

c) Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request or when requested directly by subcontractor or supplier, or when acceptance will require substantial revision of Contract Documents.

d) Substitute products shall not be ordered or installed without written acceptance by the Engineer.

e) Only one request for substitution for each product line will be considered. When substitution is not accepted, provide specified product.

f) The Engineer will determine acceptability of substitutions.

Requests for substitutions shall conform to the following:

a) Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.

b) Identify product by specifications section and article numbers. Provide manufacturer's name and address, trade name or product, and model or catalog number. List fabricators and suppliers, as appropriate.

c) Give itemized comparison of proposed substitution with specified product, listing variations, and reference to specifications section and article numbers.

d) Give cost data comparing proposed substitution with specified product, and amount of net change to Contract sum.

e) List availability of maintenance services and replacement materials.

f) State effect of substitution on construction schedule, and changes required in other work or products.

Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product. The Contractor shall provide the same warranty for the substitution as for the specified product, shall coordinate installation of accepted substitute, making such changes as may be requested for Work to be complete in all respects, certifies that cost data presented is complete and includes all related costs under this Contract and waives claims for additional costs related to substitution which may later become apparent. The Contractor shall submit the number of copies the Contractor needs plus four of request for substitution.

For accepted products, submit shop drawings, product data, and samples, and tests conducted in accordance with 3-8.

ADD:

4-9. AGENCY-FURNISHED MATERIALS.

Materials which are listed as Agency-furnished materials in the Special Provisions will be available to the Contractor free of charge.

The Contractor shall submit a written request to the Engineer for the delivery of Agency-furnished material at least fifteen (15) Working Days in advance of the date of its intended use. The request shall state the quantity and the type of each material.

The locations at which Agency-furnished materials will be available to the Contractor free of charge will be designated in the Special Provisions. In those cases, the materials shall be hauled to the site of the Work by the Contractor at the Contractor's expense, including any necessary loading and unloading that may be involved. If the locations are not designated in the Special Provisions, the Agency-furnished materials will be furnished to the Contractor free of charge at the site of the Work. In either case, all costs of handling and placing Agency-furnished material shall be considered as included in the price paid for the contract item involving the Agency-furnished material.

The Contractor shall be responsible for Agency-furnished materials furnished to the Contractor, and shall pay all demurrage and storage charges. Agency-furnished materials, once furnished, delivered, or picked-up by the Contractor, that are lost or damaged from any cause whatsoever shall be replaced by the Contractor at the Contractor's expense. The Contractor shall be liable to the Agency for the cost of replacing Agency-furnished materials, and those costs may be deducted from any monies due or to become due the Contractor. All Agency-furnished material that is not used on the Work shall remain the property of the Agency, and the Contractor shall arrange with the Agency Representative for delivery back to the Agency at Contractor’s expense.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

REVISE as follows:

5-1 LAWS AND REGULATIONS.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall keep itself fully informed of all existing and future State and National laws and County and Municipal ordinances and regulations which in any manner affect those engaged or employed in the Work or the materials used in the Work or which in any way affect the conduct of the Work and of all such order and decrees of bodies or tribunals having any jurisdiction or authority in the Plans, Specifications, or Contract for the Work in relation to any such law, ordinance, regulation, order or decree, he shall forthwith report the same to the Agency Representative in writing.

The Contractor shall at all times observe and comply with and shall cause all its agents, employees, and subcontractors to observe and comply with all such existing and future laws, ordinances, regulations, orders, and decrees even though such requirements may not be specifically mentioned in the specifications or shown on the Plans, and shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by itself, its employees, its agents, or its subcontractors. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any such claim or liability.

As a material part of this Contract, Contractor's and subcontractors' owners and employees agree to be bound by and adhere to the Federal Department of Transportation (DOT) regulations found in Title 49 CFR 382. All Contractor's and subcontractors' owners and employees who are required to hold commercial licenses and/or who are in safety sensitive positions shall be subject to the provisions of the DOT regulations.

5-2 SPECIAL NOTICES.

MODIFY to ADD the following:

Any notice required or given by one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever, unless served in the following manner:

a) If the notice is given to the Agency, by personal delivery or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to the Agency, postage prepaid and registered.

b) If the notice is given by the Engineer to the Contractor by personal delivery to said Contractor or to his authorized representative or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to said Contractor at his regular place of business or such other address as may have

been established for the conduct of the work under this Contract, postage prepaid and registered.

c) If notice is given to the surety or any other person by personal delivery to said surety or other person, or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to such surety or person at the address of said surety or person last communicated by him to the party giving the notice, postage prepaid and registered.

5-3 LABOR.

5-3.3 Payroll Records. *MODIFY to ADD the following:*

The Contractor and all its subcontractors shall submit to the City and the Labor Commissioner (Division of Labor Standards Enforcement) certified payroll records every Friday until Notice of Completion is filed and recorded.

The City of Irvine will be using the eComply Solutions software for managing certified payrolls on this project. Accordingly, Contractor shall register in, attend training for, and use the eComply Solutions software for submitting certified payrolls and related tasks as deemed appropriate by the City of Irvine. When the project commences, you will be contacted by an eComply Solutions representative regarding this process. Further information will be provided via a separate communication at that time.

5-4 INSURANCE.

MODIFY to ADD the following:

5-4.1 General. Without limiting Contractor's indemnification obligations, the Contractor shall not commence work until he procures and maintains, at his sole cost and for the duration of this Contract, insurance coverage as provided herein, against all claims for injuries against persons or damages to property which may arise from or in connection with the performance of the Work hereunder by Contractor, its agents, representatives, employees, and/or subcontractors. In the event that Contractor subcontracts any portion of the Work in compliance with 1-6.2 of the Standard Specifications and Special Provisions, the Contract between the Contractor and such subcontractor shall require the subcontractor to maintain the same policies of insurance that the Contractor is required to maintain pursuant to 5-4.

The Insurance obligations under this agreement shall be (1) all the Insurance coverage and/or limits carried by or available to the Contractor; or (2) the minimum Insurance coverage requirements and/or limits shown in this agreement; whichever is greater. Any insurance proceeds in excess of or broader than the minimum required coverage and/or minimum required limits, which are applicable to a given loss, shall be available to the City. No representation is made that the minimum Insurance requirements of this agreement are sufficient to cover the obligations of the Contractor under this agreement.

Insurance policies shall be deemed not in compliance if they include any limiting provision or endorsement that has not been submitted for approval in accordance with 5-4.

The Contractor’s insurance shall be “occurrence” rather than “claims made” insurance, except for Professional Liability insurance, which may be for claims made and shall apply separately

to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

Any deductibles or self-insured retentions must be declared to and approved by Agency prior to the execution of this Contract by Agency. Prior to commencing work, the Contractor will provide the Agency, in accordance with 7-3, written confirmation of the deductible for each insurance coverage required by this contract.

Self-insurance will be subject to the Agency's review and prior approval. If the Contractor uses any form of self-insurance, it shall submit:

a) A notice of election to self-insure.

b) The coverages for which self-insurance applies.

c) The amount of self-insurance.

d) Declaration under penalty of perjury by a certified public accountant certifying the accountant has applied Generally Accepted Accounting Principles (GAAP) guidelines and the Contractor has sufficient funds or other resources to cover the self-insurance amounts.

e) Copy of its commercial general liability policy and its excess policy, including the declarations page, all amendments, riders, endorsements, and other modifications in effect at the time of contract execution, for those amounts not covered by self-insurance.

Self-insurance programs and self-insured retentions are subject to separate annual review and approval by the Agency as evidence of the Contractor's financial capacity to respond to potential claims. Additionally, self-insurance programs or retentions must provide the Agency with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

All policies shall be endorsed to state that coverage shall not be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to Agency by U.S. mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided.

a) In lieu of this endorsement, the Contractor shall either:

b) Submit a letter, signed by the insurance agent or broker, certifying that he/she shall notify the City should the coverage be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to Agency by U.S. mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided; or

c) Submit evidence that the insurance premium has been paid in full for the life of the policy.

Indemnification. Contractor shall immediately report all claims to its insurance carrier and acknowledge receipt within thirty (30) days.

No officer, employee, or agent of the City, City Representative, the Engineer, or their consultants shall be personally responsible for any liability arising under or by virtue of the Agreement.

To the maximum extent permitted by law, Contractor shall hold harmless, indemnify, and defend the City, City Representatives, and each of their officers, employees, and agents from and against any and all actions, suits, claims, demands, judgments, attorney's fees, costs, damages to persons or property, losses, penalties, obligations, expenses or liabilities (herein "claims" or "liabilities") that may be asserted or claimed by any person or entity arising out of the willful or negligent acts, errors or omissions of Contractor, its employees, agents, representatives or subcontractors in the performance of any tasks or services for or on behalf of City, whether or not there is concurrent active or passive negligence on the part of City and/or City Personnel, but excluding such claims or liabilities arising from the active negligence or willful misconduct of City or City Personnel. In connection therewith:

a) Contractor shall defend any action or actions filed in connection with any such claims or liabilities, and shall pay all costs and expenses, including attorney's fees incurred in connection therewith.

b) Contractor shall promptly pay any judgment rendered against City or any City Personnel for any such claims or liabilities.

c) In the event City and/or any City Personnel is made a party to any action or proceeding filed or prosecuted for any such damages or other claims arising out of or in connection with the negligent performance or a failure to perform the work or activities of Contractor, Contractor shall pay to City any and all costs and expenses incurred by City or City Personnel in such action or proceeding, together with reasonable attorney's fees and expert witness fees. So much of the money due to the Contractor under and by virtue of the Agreement as shall be considered necessary by the City may be retained by the City until disposition has been made of such actions or claims for damages as aforesaid.

These Indemnification provisions are independent of and shall not in any way be limited by the Insurance Requirements of this Agreement. Entity approval of the Insurance contracts required by this Agreement does not in any way relieve the Contractor from liability under this section.

5-4.2 General Liability Insurance. *DELETE the 2nd paragraph and SUBSTITUTE with the following:*

General Liability (including premises, operations and mobile equipment, products, and completed operations, broad form property damage including completed operations, explosion, collapse and underground hazards, contractual liability, personal injury, independent contractors' liability): with a minimum limit of Two Million Dollars ($2,000,000) for each occurrence (combined single limit for bodily injury and property damage) and Four Million Dollars ($4,000,000) general aggregate. The general aggregate limit shall apply separately to the Contractor's work under this Contract.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

Products-Completed Operations: Contractor shall procure and submit evidence of insurance in accordance with 7-3 of the Standard Specifications and these Special Provisions for a period of at least three (3) years from the time that all Work under this Contract is completed.

5-4.3 Workers' Compensation Insurance. *MODIFY to ADD the following:*

Workers' Compensation and Employer's Liability: Workers' Compensation Insurance in an amount required by the laws of the State of California (Statutory Limits). Employer's Liability Insurance with a minimum limit of One Million Dollars ($1,000,000) per occurrence.

Such insurance shall be endorsed to waive the insurer's right of subrogation against the City of Irvine and their elected officials, officers, employees, volunteers, boards, and representatives.

In the event Contractor has no employees requiring Contractor to provide Workers' Compensation Insurance, Contractor shall so certify to Agency in writing prior to Agency's execution of this Contract. Agency and Agency Personnel shall not be responsible for any claims in law or equity occasioned by failure of the Contractor to comply with this section or with the provisions of law relating to Workers' Compensation.

If Contractor is providing on-site staffing services, then the Workers' Compensation insurance shall include an Alternative Employers Endorsement.

5-4.4 Automobile Liability Insurance. *DELETE in its entirety and SUBSTITUTE with the following:*

Automobile liability insurance with a limit of liability not less than Two Million dollars ($2,000,000) each occurrence. The limits shall be provided by either a single primary policy or combination of policies. If limits are provided with excess and/or umbrella coverage the limits combined with the primary will equal the minimum limits set above. Such insurance shall include coverage for all "owned," "hired" and "non-owned" vehicles, or coverage for "any auto."

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

ADD:

5-4.5 Contractor's Pollution Liability. Contractors Pollution Liability Insurance covering all of the contractor's operations to include onsite and offsite coverage for bodily injury, property damage, defense costs, cleanup costs, coverage for offsite disposal facilities with minimum limits of Two Million Dollars ($2,000,000) each loss and Four Million Dollars ($4,000,000) in the aggregate.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

Prior to commencing work, the Contractor shall provide the City the names and locations of disposal facilities for approval by the City.

The insurance coverage required for General Liability, Automobile Liability and Contractor's Pollution Liability shall be endorsed to provide the following:

The Contractor shall name as additional insured the City of Irvine, their elected officials, officers, employees, volunteers, boards, and representatives with regard to liability and defense of suits or claims arising out of the performance of the Contract.

Additional Insured Endorsements shall not:

a) Be limited to "Ongoing Operations"

b) Exclude "Contractual Liability"

c) Restrict coverage to the "Sole" liability of contractor

d) Contain any other exclusion contrary to the Contract

This insurance shall be primary and any other insurance, deductible, or self-insurance available to the insured shall be in excess of and shall not contribute with this insurance.

5-4.6 Builders Risk Insurance. At its own expense, the successful Contractor will be required to obtain, pay for, and maintain, for the duration of the Agreement, builders risk insurance for any property constructed on behalf of the City, to cover "all risks" of physical loss providing coverage for loss or damage from collapse, including collapse resulting from builder's design error. The value of the insured shall cover 100% of the completed Contract cost and shall maintain until acceptance of the Work. Proceeds payable under this insurance policy shall be fully payable to the City as Loss Payee.

Such insurance shall be endorsed to waive the insurer's right of subrogation against the indemnified parties.

5-4.7 Professional Liability Insurance. At its own expense, the successful Contractor will be required to obtain, pay for, and maintain, for the duration of the Agreement and for a minimum of five (5) years thereafter, a Professional Liability Insurance Policy (that includes errors and omissions, and professional malpractice) with a minimum limit of Two Million Dollars ($2,000,000) per claim. The policy shall provide coverage for any loss arising out of or caused by the Contractors performance of the Agreement.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor.

5-4.8 Evidence of Insurance. Contractor shall provide to City a Certificate(s) of Insurance evidencing such coverage together with copies of the required policy endorsements no later than five (5) business days prior to commencement of service and at least fifteen (15) business days prior to the expiration of any policy. Coverage shall not be suspended, voided, cancelled, reduced in coverage or in limits, non-renewed, or materially changed for any reason, without thirty (30) days prior written notice thereof given by the insurer to City by U.S.

mail, or by personal delivery, except for nonpayment of premiums, in which case ten (10) days prior notice shall be provided.

A statement on an insurance certificate will not be accepted in lieu of the actual endorsement. Insurance policies shall not be in compliance if they include any limiting provision or endorsement that has not been submitted to the City for approval.

The City's insurance certificate tracking services provider, EXIGIS, LLC, will send Contractor an email message providing instructions for submitting insurance certificates and endorsements.

The City project title or description MUST be included in the "Description of Operations" box on the certificate.

Certificate Holder:
City of Irvine
c/o EXIGIS Risk Management Services
P.O. Box 4668 - ECM #35050
New York, NY 10163-4668

ADD:

5-5.1 Property Rights in Materials. Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the Work or the soil, or after payment has been made for materials delivered to the site of the Work, or stored subject to or under the control of the Agency.

ADD:

5-5.2 Warranty of Title. No materials, supplies or equipment for the Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants clear and good title to all materials, supplies, and equipment installed and incorporated in the Work and agrees upon completion of all Work to deliver the premises together with all improvements and appurtenances constructed or placed thereon by him to the Agency free from any claims, liens, encumbrances, or charges and further agrees that neither he nor any persons, firm, or corporation furnishing any material or labor for any work covered by the Contract shall have any right to a lien upon the premises or any improvement or appurtenance thereon, provided that this shall not preclude the Contractor from installing metering devices or other equipment of utility companies or of municipalities, the title of which is commonly retained by the utility company or the municipality. Nothing contained in this article, however, shall defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection, or any right under any law permitting such persons to look to funds due the Contractor in the hands of the Agency.

The provisions of this subsection shall be physically inserted in all subcontracts and material contracts and notices of its provision shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

5-6 PATENT FEES AND ROYALTIES.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work and shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents from all claims, suits or actions of every nature for or on account of the use of any patented materials, equipment devices, or processes. To the maximum extent permitted by law, all obligations of the Contractor stated in 7-3.2 shall apply in the case of any such claim, suit or action.

5-7.1.2 Work Site Safety Official. *MODIFY to ADD the following:*
Failure by the Contractor to provide the required Work Site Safety Official shall be grounds for the Agency to direct the cessation of all work activities and operations at no cost to the Agency until the Contractor is in compliance.

ADD:

5-7.1.3 Emergencies. Unusual conditions may arise on the Work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the Work, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as his operations make necessary to protect from danger or damage, or loss of life or property, which would result from the interruption or contamination of public water supply, irrigation or other public service, or from failure or partly completed work.

Whenever, in the opinion of the Engineer, an emergency exists against which the Contractor has not taken sufficient precaution for the safety of the public or the protection of utilities or of adjacent structures or property which may be injured by process of construction on account of such neglect; and whenever in the opinion of the Engineer, immediate action shall be considered necessary in order to protect public or private, personal or property interest, or prevent likely loss of human life or damage on account of the operations under the Contract, then and in that event the Agency may provide suitable protection to said interest by causing such work to be done and material to be furnished as, in the opinion of the Agency Representative may seem reasonable and necessary.

The cost and expense of said labor and material, together with the cost and expense of such repairs as may be deemed necessary, shall be borne by the Contractor, and if he shall not pay said cost and expense upon presentation of the bills therefor, duly certified by the Agency Representative, then said cost and expense will be paid by the Agency and shall thereafter be deducted from any amounts due, or which may become due to the Contractor. Failure of the Agency, however, to take such precautionary measure, shall not relieve the Contractor of his full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the Agency.

5-7.2.1 General. *DELETE in its entirety 2nd paragraph and SUBSTITUTE with the following:*

The Contractor shall submit to the Engineer, as a condition of obtaining City issued permits and in advance of excavation, a permit from the Division of Occupational Safety and Health pursuant to Chapter 6 (commencing with Section 6500) of Part 1 of Division 5 of the Labor Code along with a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of any trench or trenches five (5) feet or more in depth. The plan shall be prepared by a registered civil or structural engineer. As a part of the plan, a notice shall be included stating that the registered civil or structural engineer certifies that the plan complies with the CAL/OSHA Construction Safety Orders. A copy of the plan and permit shall be submitted to the Engineer.

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions on the job site, including safety of all persons and property during performance of the Work, and the Contractor shall fully comply with all local, county, state and federal laws, rules, regulations, and orders relating to safety of the public and workers.

The Contractor shall hold harmless, indemnify, and defend the Agency, the Engineer, the Agency Representative and each of their officers, employees, and agents from civil or criminal penalties resulting from a failure to comply with applicable safety laws, rules, regulations and orders. To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the event of any such failure to comply with applicable safety laws, rules, regulations or orders.

The duty, if any, of the Agency Representative to conduct construction review or inspection of the Contractor's performance is not intended to include review or inspection of the adequacy of the Contractor's safety measures in, on, or near the construction site.

5-7.8 Steel Plate Covers. *MODIFY to ADD the following:*

The Contractor shall protect transverse or longitudinal cuts, voids, trenches, holes, and excavations in the right-of-way that cannot be properly completed within one (1) Working Day by adequately designed barricades and structural steel plates (plates) that will support legal vehicle loads in such a way as to preserve unobstructed traffic flow.

The Contractor shall secure approval, in advance, from Engineer concerning the use of any bridging proposed on the Work.

The Contractor shall adequately shore trenches to support the bridging and traffic loads.

The Contractor shall design plates for HS 20-44 truck loading in accordance with Caltrans Bridge Design Specifications Manual.

For spans greater than 5’-3", submit a structural design prepared by a California Registered Civil Engineer to the Engineer.

The surface of the plates shall be skid-resistant with a nominal Coefficient Of Friction (COF) of 0.35 as determined by California Test Method 342.

Plates must provide complete coverage to prevent any person, bicycle, motorcycle or motor vehicle from being endangered due to plate movement causing separations or gaps.

Install and secure plates against movement or displacement by using adjustable cleats, shims, welding, or other devices in a manner that will minimize noise.

The Contractor shall Install plates as follows:

Mill the pavement to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate. Method 2 installation is prohibited.

Alternative installation method may be submitted in accordance with 3-8, “Submittals” for the Engineer’s approval.

The Contractor is responsible for maintenance of the plates and shoring, or any other approved device used to secure the plates. The Contractor shall immediately mobilize necessary personnel and equipment after being notified by the Agency Representative, the Agency Code Enforcement or Police Department of a repair needed e.g., plate movement, noise, anchors, and asphalt ramps. Failure to respond to the emergency request within 2 hours will be grounds for Agency to perform necessary repairs that will be invoiced at actual cost including overhead or $500 per incident, whichever is greater.

When plates are removed, the Contractor shall repair any damage to the pavement with fine graded asphalt concrete mix or slurry seal satisfactory to the Engineer.

Payment for Steel Plate Covers is included in the various bid items of work.

ADD:

5-8 CORRESPONDENCE. Unless specified otherwise or requested by the Engineer, the use of facsimile (fax) machines, text messages, or phone calls shall not be considered official project correspondence. Unless otherwise allowed by the Engineer, all email shall be directed to the Engineer. The email address for the Engineer will be provided at the pre-construction meeting. Correspondence received after 2:00 p.m. shall be considered as being received the following working day. The Engineer will not accept any illegible correspondence.

ADD:

5-9 CONTRACT COORDINATION. The Contractor shall coordinate scheduling, submittals, and the Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

In addition to weekly progress meetings, as required by the Agency, the Contractor shall hold coordination meetings and pre-installation conferences with Agency Representatives and subcontractors to assure coordination of Work.

Should the Agency exercise partial Acceptance or beneficial occupancy of premises, the Contractor shall coordinate access to site to complete work or to correct defective work and work not in strict conformance with Contract Documents to minimize disruption of Agency's activities.

ADD:

5-10 CONTRACTOR’S RESPONSIBILITY FOR THE WORK. Until Acceptance of the Work, the Contractor shall have the responsibility, charge and care of the Work and of the

materials to be used therein (including materials for which it has received partial payment or materials which have been furnished by the Agency) and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the Work.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the work or the material occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary to protect the work or materials from damage, the Contractor shall at his expense provide suitable drainage and erect such temporary structures as are necessary to protect the work or materials from damage. The suspension of the work from any cause whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified. If ordered by the Agency Representative, the Contractor shall at his expense properly store materials which have been partially paid for by the Agency or which have been furnished by the Agency. Such storage by the Contractor shall be on behalf of the Agency, the Agency shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored, except on written authorization from the Agency.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act as though instructed to do so by the Agency.

5-11 PROJECT RECORD DOCUMENTS.

5-11.1 Document Control.

Virtual Project Manager (VPM) construction management software, shall be used for all aspects of document control and management. After contract award, the Contractor shall register and create an account utilizing a City-provided Username and Password.

5-11.1.1 Construction Management Software

The Contractor shall process the project documentation as specified or as directed by the City utilizing an online cloud-based project management system. Virtual Project Manager (VPM) allows for paperless documentation and project administration. For more information, go to www.virtual- pm.com.

5-11.1.2 Project Management Documentation and Administration

5-11.1.2.1 General

a) Virtual Project Manager (VPM) allows for paperless documentation and project administration. All posted information is available to all personnel involved with the project at any time using the internet.
b) The use of VPM by the Contractor is mandatory. Access to VPM will be provided at no cost to the contractor.

5-11.1.2.2 Equipment and Communication Services

The Contractor shall procure and use the information technology (IT) equipment and communications services required to utilize the VPM. IT equipment necessary include but are not limited to, a computer, internet access, a digital camera, and a scanner. (IT) equipment shall meet the user software and hardware requirements below, with internet

access, and the ability to scan and print up to an 11-inch by 17- inch document. Acquisition, configuration, maintenance and support of the Contractor's computer hardware and software are the Contractor's responsibility. The following are the minimum user software and hardware workstation requirements:

1. Browser Latest version of, Firefox, Chrome, Safari
2. Connection 1.5Mbs / 768 Kbs (recommended minimum download / upload)

5-11.1.2.3 Access and Submittal Procedures

After award, the Contractor will a Username and Password To access VPM, go to www.virtual-pm.com. To Login, from the homepage, select LOGIN and enter the Username and Password that will be provided to you by the agency.

The Contractor shall submit the items associated with this section via Virtual Project Manager (VPM), including, but not limited to, those specified below.

1. Daily/Weekly Logs: Contractor’s daily and weekly reports shall be entered electronically via VPM.
2. Change Order Manager: Contractor requests for change order submission, and change order processing will be performed electronically via VPM.
3. Transmittals: Schedules, Pay applications, etc. shall be submitted electronically via VPM.
4. Submittals: Submittals requiring approval shall be submitted electronically via VPM.
5. RFIs: Requests for information (RFIs) shall be submitted electronically via VPM.
6. Miscellaneous: Correspondences, permits, approvals, inspections, drawings, photos, tracking and resolution of Noncompliance Notices, tracking of Action Items created as part of the weekly construction meetings, development and management of the Punch List and any other record documents required in the Standard Specifications and these Special Provisions shall be accomplished electronically via VPM.

5-11.2 Maintenance of Documents and Samples. The Contractor shall maintain one record copy of:

a) Contract Drawings

b) Specifications

c) Addenda

d) Change Orders and Other Modifications to the Contract

e) Reviewed Shop Drawings, Product Data, Samples, and approved submittals

f) Field Test Records

g) Construction Schedules

h) Manufacturer's Certificates

The Contractor shall maintain documents in clean, dry, legible condition and not used for construction purposes.

The Contractor shall keep Record Documents and samples accessible for inspection by Agency Representative. Applications for partial payment will not be approved if the Record Documents are not kept current. The Agency Representative must so verify prior to submittal of each Application for Payment.

ADD:

5-11.3 Recording. The Contractor shall record changes to the plans and discoveries of buried objects at the Work on Record Documents with red ball-point pen, label each Document "PROJECT RECORD" in large printed letters, record information concurrently with construction progress, not conceal any work until required information is recorded and legibly mark each item on Contract Drawings and Shop Drawings to record actual construction, including:

a) Measured depths of elements in relation to fixed datum point

b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements

c) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction

d) Field changes of dimension and detail

e) Changes made by Contract modifications

f) Details not on original Contract Drawings

g) Previously unknown buried objects

The Contractor shall legibly mark each item to record actual construction, including:

a) Manufacturer, Trade Name, and Catalog Number of each product actually installed, particularly optional items and substitute items

b) Changes made by Addenda or modifications

The Contractor shall maintain other documents per requirements of individual specifications sections.

ADD:

5-11.4 Submittals. At Contract closeout the Contractor shall deliver Record Documents and samples as specified in 5-11.1. Request for final payment will not be approved until all Record Documents have been delivered.

The submittals shall be transmitted with cover letter with signature of Contractor or authorized representative, listing date, project title and number, and number and title of each Record document.

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

REVISE as follows:

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall begin the Work on or before the date stipulated in the Notice to Proceed and shall diligently prosecute the Contract to completion within the time limit provided in the Contract.

The Contractor shall notify the Agency Representative of his intent to begin work at least two (2) Working Days prior to the start of any work.

The Contractor may, upon written approval from the Agency, begin work in advance of the date in the Notice to Proceed; however, **no work shall be started in advance of the completed execution of the Contract and approval of the construction progress schedule by the Agency**. The Agency may, but shall not be required to, provide access to the site prior to the date specified in the Notice to Proceed.

6-1.1 General. Within ten (10) days after the date of the City's execution of the Contract, the Contractor shall submit a proposed construction schedule to the Engineer for approval. The construction schedule shall be in accordance with 6-1.2 and 6-1.3 and shall be in sufficient detail to show chronological relationship of all activities of the Work. These include, but are not limited to, estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, utility relocation efforts, procurement of materials, and scheduling of equipment.

Prior to issuing the Notice to Proceed, the Engineer will schedule a Pre-Construction Meeting with the Contractor to review the proposed construction schedule and delivery dates, arrange utility coordination and clarify inspection procedures.

Notwithstanding any other provisions of the contract, the Contractor shall not be obligated to perform any work and the City shall not be obligated to accept or pay for any work performed by the Contractor prior to delivery of the Notice to Proceed. The City's knowledge of work performed prior to the delivery of the Notice to Proceed shall not obligate the City to accept or pay for such work. The Contractor shall provide the required contract bonds and evidences of insurance prior to commencing work at the site.

6-1.2 Definitions. The following definitions shall apply to this section:

a) ACTIVITY – a task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration, and one or more logic ties.

b) BASELINE SCHEDULE – the initial schedule representing the Contractor's work plan on the first working day of the project.

c) CONTRACT COMPLETION DATE – the current extended date for completion of the contract shown on the Weekly Statement of Working Days furnished by the Engineer in conformance with the provisions in 6-3.

d) CRITICAL PATH – the longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.

e) CRITICAL PATH METHOD (CPM) – a network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.

f) DATA DATE – the day after the date through which a schedule is current. Everything occurring earlier than the data date is “as-built” and everything on or after the data date is “planned.”

g) FLOAT – the difference between the earliest and latest allowable start or finish times for an activity.

h) FRAGNET – a fragnet is defined as the sequence of new activities that are proposed to be added to the existing schedule, to demonstrate either added scope, or a change and the corresponding impact. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities.

i) MILESTONE – an event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.

j) NEAR CRITICAL PATH – a chain of activities with total float exceeding that of the critical path, but having no more than ten (10) Working Days of total float.

k) SCHEDULED COMPLETION DATE – the planned project finish date shown on the current accepted schedule.

l) TOTAL FLOAT – the amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

m) UPDATE SCHEDULE – a current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

6-1.3 General Requirements. The Contractor shall meet with the Engineer on a date mutually agreed by the parties with the intent of discussing the schedule requirements. This meeting shall happen before the Contractor begins the work on the Baseline schedule.

The Contractor shall submit to the Engineer baseline, monthly update, look-ahead schedules, and final update schedules, each consistent in all respects with the time and order of work requirements of the contract. The project work shall be executed in the sequence indicated on the current accepted schedule.

Schedules shall show the order in which the Contractor proposes to carry out the work with logical links between time-scaled work activities and calculations made using the critical path method to determine the controlling operation or operations. The Contractor is responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

The Contractor shall produce schedules using computer software and shall furnish compatible software for the Engineer's exclusive possession and use. The Contractor shall furnish network diagrams and schedule data as parts of each schedule submittal.

The schedule shall be prepared using the latest version of Oracle's Primavera P6 scheduling tool or approved equal. Any tool other than Primavera shall first require approval from the Engineer.

The Contractor shall not sequester float through strategies such as extending activity duration estimates to consume available float, using preferential logic, using extensive crew/resource constraints, using special lead/lag logic restraints, using imposed dates or other float suppression techniques.

Schedules shall include, but not be limited to, applicable activities that show the following:

a) Project characteristics, salient features, or interfaces, including those with outside entities that could affect time of completion.

b) Project start date, scheduled completion date, and other milestones.

c) Work performed by the Contractor, subcontractors, and suppliers.

d) Submittal development, delivery, review and approval, including those from the Contractor, subcontractors, and suppliers.

e) Procurement, delivery, installation, and testing of materials, plants, and equipment.

f) Testing and settlement periods.

g) Utility notification and relocation.

h) Erection and removal of false work and shoring.

i) Lane closures, ramp closures, etc.

j) Major traffic stage switches.

k) Finishing roadway and final cleanup.

l) Schedule shall further include the following:

    1) A clear and legible description for each activity.

    2) A detailed Work Breakdown Structure (WBS) or Activity Coding Structure, sufficient to clearly organize, sort, and filter activities as needed.

    3) A duration of not less than one (1) Working Day, except for event activities, and not more than twenty (20) Working Days, unless otherwise authorized by the Engineer.

    4) At least one predecessor and one successor activity, except for project start and finish milestones.

    5) Required constraints.

The Engineer's review and acceptance of schedules shall not waive any contract requirements and shall not relieve the Contractor of any obligation thereunder or responsibility for submitting complete and accurate information. Schedules that are rejected shall be corrected by the Contractor and resubmitted to the Engineer within five (5) Working Days of notification by the Engineer, at which time a new review period of one week will begin.

Errors or omissions on schedules shall not relieve the Contractor from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Engineer, either the Contractor or the Engineer discover that any aspect of the schedule has an error or omission, it shall be corrected by the Contractor on the next update schedule.

The Contractor shall include the following for each schedule submittal:

a) Two sets of originally plotted, time-scaled network diagrams.

b) Two copies of a narrative report.

c) Two copies of each of three (3) sorts of the CPM software-generated tabular reports.

d) Electronic copy of the schedule data.

The time-scaled network diagrams shall conform to the following:

a) Show a continuous flow of information from left to right.

b) Be based on early start and early finish dates of activities.

c) Clearly show the primary paths of criticality using graphical presentation.

d) Include a title block and a timeline on each page.

Tabular reports shall be software-generated and provide information for each activity included in the project schedule. Three different reports shall be sorted by (1) activity ID, (2) early start and (3) total float. Tabular reports shall be 8 ½” x 11” in size and shall include, as a minimum, the following applicable information:

a) Data date

b) Activity number and description

c) Predecessor and successor activity, numbers, and descriptions

d) Activity codes

e) Scheduled, or actual and remaining durations (work days) for each activity

f) Earliest start (calendar) date

g) Earliest finish (calendar) date

h) Actual start (calendar) date

i) Actual finish (calendar) date

j) Latest start (calendar) date

k) Latest finish (calendar) date

l) Free float (working days)

m) Total float (working days)

n) Percentage of activity completed and remaining duration for incomplete activities

o) Lags

p) Required constraints

Schedule submittals will only be considered complete when all documents and data have been provided as described above.

6-1.4 Computer Software. The software shall be the current version of Oracle's Primavera P6 for Windows or equal. If the Contractor proposes to use a different software than Primavera, the Contractor shall submit to the Engineer for approval a description of proposed software. All software shall be compatible with the latest Windows operating system.

The Contractor shall furnish schedule software and all original software instruction manuals to the Engineer with submittal of the baseline schedule. The furnished schedule software will be returned to the Contractor upon Project Acceptance.

The Contractor shall instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within twenty (20) Working Days of approval of the Contract, the Contractor shall provide a commercial 16-hour training session and training manuals for 3 City employees in the use of the software at a location acceptable to the Engineer. It is recommended that the Contractor also send at least 3 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software.

6-1.5 Schedule Submittals, Network Diagrams and Reports.

The Contractor shall:

a) Submit the Baseline Schedule within twenty (20) Working Days after the approval of the Contract. Review 6-1.6 for more details on the Baseline Schedule requirements.

b) Contractor shall incorporate any revisions deemed necessary by the City after the City's review of the Baseline Schedule.

c) Once the City approves the Baseline Schedule, the Contractor shall submit two (2) color plots on "E" size sheets (approximately 34" x 44") of each required schedule, four (4) copies of the schedule in 11" x 17" format. A computer copy of the schedule data in the native file format should also be presented.

d) Submit the Monthly Updated Schedules and reports along with the computer copy of the schedule file, on or within the first working day of each month.

The Monthly Updated Schedule shall incorporate the Project's actual progress (or as-built information) as of the data date indicated on the update into the Baseline Schedule or the latest monthly update as appropriate.

e) Submit a 3-Week Look-Ahead Schedule weekly and at every progress meeting during construction.

f) Submit Final As-Built Schedule upon completion of the entire Project.

6-1.6 Baseline Schedule. The Contractor shall submit to the Engineer a baseline schedule within ten (10) days after the date of the City's execution of the Contract. The Contractor shall allow three (3) weeks for the Engineer's review after the baseline schedule and all support data are submitted. Beginning the week the baseline schedule is first submitted, the Contractor shall meet with the Engineer weekly to discuss and resolve schedule issues until the baseline schedule is accepted.

The baseline schedule shall include the entire scope of work and shall show how the Contractor plans to complete all work contemplated. The baseline schedule shall clearly identify the activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum. Not more than 30 percent of the baseline schedule activities shall be critical or near critical, unless otherwise authorized by the Engineer.

The baseline schedule shall not extend beyond the number of Working Days originally provided in these Special Provisions. The baseline schedule shall have a data date of the first working day of the contract and not include any completed work to date. The baseline schedule shall not attribute negative float or negative lag to any activity.

Each baseline schedule submittal shall include the following:

a) A Baseline Narrative report which must include the following information:

1) Explanation of the Contractor's general approach to this project and an explanation of what the Contractor considers as key factors to successfully complete the project within the contractual time.

2) A brief explanation of where the work will begin and the how the work and crews will flow through the project.

3) Describe how the Agency's jurisdictional requirements regarding working times and lane closures have been factored in the schedule.

4) A general explanation of the anticipated workdays per week, number of shifts per day, number of hours per shift, and holidays observed.

5) A description of problems, risks or issues anticipated.

6) Typical crew sizes and major equipment to be used in the job.

7) Long lead items.

b) Hard copy of the schedule in 11" x 17" format.

c) Color plots in "E" sheet (Approximately 34" x 44".)

6-1.7 Update Schedule. The Contractor shall submit an update schedule and meet with the Engineer to review contract progress, on or before the first day of each month, beginning one month after the baseline schedule is accepted. The Contractor shall allow two (2) weeks for the Engineer's review after the update schedule and all support data are submitted, except that the review period shall not start until any previous month's required schedule is accepted. Update schedules that are not accepted or rejected within the review period will be considered accepted by the Engineer.

The update schedule shall have a date of the last date of the reporting period month or other date established by the Engineer. The update schedule shall show the status of work actually completed to date and the work yet to be performed as planned. The following shall be included with each monthly update:

a) The electronic copy of the schedule file in the native file format.

b) Hard copies of the schedule in 11” x 17” format and color plots in “E” sheet size.

c) A critical path report, showing only the longest path in the project.

d) A list and detailed description of all changes made to the schedule.

e) A narrative report. The narrative report shall be organized in the following sequence with all applicable documents included:

1) Contractor’s transmittal letter.

2) Work completed during the period.

3) Identification of unusual conditions or restrictions regarding labor, equipment or material; including multiple shifts, 6-day work weeks, specified overtime or work at times other than days or hours.

4) Description of the critical path method.

5) Changes to the critical path and scheduled completion date since the last schedule submittal.

6) Description of the problem areas.

7) Current and anticipated delays:

b. Cause of Delay.

c. Impacts of delay on other activities, milestones, and completion dates.

d. Corrective action and schedule adjustments to correct the delay.

8) Pending Items and status thereof:

e. Permits

f. Change Orders

g. Time adjustments

h. Non-compliance notices

9) Reasons for an early or late schedule completion date in comparison to the contract completion date.

6-1.8 Look-Ahead Schedule. The Contractor shall prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Baseline/Monthly Update. Each task in the Look Ahead Schedule shall be referenced back to a relevant Activity ID on the Master Schedule (Either the Baseline or the latest Monthly Update). Activities shall not exceed five (5) Working Days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. The Contractor shall update this schedule weekly.

6-1.9 Time Impact Analysis (TIA). The Contractor shall submit a written TIA to the Engineer with each request for adjustment of contract time, or when the Contractor or Engineer consider that an approved or anticipated change may impact the critical path or contract progress. The Contractor shall submit the TIA for review within ten (10) Working Days after the date of the alleged delay impact to the schedule or within ten (10) Working Days after receiving a written request for TIA from the Engineer. Delays of any non-critical Work shall not be the basis for an extension of Contract time until the delays consume the float associated with that non-critical work activity and cause the work activity to become critical The City will not grant time extensions unless substantiated by the CPM Schedule, and then not until the project float becomes zero. If the Contractor fails to submit a TIA within the aforementioned time specified, then the City shall deem the Contractor to have agreed that there is no time impact and that the Contractor has irrevocably waived its rights to any additional Contract time.

For each TIA the Contractor shall provide information justifying the request and stating the extent of the adjustment requested for each specific change or alleged delay. Each TIA shall be in a form and content suitable to the Engineer and include the following:

a) The TIA shall illustrate the impacts of each change or delay on the current schedule completion date or internal milestones, as appropriate.

b) The TIA shall include a written narrative. The narrative shall detail the proposed methodology for creating the Fragnet, include a chronology of events leading to the delay, and an explanation of how the delay impacted the critical path.

c) The analysis shall use the accepted schedule that has a data date closest to and prior to the event. If the Engineer determines that the accepted schedule used does not appropriately represent the conditions prior to the event, the accepted schedule shall be updated to the day before the event being analyzed.

d) The TIA shall include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and completion date of the accepted schedule, the difference between schedule completion dates of the two schedules shall be equal to the adjustment of Contract time. The Engineer may construct and utilize an appropriate project schedule or other recognized method to determine adjustments in Contract time until the Contractor provides the TIA.

The Contractor shall allow the Engineer 2 weeks after receipt to approve or reject the submitted TIA. If the TIA is accepted, the contract completion time shall be adjusted accordingly. All approved TIA schedule changes shall be shown on the next update schedule.

If the TIA submitted by the Contractor is rejected by the Engineer, the Contractor shall meet with the Engineer to discuss and resolve issues related to the TIA. If agreement is not reached, the Contractor will be allowed 15 days from the meeting with the Engineer to give notice in conformance with the provisions in Section 3. The Contractor shall only show actual as-built work, not unapproved changes related to the TIA, in subsequent update in schedules. If agreement is reached at a later date, approved schedule changes shall be shown on the next update schedule.

6-1.10 Final Update Schedule. The Contractor shall submit a final update, as-built schedule with actual start and finish dates for the activities, within thirty (30) Calendar Days after completion of the Work. The Contractor shall provide a written certificate with this submittal signed by the Contractor's project manager and an officer of the company stating, “To my knowledge and belief, the enclosed final update schedule reflects the actual start and finish dates of the actual activities for the project contained herein.” An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

6-1.11 Retention. The City will retain an amount equal to 25 percent of the estimated value of the Work performed during each estimate period in which the Contractor fails to submit an acceptable schedule conforming to the requirements of these Special Provisions as determined by the Engineer. Schedule retentions will be released for payment on the next monthly estimate for partial payment following the date that acceptable schedules are submitted to the Engineer or as otherwise specified herein. Upon completion of all contract work and submittal of the final update schedule and certification, any remaining retained funds associated with this section, “Progress Schedule (Critical Path Method),” will be released for payment. Retentions held in conformance with this section shall be in addition to other retentions provided for in the contract. No interest will be due the Contractor on retention amounts.

6-1.12 Payment. Payment for Construction Schedule (critical path method) shall be at the contract unit price per Lump Sum and shall include full compensation for furnishing all labor, materials, equipment, and incidentals, including computer software, and for doing all the work involved in preparing, furnishing, and updating schedules, and instructing and assisting the Engineer in the use of computer software, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

Payment for the construction schedule (critical path method) contract item will be made progressively as follows:

a) A total of 25 percent of the item amount will be paid upon achieving all of the following:

    1) Completion of 5 percent of all contract item work.

    2) Software training for Agency staff.

    3) Acceptance of all schedules and any time impact analyses required at the time 5 percent of all contract item work is complete.

b) A total of 50 percent of the item amount will be paid upon completion of 25 percent of all contract item work and acceptance of all schedules and time impact analyses required at the time 25 percent of all contract item work is complete.

c) A total of 75 percent of the item amount will be paid upon completion of 50 percent of all contract item work and acceptance of all schedules and time impact analyses required at the time 50 percent of all contract item work is complete.

d) A total of 100 percent of the item amount will be paid upon completion of all percent of all contract item work and acceptance of all schedules and time impact analyses required at the time all percent of all contract item work is complete, and submittal of the certified final update schedule.

If the Contractor fails to complete any of the work or provide any of the schedules required by this section, the Engineer shall make an adjustment in the compensation in conformance with the provisions in Section 3 “Changes of Work,” of the Standard Specifications for the work not performed. Adjustments in compensation for schedules will not be made for any increased or decreased work ordered by the Engineer in furnishing schedules.

Should the Contractor fail to meet the requirements under 6-1 of these Special Provisions, the Engineer reserves the right to withhold payment for work being performed. Furthermore, if after notice is given to the Contractor to perform work to meet these requirements, and the Contractor refuses or for any reason fails to perform sufficiently to meet these schedules, City may withhold or deny payment for work being performed.

6-2 PROSECUTION OF THE WORK.

ADD:

6-2.1 Time of Completion and Forfeiture Due to Delay. The Contractor shall complete the Work called for under the Contract within the time set forth in the Special Provisions.

In accordance with Government Code § 53069.85, Contractor agrees to forfeit and pay to the Agency the amount per day set forth in the Contract for each and every day of delay which shall be deducted from any payments due or to become due the Contractor.

The Agency has endeavored to identify all areas of the site which may contain hazardous waste, as defined by Health and Safety Code § 25117, and unless otherwise noted said hazardous waste in these areas has been mitigated. However, the parties expressly acknowledge the possibility of the existence of further hazardous waste not previously identified. If, during the course of his work, the Contractor encounters any such hazardous waste, he shall promptly notify the Agency through its designated representative. If the material is indeed “hazardous waste” pursuant to Health and Safety Code § 25117, the Agency has the option to have the mitigation work performed by the Contractor or by a separate contract from the work being performed. If the Contractor performs said mitigation work, the cost will be paid for as an addition to the work in accordance with Section 2. To the maximum extent permitted by law, the Agency shall not be liable for any damages beyond an appropriate time extension for delays occasioned by the existence of hazardous waste conditions contemplated herein.

No forfeiture due to delay shall be made because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor (including but not restricted to acts of nature or of the public enemy, acts of the government, acts of the Agency, or acts of another contractor in the performance of a contract with the Agency, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather). Any such delays, except for acts of the Agency, shall not entitle the Contractor to any additional compensation. The sole remedy of the Contractor shall be an extension of time obtained in accordance with this section.

The Contractor shall, within ten (10) Calendar Days from the beginning of any such delay, notify the Agency Representative in writing of the cause of delay, whereupon the Agency Representative will ascertain the facts and extent of the delay and extend the time for completing the Work if, in his judgment, the findings of the fact justify such an extension, and the Agency Representative's findings of facts thereon shall be final and conclusive.

ADD:

6-2.2 Order of Work Requirements. When required by these Special Provisions or the Plans, the Contractor shall follow the sequence of operations and restrictions as set forth therein.

The Work shall be performed in conformance with the staging of construction shown on the Plans and indicated below. Subject to approval by the Engineer, non-conflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction. The Engineer's approval of any Contractor-requested modifications to the order of work or staging of the work shall not be grounds for a Change Order request or time extension request by the Contractor. If the Contractor deviates from the specified order of work or the staging plans, it does so at its own risk and shall assume all time impacts and cost associated with such deviations.

The order of work described below is not intended to include all work items necessary to complete a particular construction stage and serves to only summarize the order of major work items.

a) Selective Demolition/ Clearing and Grubbing/ Earthwork

b) Trail Modifications

c) Site Furnishings

d) Landscape and Irrigation Improvements

6-4 DELAYS AND EXTENSIONS OF TIME

6-4.2 Extensions of Time. *DELETE in its entirety and SUBSTITUTE with the following:*

The Agency may extend the time fixed for completion of the Work under the Contract from time to time. All applications for extensions of time shall be in writing and shall be filed with the Agency before the expiration of the original time fixed in the Contract or as previously extended.

An extension of time may be granted by the Agency after the expiration of the time originally fixed in the Contract or as previously extended, and the extension so granted

shall be deemed to commence and be effective from the date of such expiration. Any extension of time shall not release the sureties upon any bond required under the Contract nor effect forfeitures due to delay.

No extension of time will be granted for delays that are not on the critical path.

6-6 SUSPENSION OF THE WORK.

6-6.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*

The Engineer shall have the authority to suspend the Work wholly or in part, for any time period as the Engineer deems necessary in the interest of Agency, for Agency's convenience, or due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work wholly or in part. The suspended work shall be resumed as ordered or approved in writing by the Engineer.

Resumption of work shall be predicated on receipt of the following from the Contractor:

a) A revised schedule showing each task yet to be accomplished and the time line to accomplish each – until final completion.

b) The work force projections attached to each task listed per workweek.

c) The cost expenditures attached to each task summarized per each workweek.

d) Lien releases from each subcontractor, supplier, and vendor to which the Contractor has requested materials, equipment or any other service recognizing the payments received.

e) An Income and Expense Statement projecting how the Contractor will finance the reminder of the project.

Such suspension shall be without liability to the Contractor on the part of the Agency except as otherwise specified in 6-4.3. For purposes of 6-4.3, delays resulting from suspensions ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract, shall not be delays for which the Agency is responsible.

In the event that a suspension of Work is ordered as provided above, the Contractor, at the Contractor's expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of that suspension as provided in 5-7, and as specified in these Special Provisions. In the event that the Contractor fails to perform the work above specified, the Agency will perform that work and, if the suspension is due to Contractor's failure to carry out orders given or to perform any provision of the Contract, the cost thereof will be deducted from monies due or to become due the Contractor.

If a suspension of work is ordered by the Engineer, in accordance with this subsection, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in 1-2.

The suspension of Work shall not relieve the Contractor of the responsibilities as set forth in the Contract Documents.

6-7 TERMINATION OF THE CONTRACT FOR DEFAULT.

ADD the following:

In the event this Contract is terminated for grounds which are later determined not to justify a termination for breach, such termination shall be deemed to constitute a Termination of the Contract for Convenience pursuant to 6-8.

6-8 TERMINATION OF THE CONTRACT FOR CONVENIENCE.

DELETE in its entirety and SUBSTITUTE with the following:

The Agency reserves the right to terminate the Contract at any time upon a determination by the Engineer that termination of the Contract is in the best interest of the Agency.

If the Agency elects to terminate the Contract, the termination of the Contract and the total compensation payable to the Contractor shall be governed by the following:

a) The Engineer will issue the Contractor a signed written notice, specifying that the Contract is to be terminated. Upon termination of the Contract, the Contractor will be relieved of further responsibility for damage to the Work (excluding materials) as specified in 4-2 of the Standard Specifications, 5-11 of these Special Provisions and, except as otherwise directed in writing by the Engineer, the Contractor shall:

    1) Stop all work under the Contract except that specifically directed to be completed prior to Acceptance.

    2) Perform work the Engineer deems necessary to secure the project for termination.

    3) Remove equipment and plant from the site of the Work.

    4) Take action that is necessary to protect materials from damage.

    5) Notify all subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.

    6) Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the Work and not yet used in the Work, including its storage location, and such other information as the Engineer may request.

    7) Dispose of materials not yet used in the Work as directed by the Engineer. It shall be the Contractor's responsibility to provide the Agency with good title to all materials purchased by the Agency hereunder, including materials for which partial payment has been made as provided in 7-3.2 and with bills of sale or other documents of title for those materials.

8) Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the Agency all the right, title, and interest of the Contractor under subcontracts or orders for materials terminated hereunder.

9) Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the Contract.

10) Take other actions directed by the Engineer.

b) Acceptance of the contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials. The Contractor shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:

1) The Contractor's responsibility for damage to materials for which partial payment has been made as provided in 7-3.2 and for materials furnished by the Agency for use in the Work and unused shall terminate when the Engineer certifies that those materials have been stored in the manner and at the locations the Engineer has directed.

2) The Contractor's responsibility for damage to materials purchased by the Agency subsequent to the issuance of the notice that the Contract is to be terminated shall terminate when title and delivery of those materials has been taken by the Agency.

When the Engineer determines that the Contractor has completed the Work under the Contract directed to be completed prior to termination and such other work as may have been ordered to secure the project for termination, the Engineer will formally accept the Contract, and immediately upon and after the acceptance by the Engineer, the Contractor will not be required to perform any further work thereon.

c) Termination of the Contract shall not relieve the surety of its obligation for any just claims arising out of the work performed.

d) Where Agency terminates the Contract for Agency’s convenience and not due to the fault of Contractor, the total compensation to be paid to the Contractor shall be determined by the Engineer based on the following:

1) The reasonable cost to the Contractor, without profit, for all work performed under the contract, including mobilization, demobilization, and work done to secure the project for termination. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials, and for other appropriate credits against the cost of the work. When, in the opinion of the Engineer, the cost of a contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the Plans and Specifications and the excessive actual cost shall be disallowed.

2) A reasonable allowance for profit on the cost of the work performed as determined under part (1) above, provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed 4 percent of the cost.

3) The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the Agency or otherwise disposed of as directed by the Engineer.

4) A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

All records of the Contractor and the Contractor's subcontractors, necessary to determine compensation in conformance with the provisions in this Section 6-8, shall be open to inspection or audit by representatives of the Agency at all times after issuance of the notice that the Contract is to be terminated and for a period of 3 years, thereafter, and those records shall be retained for that period.

After acceptance of the Work by the Agency, the Engineer may make payments on the basis of interim estimates pending issuance of the final estimate in conformance with the provisions in 7-3.2 and 7-6, when, in the Engineer's opinion, the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the final estimate shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

THE PROVISIONS IN THIS SECTION 6-8 SHALL BE PHYSICALLY INCLUDED IN ALL SUBCONTRACTS.

6-9 LIQUIDATED DAMAGES. *DELETE in its entirety and SUBSTITUTE with the following:*

Liquidated damages shall be as specified in the Contract.

SECTION 7 – MEASUREMENT AND PAYMENT

REVISE as follows:

***7-2* LUMP SUM WORK.** *DELETE 2nd paragraph in its entirety.*

ADD:

7-2.1 Detailed Schedule. The Contractor shall furnish the Agency a cost break-down for all contract lump sum items. Cost break-down tables shall be submitted to the Agency Representative for acceptance within fifteen (15) days after award of Contract. Cost break-down tables will be approved, in writing, by the Agency Representative before any partial payment will be made for the applicable items involved.

The Contractor shall determine the quantities required to complete the Work shown on the Plans. The quantities and their values shall be included in the cost break-downs submitted to the Agency Representative for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

The sum of the amounts for the line items of work listed in each cost break-down table for each lump sum item shall be equal to the contract lump sum price bid. Overhead and profit shall be included in each individual line item of work listed in a cost break-down table.

No adjustment in compensation will be made in the contract lump sum prices due to differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the Work as shown on the plans and as specified in the Special Provisions.

Individual line item values in the approved cost break-down tables will be used to determine partial payments during the progress of the Work and as the basis for calculating an adjustment in compensation for the contract lump sum items due to changes in line items of work ordered by the Engineer. When the total of ordered changes to line items of work increases or decreases the lump sum price bid by more than twenty-five percent, the adjustment in compensation for the applicable lump sum item will be determined in the same manner specified for increases and decreases in the total pay quantity of an item of work in Section 3 of the Standard Specifications and the Special Provisions.

7-3 PAYMENT.

7-3.1 General. *ADD the following at the end of the 2nd paragraph:*

The cost of items of work not listed in the “Schedule of Work” in the Bidders Proposal shall be considered to be included in the cost of the other work that is listed and no additional compensation will be allowed therefor.

When an item of work is designated as (F) or (S-F) in the “Schedule of Work,” the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised,

and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions. If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the "Schedule of Work" shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the Plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the "Schedule of Work" for a final pay item and the quantity or summation of quantities for the same item shown on the Plans, payment will be based on the quantity shown in the "Schedule of Work."

ADD:

7-3.1.1 Application for Payment. The Contractor shall use the City of Irvine Certified Invoice for Progress Payment Form; furnished to the Contractor. The Contractor shall type the required information, follow the schedule of work and bid prices in accepted Bidder's proposal for unit price contract, execute certification by signature of an authorized officer, use data on accepted Schedule of Values for lump sum work, provide dollar value in each column for each line item for portion of work performed, list each authorized Change Order number and dollar amount and adjusted Contract Price, and obtain the Agency Representative concurrence on invoiced amounts prior to submittal for payment.

The Contractor shall follow the following submittal procedures: Submit original and one (1) copy of each Application for Payment at times stipulated in 9-3.2; submit under transmittal letter; include submittal date, project title and number and submit updated Progress Schedule with Application for verification of progress. Incomplete application for payment will be rejected.

When Agency Representative requires substantiating information, the Contractor shall submit data justifying line item amounts in question.

The Contractor shall provide one copy of data with cover letter for each copy of submittal, show application number and date, and line item by number and description.

7-3.2 Partial and Final Payment. *DELETE in their entirety 1st and 2nd paragraphs and SUBSTITUTE with the following:*

Payment for services will be made monthly on approved invoices, with payment terms of net thirty (30) days upon receipt of invoice. The Contractor shall submit invoices within fifteen (15) days from the end of each month on the form (Certified Invoice for Progress Payment) provided by the Agency. This estimate shall include the value of the total amount of the work completed by the Contractor during the calendar month previous to that in which the estimate is made.

When the Work has been completed to the satisfaction of the Engineer, the Contractor shall make a final estimate of the total amount of work done thereunder and the amount to be paid therefor under the terms of the Contract and shall certify to the Agency the amount of the final estimate. If the Agency finds the Work has been completed according to the Contract, the Agency will accept the work, will file a notice of completion, and will pay the entire sum so found to be due after deducting therefrom all previous payments and all amounts to be retained under the provisions of the Contract and upon receiving signed unconditional releases upon final payment from all subcontractors and material suppliers. All prior progress estimates and payments shall be subject to correction in the final estimate and payment. The project retention release will not be due and payable until the expiration of the 60 days from the date of filing a notice of completion of the Work by the Agency.

Interest penalties are not required on payment delays due to disagreement between the Agency and Contractor over the payment amount or other issues involving contract compliance.

It is mutually agreed between the parties to the Contract that no certificate given or payment made under the Contract shall be conclusive evidence of performance of the Contract and no payment shall be construed to be an acceptance of any defective work or improper materials.

The Contractor further agrees that the payment and acceptance of the final amount due under the Contract shall release the Agency, the Agency Representative, the Engineer, and their consultants from any and all claims or liability arising out of the Contract.

ADD:

7-3.2.1 Agency's Right to Withhold Certain Amounts and Make Application Thereof. In addition to the amount which the Agency may retain under the above article on progress payments, the Agency may withhold a sufficient amount or amounts from any payment otherwise due to the Contractor as in the Agency's judgment may be necessary to cover:

a) Payments which may be past due and payable for just claims against the Contractor or any subcontractors for labor or materials furnished in or about the performance of the Work on the project under this Contract.

b) Estimated or actual costs for correcting defective work not remedied.

c) Amounts claimed by the Agency as forfeiture due to delay or other offsets.

d) Any other amounts the Agency is authorized to withhold under the Contract Documents or under applicable law.

The Agency may apply such withheld amount or amounts to the payment of such claims in its discretion. In so doing, the Agency shall be deemed the agent of the Contractor and any payments so made by the Agency shall be considered as a payment made under the Contract by the Agency to the Contractor, and the Agency shall not be liable to the

Contractor for such payment made in good faith. Such payments may be made without prior judicial determination of the claim or claims. The Agency will render to the Contractor a prior account of such funds disbursed in behalf of the Contractor.

ADD:

7-3.2.2 Substitution of Securities. Upon the Contractor's request, the Agency will make payment of funds withheld from progress payments pursuant to the requirements of Public Contract Code Section 22300 if the Contractor deposits in escrow with a bank acceptable to the Agency, securities eligible for the investment of State funds under Government Code Section 16430 or bank or savings and loan certificates of deposit, upon the following conditions:

a) The Contractor shall bear the expense of the Agency and the Escrow Agent in connection with the escrow deposit made.

b) Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this section.

c) The Contractor shall enter into an escrow agreement satisfactory to the Agency, such agreement shall include provisions governing inter alia;

    1) The amount of securities to be deposited,

    2) The providing of powers of attorney or other documents necessary for the transfer of the securities to be deposited,

    3) Conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to, termination of the Contractor's control over the Work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the Contract,

    4) Decrease in value of securities on deposit, and

    5) The termination of the escrow upon completion of the Contract.

d) The Contractor shall obtain the written consent of the surety of such agreement.

7-3.4 Mobilization DELETE in its entirety and SUBSTITUTE with the following:

7-3.4.1 General. Mobilization shall consist of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, materials and incidentals to the project site necessary for work on the project and for all other work and operations which must be performed or costs incurred including bonds, insurance, and financing prior to beginning work on the various contract items on the project site.

Mobilization shall also include the cost, time and labor to move the necessary construction equipment to and from the job site, supervisory time on the job by the Contractor's personnel to keep the construction site in a safe condition, and all other related work as required for all non-working days during the course of construction. Contractor is responsible for securing an adequate storage site for equipment and materials.

The Contractor shall have on the work site at all times, as its agent, a competent English speaking superintendent capable of reading and thoroughly understanding the plans, specifications, other related documents, and directions from Agency's Representative.

7-3.4.2 Measurement and Payment. Mobilization is eligible for partial payment if the Contract includes a bid item for mobilization. Payment for Mobilization shall be per the **Lump-Sum (LS)** price bid for **Mobilization/Demobilization** and shall include obtaining and paying for all permits and business licenses as required from the City of Irvine, State of California and other agencies. The City of Irvine will waive its permit fee. The Contractor shall comply with the requirements specified by each license or permit. No payment for Mobilization will be made until the Contractor's Construction Schedule has been submitted, reviewed and accepted and is current. Progress payments for this item shall be paid in accordance with the percentage completion of the project, and shall include the costs of such mobilization and administration for the entire contract period including construction schedule as specified in these specifications. Payments shall be made upon the basis of the following:

a) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5 percent or more of the original contract amount, 50 percent of the contract item price for mobilization or 5 percent of the original contract amount, whichever is the lesser, will be included in the estimate for payment.

b) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 10 percent or more of the original contract amount, the total amount earned for mobilization shall be 75 percent of the contract item price for mobilization or 7.5 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

c) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 20 percent or more of the original contract amount, the total amount earned for mobilization shall be 95 percent of the contract item price for mobilization or 9.5 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

d) When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 50 percent or more of the original contract amount, the total amount earned for mobilization shall be 100 percent of the contract item price for mobilization or 10 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

e) Upon completion of all work on the project, payment of any amount bid for mobilization in excess of 10 percent of the original contract amount shall be paid.

ADD:

7-4 RESOLUTION OF CONSTRUCTION CLAIMS. Any claims submitted by the Contractor against the Agency for Work covered by this Contract in the amount of $375,000 or less shall be subject to the procedures specified in Public Contract Code § 20104, *et seq*.

ADD:

7-5 PROMPT PAYMENT. In addition to requirements specified elsewhere, the following shall also apply: Subsection (f) of Section 20104.50 of the Public Contract Code, Article 1.7 of Part 3 of Division 2.

ARTICLE 1.7

§ 20104.50 Timely progress payments; legislative intent; interest; payment requests:

a) It is the intent of the Legislature in enacting this section to require all local governments to pay their Contractors on time so that these Contractors can meet their obligations. In requiring prompt payment by all local governments, the Legislature hereby finds and declares that the prompt payment of outstanding receipts is not merely a municipal affair, but is instead a matter of statewide concern.

b) It is the intent of the Legislature in enacting this article to fully occupy the field of public policy relating to the prompt payment of local governments' outstanding receipts. The Legislature finds and declares that all government officials, including those in local government, must set a standard of prompt payment that any business in the private sector which may contract for services should look towards for guidance.

c) Any local agency which fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from a contractor on a construction contract shall pay interest to the contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

d) Upon receipt of a payment request, each local agency shall act in accordance with both of the following:

    1) Each payment request shall be reviewed by the local agency as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.

    2) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request in not proper.

e) The number of days available to a local agency to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which a local agency exceeds the seven-day return requirement set forth in paragraph (2) of subsection (c).

f) For purposes of this article:

    1) A "local agency" includes, but is not limited to, a city, including a charter city, a county, and a city and county, and is any public entity subject to this part.

    2) A "progress payment" includes all payments due Contractors, except that portion of the final payment designated by the Contract as retention earnings.

3) A payment request shall be considered properly executed if funds are available for payment for the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the local agency.

g) Each local agency shall require that this article, or a summary thereof, be set forth in the terms of any contract subject to this article.

7-6 DESCRIPTION OF CONTRACT ITEMS. The following special provision subsection numbers correspond to the Bid Item numbers.

The Contractor shall submit to the Engineer within 15 days after award of Contract, a detailed schedule of values for all lump sum bid items in the contract.

The unit prices and lump sum amounts to be paid for under the bid items listed in the Proposal shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals necessary for the completion of the work and for performing all work contemplated and embraced under the Contract, in accordance with the Plans and Specifications. This shall include the Contractor's costs involved with bonding, insurance, worker's compensation, overhead, financing, obtaining required permits.

Payment for all work shall be included in the various bid items. No additional compensation shall be made, therefore. Work associated with each bid item shall include, but not be limited to the following description of bid items:

7-6.1 MOBILIZATION/DEMOBILIZATION. (Bid Item No. 1)

Mobilization shall consist of preparatory work and operations including all of the labor, equipment, tools, supplies, costs, arrangements, and others that are necessary for the movement of personnel, equipment, materials, and incidentals to the project site necessary for work on the project and for all other work and operations which must be performed including, but not limited to**, bonds, insurance, permits, arranging and coordinating with the site furniture manufacturer, deferred plan submittals, securing an adequate storage site for equipment and materials, temporary 6' high screened construction fencing, BMP, temporary traffic control, water pollution control (WPCP), erosion control plan,** financing prior to beginning work on the various contract items on the project site, and development of construction schedule per Section 6-1.

The cost of time, materials, and labor to move the necessary construction equipment to and from the site, supervisory time on the job by the Contractor's personnel to keep the construction site in a safe condition, and all other related work as required at all times and for all non-working days during the construction period shall have been included in the bid.

MEASUREMENT AND PAYMENT

Payment for **Mobilization/Demobilization** shall be included in the **LUMP SUM (LS)** for mobilization and demobilization and shall be considered full compensation for furnishing all labor, materials, signs, tools, equipment and incidentals, and all other items that are not mentioned here, but are required by the Contract to complete the work as indicated in the Contract Documents. No additional compensation shall be allowed thereof.

7-6.2 SITE IMPROVEMENTS (Bid Item No. 2)

Site improvements shall be constructed to the lines and grades, in conformance with the Civil and Architectural plans, Greenbook Standard Specifications, these Special Provisions, Appendix A-C, and as directed by City Engineer.

Site improvements shall include full compensation for furnishing all labor, materials, tools, and equipment to perform all Civil and Architectural work necessary to install all site improvements per plans and specifications including but not **limited to demolition and site clearing, disposal of materials, tree removals, earthwork, grading, pavement removal, storm drain improvements, 6" reinforced concrete over 6" AB (concrete pad) , and 6" wide retaining curb, decomposed granite paving with stabilizer and redwood header**.

Material quantities are **estimated** below:

Demolition and Site Clearing	1	LS
Tree Removals	10	EA
6" Dia. PVC SDR-35 Drain Pipe	45	LF
8" Dia. PVC SDR-35 Drain Pipe	80	LF
10" Dia. PVC Pipe	117	LF
12" Area Drain (Hardscape)	2	EA
24"x24" Brooks Drain Box with Grate	14	EA
Storm Drain Cleanout	2	EA
Remove Top of Ex. Drain Inlet & Place Lid	4	EA
Connect Proposed SD to Ex. Storm Drain	11	EA
6" Wide Retaining Curb	50	LF
6" Reinforced Concrete over 6" AB (Pedestrian Concrete)	24	SF
Decomposed Granite Paving with Stabilizer	22,774	SF
Redwood Header	1,594	LF

*Estimated quantities are provided for references only.

MEASUREMENT AND PAYMENT

Payment for **Site Improvements** shall be included in **the Lump Sum (LS)** for site improvements and shall be considered full compensation for furnishing all labor, materials, signs, tools, equipment and incidentals, and all other items that are not mentioned here, but are required by the Contract to complete the work as indicated in the Contract Documents. **No additional compensation shall be allowed thereof. Estimated quantities are provided for references only. Actual quantities may vary and shall not affect contract lump sum price.**

7-6.3 SITE FURNITURE. (Bid Item No. 3)

Work under this bid item shall include all costs associated to furnish and install of all site furniture per these Special Provisions, Appendix A-C, and Section 204 Dry Placed Stone, Section 900 Site Furnishings and as required by product manufacturers installation instructions. Material quantities are **estimated** below:

Picnic Seating Area with Footing	3	EA
Stone Seating Bench	6	EA
Stepping Stone	1	EA
Stone Bridge	1	EA
Dry Creek Rip Rap	1,082	SF
3’ Diameter Landscape Boulder	26	EA
5’ Diameter Landscape Boulder	28	EA

*Estimated quantities are provided for reference only.

MEASUREMENT AND PAYMENT

Payment for the **Site Furniture** shall be paid at the contract price **Lump Sum (LS)** as indicated in the Bid Schedule and shall be considered full compensation for furnishing labor, materials, tools, equipment, fittings, footings, hardware, and incidentals for doing all work involved in hauling, lifting, assembling for the installation of all Site Furniture complete, permanently attached in place as shown in the Contract Documents and Manufacturer’s instructions. **No additional compensation shall be allowed thereof. Estimated quantities are provided for references only. Actual quantities may vary and shall not affect contract lump sum price.**

7-6.4 LANDSCAPE/IRRIGATION IMPROVEMENTS (Bid Item No. 4)

Work under this bid item shall include full compensation for furnishing all labor, materials, tools, and equipment to perform all landscape and irrigation per plans and specifications including but not limited to **soil preparation and fine grading, weed abatement, hydroseed, landscape plantings, irrigation system, furnishing and installation of the trees, shrubs, and mulch** of the species and size indicated in the construction documents and of a nursery standard size and quality as prescribed in these Special Provisions and Appendix A-C.

Landscape and Irrigation material quantity **estimates** are as follows:

Soil Prep and Fine Grading	22,590	SF
Weed Abatement	22,590	SF
Tree – 24” Box	9	EA
Tree – 36” Box	13	EA

Tree – 48” Box	7	EA
Shrubs – 1 Gallon	678	EA
Shrubs – 5 Gallon	626	EA
Shrubs – 15 Gallon	65	EA
Wood Mulch – 3” Layer	15,595	SF
Hydroseed	43,230	SF
Bubblers	87	EA
Irrigation Valves	12	EA

*Estimated quantities are provided for reference only.

All trees located less than 10’ from hardscape shall have a 24” deep linear root barrier x 2mm thick, minimum 15’ length along the hardscape edge.

The contractor shall field verify the location of the existing mainline and control wires to be relocated outside of proposed paving areas. Irrigation modifications shall conform to the City of Irvine standard plans and details. The contractor shall prepare as-built plans including mainline, wires, valve, laterals, and head layout to provide head-to-head irrigation coverage. All work shall conform to Special Provisions and Appendix A-C.

MEASUREMENT AND PAYMENT

Payment for **Landscape/Irrigation Improvements** shall be paid for at the contract price **Lump Sum (LS)** as set forth in the bid schedule and shall include full compensation for all labor, materials, tools, equipment, and incidentals, and all other items that are not mentioned here, but are required by the Contract to complete the work as indicated in the Contract Documents. **No additional compensation shall be allowed thereof. Estimated quantities are provided for references only. Actual quantities may vary and shall not affect contract lump sum price**

7-6.5 MAINTENANCE AND PLANT ESTABLISHMENT. (Bid Item No. 5)

Work under this bid item shall include all costs associated with the Maintenance and Plant Establishment per these Special Provisions, Appendix A-C, and as directed by City Engineer.

MEASUREMENT AND PAYMENT

Payment for **Maintenance and Plant Establishment** period shall be made at the contract **Lump Sum (LS)** price and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to accomplish the work, complete in place, conforming to the requirements herein, including but not limited to, all labor, materials, tools, equipment, mulching, removals and incidentals, and all other items necessary to establish and maintain the landscaping for the entire duration of the Post Installation Maintenance period within the limits as shown in the Contract Documents, as specified in the Standard Specifications and these Special Provisions, as approved by

the City Engineer and no additional compensation will be allowed therefor. If an acceptable rate of growth has not been demonstrated within 30 days of planting, Contractor shall be responsible to determine the appropriate horticultural practices necessary to obtain acceptable growth. Contractors shall obtain agronomic soils testing of all areas not showing acceptable growth and shall provide copies of the test results to the City Engineer.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

DELETE in its entirety, not part of this project.

PART 2 – CONSTRUCTION MATERIALS

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

REVISE as follows:

201-1.3.3 Concrete Specified by Class and Alternate Class. *ADD the following to Table 201-1.3.3:*

Headwall, Concrete Class 560-C-3250

SECTION 202 – CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing steel bars, wire fabric or rod mats for cast-in-place concrete.
2. Support chairs, bolsters, bar supports, and spacers for supporting reinforcement.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 033000 - Cast-in-Place Concrete.

1.2 REFERENCES

A. AASHTO M 254: Standard Specification for Corrosion Resistant Coated Dowel Bars.

B. ACI 301: Specifications for Structural Concrete for Buildings.

C. ACI 315: Details and Detailing of Concrete Reinforcement.

D. ASTM A 82: Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

E. ASTM A 185: Standard Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

F. ASTM A 615: Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

G. ASTM A 706: Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

H. ASTM C 1116: Standard Specification for Fiber-Reinforced Concrete and Shotcrete.

I. ASTM D 3963: Standard Specification for Epoxy-Coated Reinforcing Steel.

J. AWS D1.1: Structural Welding Code Steel.

K. AWS D1.4: Structural Welding Code Reinforcing Steel.

L. CRSI Document: Manual of Standard Practice. American Concrete Institute (ACI) 303R - Guide to Cast-In-Place Architectural Concrete Practice.

1.3 SUBMITTALS

A. Submittals for Review:

1. Manufacturer's Certificate: Submit mill test certificates of supplied concrete reinforcement, indicating physical and chemical analysis.
2. Welder's certification.
3. Shop Drawings.

    a. Indicate sizes, spacings, locations, and quantities of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting, and spacing devices.

4. When required, prepare shop drawings by an engineer who complies with project’s state licensing law and is acceptable to agency having jurisdiction.

1.4 QUALITY ASSURANCE

A. Perform concrete reinforcement work per CRSI Manual of Standard Practice.

B. Comply with ACI 301.

C. Welders: Certified to comply with AWS D1.1 or AWS D1.4 as applicable. Perform Work in accordance with ACI 303R.

1.5 ACCEPTANCE

A. Unless specified otherwise, chairs for supporting reinforcement in flat slabs are spaced as follows.

1. 3 feet maximum for No. 5 and smaller bars.

2. 5 feet maximum for bars larger than No. 5.

B. Dowels are placed on dowel baskets and properly aligned.

C. Epoxy and galvanized coatings are not chipped or cut. Ends of cut bars are epoxy coated or galvanize painted prior to placement.

D. Minimum covering over reinforcement is as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fiber Reinforcement: ASTM C 1116 glass.

B. Reinforcing Steel: Deformed 60 ksi yield grade steel, ASTM A 615 and supplementary requirements S1 or ASTM A 706 for welding.

C. Welded Steel Wire Fabric: ASTM A 185 plain type in flat sheets or coiled rolls. Dimensions of the mesh 4”x 4” or as indicated.

D. Stirrups: ASTM A 82 steel.

E. Plain Dowel Bars for Expansion Joints: Smooth grade 60 ksi yield grade steel, ASTM A 615.

1. Galvanized or epoxy coated in roadway pavements.
2. Provide metal dowel cap at one end of dowel to permit longitudinal movement of dowel within concrete section. Design caps with 1 end closed.
3. Provide for movement equal to joint width plus 1/2 inch.
4. For load transfer bars, paint with 1 coat of paint conforming to AASHTO M 254 and coat 1/2 with grease.

F. Coatings for Corrosion Protection:

1. Epoxy coat, ASTM D 3963.
2. Galvanized, ASTM A 767.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type or an acceptable patented system. Install formwork in accordance with Section 033000 except as modified below.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.3 FABRICATION

A. Fabricate reinforcement, ACI 315 providing for concrete cover.

B. Locate reinforcing splices not indicated on Drawings at points of minimum stress. Indicate location of splices on shop drawings.

C. Weld reinforcing bars; with AWS D1.4.

PART 3 - PLACING

A. All reinforcement to be free of loose mill scale, loose or thick rust, dirt, paint, oil or grease.

B. Place all reinforcement in the exact position indicated. With tie wire, tie bars together at all intersections except where spacing is less than 12 inches in each direction, in which case tie alternate intersections.

C. Maintain the distance from vertical forms and between layers of reinforcement by means of prefabricated chairs, ties, hangers, or other approved devices. Placing

and fastening of reinforcement in each section of the Work must be approved before concrete is placed.

D. Overlap sheets of metal mesh one square plus 6 inches to maintain a uniform strength. Securely fasten at the ends, edges, and supports to maintain clearances.

E. Flat Slab Work:

1. Support reinforcing steel of formed flat slabs with metal chairs, precast concrete blocks or other slab bolsters.
2. Size chairs or bolsters to position the steel in the exact location indicated.
3. Space chairs for supporting the top steel and bolsters for supporting the bottom steel not more than 5 feet on centers in each direction.
4. Plastic or epoxy coat that portion of the metal support in contact with the forms to prevent rust.
5. Tie down deck steel to beams or forms at regular intervals of not more than 5 feet on centers along the beams or forms to prevent movement of the steel during concrete placement.

3.2 SPLICING

A. Furnish all reinforcement in the full lengths indicated unless otherwise permitted. Splicing of bars, except where indicated is not permitted without written approval. Stagger splices where possible. Place reinforcing in accordance with Section 032000.

B. Unless indicated otherwise, overlap reinforcing bars a minimum of 30 diameters to make the splice. In lapped splices, place the bars and wire to maintain the minimum distance for clear spacing to the surface of the concrete.

C. Do not use lap splices on bars greater in diameter than No. 11 unless approved.

D. Weld reinforcing steel only if indicated or if authorized in writing. Weld in conformance to AWS D1.4.

E. Do not bend reinforcement after embedding in hardened concrete.

F. Do not permit reinforcement or other embedded metal items bonded to the concrete, to extend continuously through any expansion joint, except dowels in floors bonded on only one side of joints.

3.3 PLACING EMBEDDED ITEMS

A. Place all sleeves, inserts, anchors and embedded items prior to concrete placement. Temporarily fill voids in embedded items to prevent entry of concrete.

B. Give all trades whose work is related to the concrete section ample notice and opportunity to introduce or furnish embedded items before concrete placement.

SECTION 203 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Concrete formwork
2. Concrete reinforcement
3. Cast-in-place concrete 4. Concrete finishing

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Section 321314 – Concrete Paving for Landscape Flatwork.

1.2 REFERENCES

A. American Concrete Institute International (ACI):

1. 301 Structural Concrete for Buildings
2. 302.1 Guide for Concrete Floor and Slab Construction
3. 305R - Hot Weather Concreting
4. 306R - Cold Weather Concreting
5. 318 Building Code Requirements for Structural Concrete

B. ASTM International (ASTM):

1. A615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
2. C33 - Standard Specification for Concrete Aggregates.
3. C94 - Standard Specification for Ready Mixed Concrete.
4. C150 - Standard Specification for Portland Cement.
5. C171 - Standard Specification for Sheet Materials for Curing Concrete.
6. C260 - Standard Specification for Air Entraining Admixtures for Concrete.
7. C309 - Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete.
8. C494 - Standard Specification for Chemical Admixtures for Concrete.
9. C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete.
10. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

C. Concrete Reinforcing Steel Institute (CRSI) - Manual of Practice.

1.3 SUBMITTALS

A. Submittals for Review:

B. Shop Drawings: Indicate reinforcing sizes, spacings, laps, locations, and quantities of reinforcing bars, wire fabric, and accessories. Show complete layout plan for each layer of reinforcing.

C. Concrete Mix Designs: Submit for each type of concrete.

1.4 QUALITY ASSURANCE

A. Concrete Mix Design: In accordance with ACI 301, Method 1 or 2.

1.5 DELIVERY, STORAGE AND HANDLING

A. Mix and deliver concrete to project ready mixed in accordance with ASTM C94.

B. Schedule delivery so that pours will not be interrupted for over 15 minutes.

C. Place concrete onsite within 90 minutes after proportioning materials at batch plant.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Formwork:

1. Forms: Wood, metal, reusable glass fiber type, tight fitting.
2. Fasteners: Size as required, sufficient strength to maintain forms in place while concrete is placed.
3. Form release agent: Non-staining, colorless mineral oil that will not absorb moisture, stain concrete, or impair adhesion of coatings to be applied to concrete.

B. Reinforcement:

1. Bars: ASTM A615/A615M, deformed billet steel.
2. Chairs, bolsters, bars supports, and spacers:
3. Sized and shaped for support of reinforcement during concrete placement.
4. Plastic coated steel for surfaces exposed to weather.
5. Tie wire: Annealed steel, 16 gage minimum.

C. Concrete Materials:

1. Portland cement: ASTM C150, Type I or III as applicable.
2. Aggregates: ASTM C33, clean, hard, durable, and uncoated.
   a. Fine: Natural sand, free from silt, loam, and clay.
   b. Coarse: Crushed stone, maximum size No. 467, Table No. 2.
3. Admixtures:

a. Water reducing or water reducing/set retarding: ASTM C494, Type A or D.
b. Air entraining: ASTM C260.

4. Fly ash: ASTM C618, maximum 2 percent loss on ignition.
    a. Unless prohibited by local municipality

D. Expansion Joint Filler: ASTM D1752, Type 1, non-asphaltic.

E. Curing Materials:
1. Curing compound: ASTM C309, Type 1.
2. Curing paper: ASTM C171, waterproof paper or polyethylene film.

F. Bonding Agent: Two component modified epoxy resin.

G. Water: Clean and potable.

2.2 MIXES

A. Proportions: In accordance with ACI 301.

B. Design concrete to yield following characteristics:
1. Minimum 28 day compressive strength: 3000 PSI.
2. Slump: 3 to 5 inches.
3. Air entrainment: 4 to 6 percent air by volume of concrete.
4. Fly ash content: Maximum 20 percent by weight of cementitious material in mix.
    a. Unless prohibited by local municipality

2.3 FABRICATION

A. Reinforcing: In accordance with CRSI Manual.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove water and debris from forms and excavations before concrete is deposited.

B. Provide devices for conveying concrete to point of deposit to prevent disturbing forms or reinforcing or segregating concrete.

C. Clean reinforcement of loose rust, mill scale, dirt, oil, and other materials that could reduce bonding.

D. Prepare previously placed concrete surfaces by cleaning with steel wire brush and applying bonding agent in accordance with manufacturer's instructions.

3.2 INSTALLATION OF FORMWORK

A. Construct forms tight to prevent loss of mortar.

B. Install chamfer strips in corners of forms to produce beveled edges on permanently exposed surfaces.

C. Clean contact and screed surfaces of hardened concrete and foreign materials prior to assembly.

D. Apply form release agent to contact surfaces; follow manufacturer's instructions.

3.3 INSTALLATION OF REINFORCEMENT

A. Install in accordance with ACI 301 and CRSI Manual.

3.4 PLACEMENT OF CONCRETE

A. Place concrete in accordance with ACI 301 and ACI 318.

B. Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.

C. Deposit concrete as nearly as possible in its final position to minimize handling and flowing.

D. Place concrete continuously between predetermined expansion, control, and construction joints.

E. Do not place partially hardened, contaminated, or retempered concrete.

F. Do not allow concrete to free fall over 8 feet; provide tremies, chutes, or other means of conveyance.

G. Consolidate concrete with mechanical vibrating equipment. Hand compact in corners and angles of forms.

3.5 FORM REMOVAL

A. Remove forming materials in manner that will not damage surfaces of concrete; patch work damaged during form removal operations.

3.6 FINISHING

A. Formed Surfaces: While concrete is still green:

1. Patch voids over 1/2 inch in diameter or depth.

2. Remove fins and other protrusions by rubbing with carborundum stone.

B. Horizontal Surfaces: After screeding, finish surfaces with heavy broom finish.

C. Allowable Tolerances: In accordance with ACI 301.

3.7 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Provide artificial heat to maintain temperature of concrete above minimum specified temperature for duration of curing period.

D. Keep forms sufficiently wet to prevent cracking of concrete or loosening of form joints.

3.8 CURING

A. Cure concrete in accordance with ACI 308:

1. Horizontal surfaces:

a. Surfaces to receive additional toppings or setting beds: Use curing paper method.

b. Other surfaces: Use either curing paper or curing compound method.

2. Vertical surfaces: Use either wet curing or curing compound method.

3.9 CLEANING

A. Remove efflorescence, stains, oil, grease, and foreign materials from exposed surfaces.

SECTION 204 – DRY PLACED STONE

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Stone boulders

2. Bedding course

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. ASTM International (ASTM) C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

1.3 SUBMITTALS

A. Submittals for Review:

1. Samples: Minimum 12 x 12 inch samples stone samples showing color and surface finish.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years documented experience in work of this Section.

B. Obtain stone from a single quarry and from the same area within the quarry.

C. Mockup:

1. Size: Minimum of two full-size stones.

2. Show stone color and texture range.

3. Locate where directed.

4. Approved mockup may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store stone off ground; prevent contact with materials that could cause staining or damage.

B. Store aggregate to prevent inclusion of foreign matter.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Collected Stone:

1. Type, size, and color: Refer to Materials Schedule in drawings.

2. Free from defects that could impair its structural integrity or function. Inherent variations characteristic to quarry from which it is obtained are acceptable.

3. Color within range of samples approved by Landscape Architect.

B. Aggregate: Crushed stone or gravel, free of shale, friable materials, and debris, graded as follows per ASTM C136:

14. SIEVE SIZE PERCENT PASSING

15. 1 inch 100

16. 3/4-inch 90 to 100

17. 1/2 inch 20 to 50

18. 3/8 inch 0 to 15

19. No. 4 0 to 5

PART 3 - EXECUTION

3.1 PREPARATION

A. Establish lines, levels, and coursing. Protect from disturbance.

3.2 INSTALLATION

A. Excavate to required lines and elevations. Form bottom of excavations smooth and level.

B. Place aggregate bedding course to minimum 4-inch depth. Compact to minimum 90 percent relative density.

C. Set stone dry on bedding course.

D. Final locations and arrangement are subject to Landscape Architect‘s approval.

3.3 CLEANING

A. Clean stone with detergent and water applied with fiber brush.

B. If initial cleaning does not produce acceptable results, apply cleaner in accordance with manufacturer's instructions.

1. Protect adjacent surfaces.

2. Thoroughly rinse surfaces with clean water after completion of cleaning; remove traces of cleaning solution.

SECTION 205 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Shop fabricated metal panels.

B. Related Sections:

1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American Welding Society (AWS) D1.1 - Structural Welding Code - Steel.

B. ASTM International (ASTM):

1. A36/A36M - Standard Specification for Carbon Structural Steel.

2. A123/A123M - Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.

3. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

4. A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

5. A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

6. A325 – Standard Specification for Structural, Bolts, Steel, Heat Treated, 120/105 ksi, Minimum Tensile Strength; 2000.

7. A153/A 153M – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Hardware; 2000.

1.3 SUBMITTALS

A. Shop Drawings for Review:

1. Show dimensions, metal thicknesses, finishes, joints, attachments, and relationship of work to adjacent construction. Verify measurements at the site.

2. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

3. Indicated welded connections using standard AWS welding symbols. Indicate net weld lengths.

4. Bear seal and signature of a registered State of Texas Engineer responsible for system design.

B. Product Data for Review:

1. Provide manufacturer's current catalog cuts, data sheets and installation instructions for hardware.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Minimum 2 years documented experience in work of this Section.

B. Field Measurements: Make field measurements as required prior to fabrication and installation.

C. Shop Assembly: Preassemble items in shop. No field welding will be allowed.

D. Coordination: Where concrete, masonry or other materials must be set to exact locations to receive work, furnish assistance and direction necessary to permit other trades to properly locate their work.

E. Templates and Built-ins: Furnish anchors, fastenings, sleeves, setting templates and layouts affecting or installed in the work of other trades.

F. Replacement: Replace damaged work at no cost to the owner

G. Perform work in accordance with ASTM E985.

PART 2 - PRODUCTS

2.1 MATERIALS – STEEL

A. Shapes: ASTM A36/A36M.

B. Plate: ASTM 283

C. Bar: ASTM A108

2.2 ACCESSORIES

A. Bolts, nuts and washers: ASTM 307.

B. Anchoring Cement: Non-shrink cementitious type.

2.3 FABRICATION

A. Fabricate from steel plate or beam stock of sizes indicated.

B. Make bends uniform and free from buckles and other defects.

C. Miter and cope intersections within 2 degrees, fit to within 1/8 inch.

D. Continuously weld connections. Welding to conform to AWS D1.1. Grind exposed welds smooth.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Fabricate components with joints tightly fitted and secured.

G. Accommodate for expansion and contraction of members and structure movement without damage to connections or members.

H. Provide anchors, plates, or angles required for connecting to structures.

I. Exposed Mechanical Fastenings: Provide flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

J. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

2.4 FINISHES

A. Shop Finishing: Galvanize items to minimum 2.0 ounces per square foot in accordance with ASTM A123/A123M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify measurements at the job.

B. Verify that field conditions are acceptable and are ready to receive work.

C. Notify Landscape Architect of condition or defects which would interfere with installation. Starting work implies acceptance or surfaces as satisfactory.

3.2 INSTALLATION

A. Install in accordance with approved Shop Drawings.

B. Set plumb and level, accurately fitted, free from distortion and defects.

C. Allow for erection loads, and for temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Mechanically fasten joints butted tight, flush, and hairline.

E. Installation Tolerances to a maximum offset from true alignment: 1/4-inch.

F. Field weld anchors as indicated on shop drawings.

1. Field welding above anchors is not allowed.

2. Faulty and Defective Welding: Chip out and replace welding showing cracks, slag, inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Remove, replace and re-weld, in shop, at no cost to the owner.

G. Bolted, Screwed and Riveted connections:

1. Bolts and Screws: Use bolts and screws for field connections only and as indicated on the Shop Drawings. Provide washers under heads and nuts. Draw nuts tight

and spot weld threads of permanent connection to prevent loosening. Use beveled washers where bearing is on sloped surfaces.

3.3 ADJUSTING

A. Clean and touch up galvanized coatings at welded and abraded surfaces in accordance with ASTM A780, Annex A2.

SECTION 206 – CONCRETE PAVING FOR LANDSCAPE FLATWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Concrete formwork.

2. Concrete reinforcement.

3. Concrete sidewalks.

4. Concrete stairs and steps.

5. Joint devices associated with concrete work.

6. Concrete curing.

C. RELATED SECTIONS

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. Section 312300 – Landscape Excavation and Fill.

3. Section 329119 – Landscape Grading.

1.2 REFERENCES

A. American Concrete Institute International (ACI):

1. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

2. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

3. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.

4. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988.

B. ASTM International (ASTM) (www.astm.org):

1. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2004.

2. ASTM C 33 - Standard Specification for Concrete Aggregates; 2003.

3. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2003.

4. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2003a.

5. ASTM C 150 - Standard Specification for Portland Cement; 2002a.

6. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2001.

7. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2001.

8. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds

for Curing Concrete; 2003.

9. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2004.

10. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (non-extruding and Resilient Bituminous Types); 1999.

11. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004.

1.3 SUBMITTALS

A. See Section 013300 – Submittal Requirements, for specific submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

C. Jobsite Mock-Up Samples: After approval of color/texture verification samples, cast one each 6-foot square x 4-inch-thick sample for each different color and texture. Simulate job conditions by casting sample panels adjacent to each other when plans indicate different colors and textures adjacent to each other. Join adjacent panels using detailed expansion joints. Include required joints and surface treatment.

1. Notify Landscape Architect seven days in advance of dates and times when mockups will be constructed.

2. Obtain Landscape Architect’s approval of mockup before starting construction.

3. Maintain approved mockups during construction in an undisturbed condition as a standard for judging completed pavement.

4. Demolish and removed approved mockups from the site when directed by Landscape Architect.

5. Approved mockups may remain as part of the completed Work.

D. Color Samples: Ground and expansion joint compounds/sealants.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

B. Obtain cementitious materials from same source throughout.

C. Follow recommendations of ACI 305R when concreting during hot weather.

D. Follow recommendations of ACI 306R when concreting during cold weather.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store new and reusable form lumber and form plywood under heavy waterproof coverings or where well protected from inclement weather.

B. Handle and store metal forms in such manner as to prevent damage by denting, warping, twisting and rusting.

C. Deliver reinforcing to site in easily handled bundles with identification tags securely wired into place. Store reinforcing to prevent damage and protect from corrosion and deformation.

1.6 PROJECT CONDITIONS

A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Form Materials:

1. Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion more than permitted tolerances.

a. Form Facing for Exposed Finish Concrete: Preformed plastic.

b. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings or applied finishes, such as paint, mastic, or mortar applied materials.

c. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2. Used form materials may be reused if they are thoroughly cleaned and acceptable finishes can be produced.

3. Moldings and Chamfer Strips: "C-Select or "Finish" Southern Pine, straight, sound, and free of knots and other defects.

4. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751).

B. Reinforcement:

1. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420); deformed billet steel bars; unfinished finish.

2. Welded Steel Wire Fabric: Not Permitted

3. Dowels: ASTM A 615/A 615M Grade 60 (420); deformed billet steel bars; unfinished finish.

4. Dowel Sleeves: Speed Dowel System, size as required for specified dowel diameter and length.

5. Tie-Wires: ASTM A82, 18 gauge minimum, black, annealed.

6. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. horizontal reinforcing, including welded wire fabric, shall be supported on approved chairs or supports.

7. Provide stainless steel, galvanized, plastic, or plastic-coated steel components for placement within 1-1/2 inches of weathering surfaces.

C. Concrete Materials:

1. Cement: ASTM C 150 Normal - Type I Portland type, grey color (unless noted otherwise in drawings).

2. Coarse Mix Aggregates: ASTM C 33.

a. Description: Hard, durable, uncoated, washed, graded, cleaned and screened crushed rock or gravel aggregate for regular weight concrete. Do not use crusher-run stone or bank-run gravel.

b. Grading: Do not use aggregate which has a maximum size exceeding 1/5 of the narrowest dimension between sides of forms of the member for which the concrete is to be used, nor larger than 3/4 of the minimum clear spacing between reinforcing bars. Do not use coarse aggregate which exceeds 1 inch for paving.

D. Fine Mix Aggregates: ASTM C 33.

1. Description: Clean, hard and durable sand. Do not use sand coated with injurious amounts of silt, loam, clay or other deleterious matter.

2. Grading:

20. Percent PassingSieve Size 21. 45 - 70 # 17

22. 15 - 30 # 50

23. 3 - 8 #100

E. Water: Clean, potable, and not detrimental to concrete.

F. Admixtures:

1. Air Entrainment Admixture: ASTM C 260.

2. Chemical Admixtures: ASTM C 494/C 494M, Type A - Water Reducing and Type D- Water Reducing and Retarding.

G. Coloring Agents:

1. Only commercially pure mineral pigments shall be used to produce desired color and shall not exceed ten (10%) percent of the cement content by weight.

2. Refer to Materials Schedule in Drawings for color specification.

H. Expansion Joint Materials:

1. Joint Filler: Preformed; Closed cell flexible foam joint filler containing no impregnated petroleum products.

a. Thickness: 1/4 inch.

b. Product: "Ceramar" as manufactured by W.R. Meadows.

2. Void Cap: Provide 'Sealtight Snap-Cap' 3/8" Width x 1/2" Depth, manufactured by

W.R. Meadows, or equal.

I. Joint Sealant: Gun-grade, polyurethane with a Shore "A" hardness of not less than 40 after 72 hours. Pacific Polymers, PRC, or approved equal.

1. Product: 'Elasto-thane 227 Hard Shore' manufactured by Pacific Polymers, Inc., or approved equal.

2. Color: To match adjacent concrete surfaces.

2.2 ACCESSORIES

A. Curing Compound: ASTM C 309, Type 1-D, Class A.

B. Liquid Surface Sealer: Provide Protecrete Densifier Plus Repeller manufactured by Applied Concrete Technology, Inc., 1840 North Ave., Arlington Heights, IL, 6004.

C. Surface Retarder: Water based polymer liquid type, pink color as selected from manufacturer's standard range. Provide E-CON manufactured by L&M Construction Chemicals, Inc., 14851 Calhoun Road, Omaha, NE 68152.

2.3 MIXES

A. Proportioning and mixing of cement, aggregate, admixture and water to attain required plasticity and strength shall be in accordance with ACI-304.

B. Concrete Mixture: Concrete mixtures shall be designed by an approved commercial testing laboratory at no expense to the Owner, using approved materials furnished by the Contractor to obtain concrete properties specified below.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Concrete Properties:

1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 3,500 psi.

2. Cement Content: Minimum 5.5 sacks per cubic yard.

3. Water-Cement Ratio: Maximum 70 percent by weight.

4. Total Air Content: 4 percent, determined in accordance with ASTM C 173/C 173M.

5. Maximum Slump: 4 inches.

E. Transit Mixers: Comply with ASTM C 94/C 94M.

2.4 FINISHES

A. Refer to Materials Schedule in Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Prepare subbase in accordance with Soils Engineer's recommendations.

B. Moisten base to minimize absorption of water from fresh concrete.

C. Notify Landscape Architect minimum 24 hours prior to commencement of concreting operations.

3.3 INSTALLATION

A. Forming:

1. Place and secure forms to correct location, dimension, profile, and gradient.

2. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support applied loads until concrete is cured, and for easy removal without damage to concrete.

3. Forms shall be constructed accurately to dimensions, plumb and true to line and grade. Forms shall be substantial, mortar tight and braced, and tied to maintain position and shape during placing of reinforcing and concrete. Wavy surfaces and bulged walls or slab surfaces resulting from settlement or springing of formwork will not be acceptable.

4. Do not re-use forms for exposed concrete surfaces. Verify that forms are clean before applying release agent. Coat wood forms with release agent before pouring.

5. Forms shall be constructed and assembled in such a manner that construction joints shall occur at approved locations.

6. The Contractor shall carefully examine Drawings and provide recesses and openings of proper sizes or shapes required or as may be directed by Landscape Architect for installation of work requiring openings.

7. Care shall be taken in details of forming, setting, reinforcing, mixing and placing concrete exposed in finish work to obtain smooth, even surfaces of dense concrete, and clean sharp rises and outside corners, except where tooled corners are indicated. Use of form oil will be required to prevent concrete from bonding to form. Vibrator shall be used when requested.

8. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

9. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

10. After forms have been placed and approved, the Contractor shall see that other trades have been properly notified and are given sufficient time to complete installation of their work. Placing of reinforcing steel shall proceed progressively with work of other

trades and each shall arrange their working schedules to avoid disturbing or moving of work already installed by one trade to admit the work of another. Each trade shall be entirely responsible for proper installation and securing of the work and each shall keep his work under observation during placing of concrete.

11. Forms shall remain in place long enough to allow concrete to set properly and the Contractor shall assume responsibility for removing same. shall supporting forms or shoring be removed until concrete has sufficient strength to carry its own weight and the load upon it with safety. (See Curing.)

B. Reinforcement:

1. Place reinforcement as indicated in Drawings.

2. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

3. Interrupt reinforcement at expansion joints.

4. Place reinforcement to achieve pavement and curb alignment as detailed.

5. Provide doweled joints at spacing indicated in Drawings with one end of dowel set in capped sleeve to allow longitudinal movement.

6. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

C. Placing Concrete:

1. Place concrete in accordance with ACI 304R.

2. Notify Landscape Architect not less than 24 hours prior to commencement of placement operations.

3. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

4. Concrete shall be deposited to require as little re handling as practicable. placing equipment shall be clean and free from hardened concrete.

5. Convey concrete from mixer to place of final deposit in one continuous operation and until entire unit being placed is complete. Maintain plasticity of concrete to flow readily into formwork and embed reinforcement without segregation of aggregates.

6. Use chutes of uniform shape and slope controlling concrete fall to not more than three (3") feet.

7. Place concrete continuously over the full width of the panel and between predetermined expansion, control, and construction joints. Do not break or interrupt successive pours such that cold joints occur.

8. Spade concrete thoroughly along forms and expansion joints, and work carefully into corners and around reinforcement. Tamp and screed to a dense mass. Vibrators may be used provided they are operated under experienced supervision and forms are constructed to withstand their action.

9. Place no partially hardened, contaminated or re tampered concrete.

10. Drag vibrators in horizontal position when consolidating thin concrete slabs. Do not use vibrators for concrete distribution.

11. Separate slabs on grade from vertical surfaces with joint filler.

12. Place concrete to pattern indicated in Drawings.

13. Apply surface retarder to exposed surfaces in accordance with manufacturer's instructions.

14. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Joints:

1. Expansion joints and edges:

a. Provide at the location and intervals as shown on the Drawings, and at locations where concrete abuts buildings, curbs, structures, walls, or other vertical surfaces.

b. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.

c. Install expansion joint void cap in accordance with manufacturer’s instructions. Set top to required elevations.

d. Secure to resist movement by wet concrete.

e. Joints and other edges shall be formed in the fresh concrete using an edging tool to provide a smooth uniform impression. joints shall be struck before and after brooming.

f. After the curing period, expansion joints shall be carefully cleaned and filled with approved joint compound to one-quarter (1/4") inch below paved surface in such a manner as to avoid spilling on paved surfaces or overflow from joint.

2. Tooled score joints:

a. Provide at the location and intervals as shown on the Drawings.

b. Joints shall be formed in the fresh concrete using a jointer to cut the groove so that a smooth uniform impression is obtained. joints and edges shall be struck before and after brooming.

3. Score joints:

a. Saw cut joints within 24 hours after placing. Use 1/4-inch-thick blade, cut into 1/4 depth of slab thickness, accurately constructed true to alignment and location as shown on the Drawings.

b. Extend saw cuts to the end of each concrete panel. Do not overlap cuts into adjacent concrete panels.

4. Construction Joints:

a. To secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and latency, if, and then roughened so that the aggregate will be slightly exposed over ninety (90%) percent of each two (2") inch square area. Such cleaning and roughening shall be done using suitable tools and methods, such as picks, wire brushes, wet sandblasting, etc., and shall be followed by re cleaning by means of a stream of clean water or compressed air.

b. The previously placed concrete at the joint shall be saturated with clean water and kept thoroughly wet overnight, after which pools shall be removed by an air jet. After free or glistening water disappears, the concrete shall be given a thorough coating of neat cement mixed to a suitable consistency. The coating shall be one-eighth (1/8") inch thick on vertical surfaces and one-quarter (1/4") inch thick on horizontal surfaces, and shall be well scrubbed in by means of stiff bristle brushes wherever possible. New concrete shall be deposited before the neat cement dries.

E. Finishing:

1. Reference Materials Schedule in Drawings for type of concrete finish and locations.

2. Broom Finish:

a. Shall be obtained by drawing a stiff bristled broom across a smooth-floated finish.

b. Direction of brooming to be perpendicular to direction of walk, or as otherwise shown on the Drawings.

3. Sandblast Finish:

a. Perform in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish.

1) Light Cut: Approximately one-sixteenth (1/16") inch depth or to expose the fine aggregate in the mix.

2) Medium Cut: Approximately one-eighth (1/8") inch depth or to slightly expose the large aggregate in the mix.

3) Heavy Cut: Approximately one-half (3/16") inch depth or to completely expose the large aggregate in the mix.

b. Blast corners and edge of patterns carefully, using back-up boards, to maintain a sharp, uniform, corner of edge line.

c. Maintain control of abrasive grit and concrete dust in each area of blasting. Clean up and remove expended abrasive grit, concrete dust, and debris at the end of each day of blasting operations.

F. Tolerances:

1. Surface Tolerance: Finished paving surfaces shall not vary more than one-quarter (1/4") inch measured with a ten (10") foot metal straightedge, except at grade changes. No birdbaths or other surface irregularities will be permitted. Correct irregularities as directed.

3.4 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014523 – Testing and Inspection Services.

1. Submit proposed mix design of each class of concrete to testing firm for review prior to commencement of concrete operations.

2. Tests of concrete and concrete materials may be performed as necessary to ensure conformance with specified requirements.

B. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50-cu yd. or less of concrete placed.

1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

D. concrete work shall be true to line and grade as indicated on the drawings. The Contractor shall be responsible for proper drainage, without birdbaths, on concrete paving surfaces. discrepancies or omissions on drawings, or conditions on the site, which prevent this Contractor from providing proper drainage shall be brought to the attention of the Owner in writing for correction or relief before work proceeds.

E. Do not embed piping, other than electrical conduit, in structural concrete. Locate conduit to maintain strength of structures at maximum. Verify size, length and location of electrical conduit.

3.5 CLEANING

A. General: areas shall be maintained in a clean and orderly manner. Debris, excess product and other rubbish shall be removed daily.

B. Upon completion of work, immediately remove from the premises surplus materials, tools, equipment, rubbish and debris resulting from the work.

C. projecting fins, bolts, wire, nails, etc., not necessary for the work shall be removed or cut back one (1") inch from the surface and patched in an inconspicuous manner.

D. defects in concrete work shall be corrected; voids shall be chipped to a depth of at least one (1") inch with the edges perpendicular to the surface and parallel to form markings. Voids, surface irregularities, or honeycombing shall be filled by patching or rubbing as directed by the Landscape Architect and shall be done at the Contractor's expense. Concrete surfaces so repaired shall duplicate the appearance of the unpatched work. Thoroughly remove residual curing membrane before patchwork is started.

E. defective concrete work, which after corrective patching, rubbing, etc., fails to duplicate the appearance of unpatched work and/or conform to the standards set forth in these specifications shall be removed in its entirety and replaced at no additional cost to the Contract.

3.6 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Protect during this period by wet burlap, canvas covering (ASTM 171) or liquid curing compound. Secure Owner's approval of proposed method.

1. During this period, maintain concrete above 70 degrees F. for at least three (3) days or above 50 degrees F. for at least five (5) days.

2. Concrete from which forms are removed within seven (7) days after pouring shall be sprayed during the curing period as frequently as drying conditions may require.

3. Concrete covering or spray-on curing compound shall be a type that will not stain or discolor finished concrete surfaces

C. Curing using saturated burlap, sprinkler or membrane where approved shall commence immediately upon completion of finishing. Concrete covering shall be a type that will not stain or discolor finished concrete surfaces.

D. Curing using spray-on liquid curing compound shall be applied in accordance with the manufacturer's recommendation and as specified herein where allowed.

E. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

F. Sealing:

1. After the moisture content of exterior pedestrian concrete surfaces and colored concrete surfaces are low enough so that alkali and other salts do not become trapped beneath the sealer, normally 28 days after placement, the concrete shall be sealed with a clear, penetrating sealer.

2. The concrete surface shall be free of sand and completely clean and dry. Surface is to be swept or vacuumed, pressure washed, and rinsed clean.

3. Prior to general application a representative jobsite test area must be prepared and treated to verify and approve concrete porosity, proper surface preparation, adhesion, wet and dry slip resistance, performance, application techniques, and coverage. This test shall be performed for each concrete type and finish on the jobsite.

4. Surrounding areas, landscaping, and adjacent surfaces must be masked or protected from spills, tracking, and product or equipment contact. The work area shall be roped off, nearby vehicles removed, and appropriate sections closed to traffic.

5. The surface shall be divided into work sections using walls, joint lines, or other stationary features as natural stopping points to allow for easier control of coverage, wet edge, and overlap.

6. Thoroughly mix sealer prior to application. Apply one coat of sealer to concrete by use of a roller, hand-pump sprayer, or squeegee. Apply at full strength without thinning. Application rates will vary depending on method of application and porosity and texture of the surface.

7. Sealer to be applied on a calm day when concrete and ambient temperatures are between 50 and 90 degrees Fahrenheit.

8. Allow sealer to dry completely (minimum of 12 to 24 hours) before it is subjected to temperatures below 42 degrees Fahrenheit, or tow water from source. Surface may be walked on gently after a minimum of 12 hours and general use after a minimum of 24 hours.

9. treated surfaces shall be thoroughly inspected to verify and approve installation and safety, including wet and dry slip resistance, before the area is opened to traffic.

SECTION 207 – AGGREGATE SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Aggregate surfacing.

2. Soil barrier.

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 REFERENCES

A. ASTM International (ASTM) D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3) (600 kN-m/m3).

1.3 SUBMITTALS

A. Submittals for Review:

1. Samples:

a. 1 pint containers of proposed aggregate illustrating color, size, and gradation.

b. 12 x 12 inch soil barrier samples.

1.4 QUALITY ASSURANCE

A. Furnish aggregate from single source throughout Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and unload at the site in such a manner that no damage occurs to the product.

B. Store products in a manner that will preclude damages, stains. Cover product to protect from erosion.

C. Store products away from potential concentrated runoff areas.

1.6 PROJECT CONDITIONS

A. Do not place aggregate on soft, muddy, or frozen surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate: Refer to Materials Schedule in Drawings.

2.2 ACCESSORIES

A. Soil Barrier: Geosynthetic fabric manufactured specifically for control of weeds under paving or in landscape areas. Mirafi 135N or equal.

B. Herbicide: Non-selective type.

PART 3 - EXECUTION

3.1 PREPARATION

A. Correct irregularities in subgrade gradient and elevation by scarifying and reshaping.

B. Compact subgrade to minimum 95 percent of ASTM D698 standard Proctor maximum dry density at or near optimum moisture content.

C. Apply herbicide in accordance with manufacturer’s instructions. Allow vegetation to die before proceeding.

3.2 INSTALLATION

A. Place soil barrier over subgrade; install in accordance with manufacturer's instructions.

B. Spread aggregate over subgrade in maximum 2 inch lifts to minimum compacted thickness indicated on Drawings.

C. Level and contour surfaces to elevations and gradients indicated.

D. If necessary, add small quantities of fine aggregate to assist in compaction and leveling.

E. Roller compact to minimum 90 percent relative density.

F. Use mechanical tamping equipment in areas inaccessible to roller compaction equipment.

G. Tolerances: No birdbaths will be permitted.

1. Maximum variation from flat surface: 1/4-inch in 10 feet.

2. Maximum variation from thickness: 1/4-inch.

3. Maximum variation from elevation: 1/2 inch.

SECTION 208 – EXCAVATION AND FILL FOR LANDSCAPE

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Excavation and fill of subsurface work shown in the Landscape drawings.

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. Section 329119 – Landscape Grading

1.2 QUALITY ASSURANCE

A. Codes and Standards

1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction. The Contractor shall have a trench safety plan prepared by a registered professional engineer for all excavations in excess of 5 feet deep.

B. Testing and Inspection Services

1. The Contractor will engage a soil testing and inspection service for quality control testing during earthwork operations to inspect and test all soil materials proposed for use in all excavation and fill operations.

1.3 PROJECT CONDITIONS

A. Existing Utilities

1. It shall be the Contractor's responsibility to verify the location (horizontal and vertical depth) of all utilities prior to beginning earthwork operations. If utilities are to remain in place, provide protection from damage during construction operations.

2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult Owner immediately for directions as to how to proceed. Cooperate with Owner, public and private utility companies in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.

3. Do not interrupt existing utilities serving facilities occupied and used by Owner, except when permitted in writing by Owner and then only after temporary utility services have been provided.

B. Use of Explosives

1. The use of explosives is not permitted.

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights. Provide traffic control as required by the City and as required to protect the public.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout and other hazards created by excavation operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill Material: Refer to Section 329119 – Landscape Grading

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which earthwork and site grading operations are to be performed. After excavation to subgrade, proof roll with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 25 tons or greater to help compact pockets of loose soil and expose additional areas of weak, soft or wet soils in the presence of the Owner's Representative. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 CONSTRUCTION

A. The Contractor shall excavate to the lines and elevations shown on the Drawings, as previously indicated herein, regardless of the type, condition, or moisture content of the material encountered. Conduct excavation operations to provide positive drainage, at Contractor's expense, at all times during construction. If positive drainage cannot be maintained, Contractor shall keep standing water out of all excavations with adequate dewatering equipment.

B. All areas shall be cut accurately to the indicated grades. Care shall be taken to prevent excavation below the grades indicated and any bottoms or slopes that have been undercut shall be backfilled with approved materials and compacted to the required fill density.

C. Excavation required for rough grading shall be finished within a tolerance of 0.10 foot above or below the rough grade and in no case shall depressions be left that will not completely drain.

D. Excavation in wet areas (above optimum moisture +4%) shall continue to a depth where soil capable of being properly compacted is encountered.

E. Building Subgrade:

1. Follow recommendations in geotechnical report and on the structural drawings.

F. Filling:

1. Remove all wet soil, vegetation, organic materials and debris prior to placing fill.

2. Fill used below the parking and landscape areas shall be onsite soils encountered in the excavation or imported fill except grass, weeds, roots, vegetation and similar materials. The largest rock, particle or clod shall be less than 4 inches in diameter prior to compaction.

3. Care should be taken that utility cuts are not left open for extended periods and that cuts are properly backfilled. A positive cut-off of compacted clay at the building line shall be used to help prevent water from migrating in the utility trench.

4. Before fill is placed under pavement or if subgrade is in an excavation, subgrade soils shall be scarified to a depth of 6" and re-compacted between 95 and 100 percent of maximum dry density per ASTM D698 at a moisture content from -1 to

+3 percent above optimum moisture content.

5. Fill below all pavement and landscaped areas shall be placed in 6 to 8 inch loose lifts and compacted to a minimum dry density of 95 percent to 100 percent of the standard proctor density (ASTM D698) under pavement and 90 percent elsewhere. The moisture content shall be between 0 and +4 percent above optimum.

6. In cases where either mass fills or utility lines are more than 10 ft. deep, the fill/backfill below 10 ft should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D-698) and with 2 percentage points of the material’s optimum moisture content. The portion of the fill/backfill shallower than 10 ft should be compacted as outlined above.

7. If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench-key width of five (5) feet.

8. Compaction shall be obtained by use of sheeps foot rollers, rubber tired rollers, or other approved equipment capable of obtaining the required density. In the event the embankment material is too wet or too dry for adequate compaction, the Contractor

shall add moisture or dry the material as required to the extent necessary to obtain the required density.

G. Flatwork subgrade:

1. Construct subgrades for paved areas to conform to the grades, lines and cross sections shown on the Drawings, of uniform density.

2. After the pavement subgrades have been shaped and compacted, bring the surface to a firm, unyielding surface by rolling the entire area with an approved vibratory roller. Compact all areas inaccessible to the roller with hand tampers weighing not less than 50 pounds, and with face area not more than 100-square-inches. Unless the material at the time of the rolling contains sufficient moisture to insure proper compaction, add water as directed before compacting. Allow the material containing excess moisture, to dry to the proper consistency and moisture content before being compacted.

H. Moisture control:

1. Where soil material must be moisture conditioned before compaction, uniformly apply required amount of water to surface of soil material in such manner as to prevent free water appearing on surface during, or subsequent to, compaction operations.

2. Remove and replace, or scarify and air dry soil material that is too wet to permit compaction to specified percentage of maximum density.

3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread on surface where directed by Owner's Representative and permitted to dry. Assist drying by discing, harrowing or pulverizing, until moisture density relation tests fall within the herein-specified range.

3.3 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction

1. Testing laboratory services shall be in accordance with Division 01.

2. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed. In the building areas there will be at least 1 density test per 2500 square feet per lift with a minimum of 3. In the pavement areas there will be at least 1 density test per 5000 square feet per lift with a minimum of 3.

3. If, in the opinion of the Owner, based on testing service and inspection, the subgrade or fills, which have been placed, are below the specified density, provide additional compaction and testing at no expense to the Owner.

4. The results of density tests which may be selected will be considered satisfactory when they are in each instance equal to or greater than the specified density, and if not

more than 1 density test out of 5 has a value greater than 2% below the required density.

3.4 REPAIRS

A. Reconditioning Compacted Areas:

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction. Use hand tamping for re-compaction over underground utilities.

3.5 PROTECTION

A. Protection of Graded Areas:

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

2. Repair and re-establish grades in settled, eroded, and rutted areas to the specified tolerances.

3.6 CLEANING

A. Disposal of excess waste and materials:

1. Remove all excess excavation, trash, debris and waste materials, and legally dispose of off the Owner's property, at no additional cost.

SECTION 209 – LANDSCAPE GRADING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Soil testing.

2. Filling, backfilling, and compacting for footings, slabs-on-grade, paving, and site structures.

3. Backfilling and compacting for utilities outside the building to utility main connections.

4. Filling holes, pits, and excavations generated by removal (demolition) operations.

5. Final grading of site.

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2. Section 312301 – Excavation and Fill for Landscape

3. Section 329300 – Plants

1.2 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a

4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2001.

B. American Concrete Institute International (ACI):

1. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2001.

2. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2000a.

3. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2000.

4. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2002.

5. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 1994(R 2001).

6. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2000.

7. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2001.

8. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2001.

1.3 DEFINITIONS

A. Finished Grade Elevations: Indicated on drawings.

B. Subgrade Elevations:

1. At planting beds: 3” below finished grade elevations.

2. At seeded lawn areas: 2” below finished grade elevations.

3. At sodded lawn areas: 3” below finished grade elevations.

1.4 SUBMITTALS

A. See Division 01 - Administrative Requirements, for submittal procedures.

B. Soil Test Reports

1. Prior to starting work, submit 1 certified copy of soil test reports to the Landscape Architect and 1 copy to the Owner for approval.

2. Provide mapped locations of soil collection locations, labeled and numbered to correspond with test reports.

3. Costs of tests to be borne by the Contractor.

C. Compaction Density Test Reports

1.5 QUALITY ASSURANCE

A. Soil samples and testing shall comply with procedures specified in the U.S.D.A. Ag. Handbook 60: Diagnosis and Improvement of Saline and Alkali Soils.

B. Testing Laboratories

1. Certified facilities normally engaged in agronomic soil testing shall be utilized.

2. Recommended testing facilities:

24. Texas A&M AgriLife Extension Service

25. Address for United States Postal Service:

26. Soil, Water and Forage Testing Laboratory

27. 2478 TAMU, College Station, TX 77843-2478

28. Address for other couriers (FedEx, UPS, etc.):

29. Soil, Water and Forage Testing Laboratory

30. 2610 F&B Road, College Station, TX 77845

31.

32. Texas Plant & Soil Lab

33. 5115 W Monte Christo Rd, Edinburg, TX 78541

34.

35. Servi-Tech Laboratories

36. 6921 South Bell, Amarillo, TX 79109

C. Required Topsoil Tests

1. Using a soil sampling probe, provide soil samples to the preferred testing agency in accordance with their frequency and quantity recommendations. Label and number submitted materials to map which area they were taken from.

a. Separate area into zones for accurate sampling.

2. Test results should include chemical analysis indicating:

a. Fertility: pH, nitrate nitrogen, ammonia nitrogen, phosphate phosphorous, potassium, calcium, magnesium, zinc, iron, and manganese.

b. Suitability: total salinity, boron, sodium, potassium, calcium, magnesium, chloride, and sulfate.

c. Organic content

d. Particle size distribution

1.6 PROJECT CONDITIONS

A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials onsite in advance of need.

B. When fill materials need to be stored onsite, locate stockpiles where indicated.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.

3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Fill: Subsoil excavated on-site (Provide borrow soil materials when sufficient satisfactory soils materials are not available from excavations.

1. Graded.

2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

3. Conforming to ASTM D 2487 Group Symbol CL.

B. Granular Fill: Coarse aggregate, conforming to State of Texas Highway Department standard.

C. Topsoil: Dark brown fertile friable loamy topsoil, screened to remove rocks, clay lumps, clods, and vegetative material, and reasonably free of weeds and grasses. Physical make-up includes clay content between 7 27 percent, silt content between 15 35 percent, sand content less than 52 percent, and organic matter content between 4-12 percent of total dry weight.

D. Container Soil Mix: Comprised of 33% pH balanced compost, 33% expanded shale, and 33% washed concrete sand, screened for ¾” maximum particle size as supplied by Soil

Building Systems, (972) 831-8181

E. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

1. Grade in accordance with ASTM D 2487 Group Symbol SW.

F. Free draining aggregate (drainage behind walls, under ponds and in landscape beds):

G. Free draining river run gravel with no fines or hard durable crushed limestone where 100% passes a 1-inch sieve and 100% is retained on a No. 8 Sieve.

2.2 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable, woven.

B. Vapor Retarder: 10 mil thick, polyethylene.

2.3 SOURCE QUALITY CONTROL

A. See Division 01 - Quality Assurance, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

C. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused be Work.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as direct by Landscape Architect.

E. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

G. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

H. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

I. Dewatering:

1. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

2. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

a. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

b. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 INSTALLATION

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities and record documents.

3. Inspecting and testing underground utilities.

4. Removing trash and debris.

5. Removing vegetation, topsoil, unsatisfactory soil materials, obstructions, and deleterious materials.

6. Removing concrete formwork.

7. Removing temporary shoring and bracing and sheeting.

8. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Fill to contours and elevations indicated using unfrozen materials.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.

1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 100 percent of maximum dry density.

2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:

1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.

K. Reshape and re-compact fills subjected to vehicular traffic.

3.4 APPLICATION

A. Use general fill unless otherwise specified or indicated below.

B. At Lawn Areas:

1. Use general fill.

2. Fill up to subgrade elevations.

3. Compact to 85 percent of maximum dry density.

4. Amend as recommended by testing agency in soil test report.

5. See Section 329219 – Seeding or Section 329223 – Sodding for topsoil placement.

C. At Planting Areas Other Than Lawns:

1. Use general fill.

2. Fill up to subgrade elevations.

3. Compact to 85 percent of maximum dry density.

4. Amend as recommended by testing agency in soil test report.

5. See Section 329300 – Plants for soil amendment requirements.

D. At On-Structure Planting Beds, Raised Planters and Pots:

1. Use ‘Container Soil’ by Soil Building Systems; 866-SOIL-SBS.

2. Water heavily to compact.

3. Do not add additional soil amendments.

4. Refer to drawings for required aggregate fill at base.

E. At Foundation Walls and Footings:

1. Use Structural Fill as recommended by the Geotechnical Report or project Structural Engineer.

2. Fill up to subgrade elevation.

3. Compact each lift to 95 percent of maximum dry density.

4. Do not backfill against unsupported foundation walls.

5. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

F. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:

1. Cover drainage fill with general fill.

2. Fill up to subgrade elevation.

3. Compact to 95 percent of maximum dry density.

G. Over Buried Utility Piping and Conduits in Trenches:

1. Bedding: Use granular fill.

2. Cover with general fill.

3. Fill up to subgrade elevation.

4. Compact in maximum 8-inch lifts to 95 percent of maximum dry density.

3.5 CONSTRUCTION

A. Grading:

1. Uniformly grade areas to smooth surface at required grades and elevations.

2. Adjust contours to eliminate water ponding and provide positive drainage.

3. Make grade changes gradually.

4. Blend slopes into level areas.

5. Leave areas to receive topsoil 4-inches below final required grade.

6. Leave areas to receive planting beds 3 inches below final required grade to allow for placement of soil amendments and mulch topdressing.

7. Tolerances: Within plus or minus 1 inch of required sub-grade elevation.

8. If soils become compacted from grading operations, the Contractor shall scarify the compacted soil to a depth of 12” and re-grade to the final contours.

B. MOISTURE CONTROL

1. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

a. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

b. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight

C. COMPACTION OF BACKFILLS AND FILLS

1. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches (100 mm) in loose depth for material compacted by hand-operated tampers.

2. Place backfill and fill materials evenly on sides of structures to required elevations, and uniformly along the full length of each structure.

3. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

a. Under structures, foundations, footings, building slabs, steps, and pavements, scarify and re-compact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.

b. Under walkways, scarify and re-compact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 92 percent.

c. Under lawn or unpaved areas, scarify and re-compact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 85 percent.

D. TOLERANCES

1. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements and Section 014523 – Testing and Inspection Services for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

3.7 CLEANING

A. Remove unused stockpiled materials; leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

C. Remove surplus materials and those not suitable for reuse from site.

D. Sweep and power-wash, if necessary, paving and structures after grading operations are complete.

3.8 PROTECTION

A. Protect graded areas from traffic and erosion; keep free of trash and debris.

B. Repair settled, eroded, or rutted areas.

C. Protect paving, structures and the work of other trades. If damaged, repair will be the responsibility of the Contractor.

PART 3 – CONSTRUCTION METHODS

SECTION 300 – EARTHWORK

REVISE as follows:

300-4.1 General. *MODIFY to ADD the following:*

Fill should consist of approved earth materials free of trash debris, roots, vegetation, or other deleterious material.

300-4.2 Preparation of Placement Areas. *DELETE the last part of the 2nd sentence and SUBSTITUTE with the following:*

. . . to a relative compaction of at least 90 percent.

PART 4 – EXISTING IMPROVEMENTS

SECTION 400 – PROTECTION AND RESTORATION

REVISE as follows:

400-1 GENERAL. *ADD the following before the 1st paragraph:*

Material shown on the Plans or designated in the Special Provisions which is to be salvaged or used in the reconstructed work and which has been damaged or destroyed as a result of the Contractor's operations, shall be repaired or replaced by the Contractor at his expense.

ADD:

400-1.1 Preservation of Property. The Contractor shall exercise due care to avoid injury to existing improvements or facilities, utility facilities, adjacent property, and trees and shrubbery that are not to be removed.

All damage done to existing improvements by the Contractor shall be repaired by him to the satisfaction of the Engineer. Where sidewalks, curbs or gutters are to be repaired, the repairs shall be made by removing and replacing the damaged section back to the nearest scoring lines.

All trees and shrubbery that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and waterlines, all highway or street facilities, and any other improvements of facilities within or adjacent to the work shall be protected from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operation, they shall be replaced or restored at the Contractor's expense to a condition as good as when the Contractor entered upon the work or as good as required by the Plans and Specifications if any such objects are a part of the work being performed.

The fact that any such pipe or other underground facility is not shown on the Plans shall not relieve the Contractor of his responsibility under this article. It shall be the Contractor's responsibility to ascertain the existence of any underground improvement or facilities which may be subject to damage by reason of his operations.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary, all foundations and other parts of all existing structures adjacent to and adjoining the site of the work which are in any way affected by the excavations or other operations connected with the performance of the Work.

Whenever any notice is required to be given by the Agency or the Contractor to any adjacent or adjoining landowner or other party before commencement of any work, such notice shall be given by the Contractor.

ADD:

400-1.2 Video Recording and Photographing of Pre-existing Conditions. The Contractor shall video record and photograph pre-existing conditions of the project site prior to any construction activities such as, but not limited to:

a) Property markers

b) Right of way and easement conditions

c) Utility markings and USA markings

d) Existing property damages

e) Survey conditions

f) Pavement conditions, markings, and striping

g) Adjacent property conditions

h) Sidewalk, median, curb, and gutter conditions

i) Safety conditions

j) Unusual conditions or equipment

k) Existing landscape conditions (including vegetation and irrigation) along the project limit.

The Contractor shall submit recordings/photographs on CD, DVD or USB media to the Engineer no later than (five) 5 Working Days after Notice to Proceed.

Payment for video recording and photographing services shall be included in the various Bid Items and no additional compensation will be allowed therefor.

SECTION 402 – UTILITIES

REVISE as follows:

ADD:

402-0 GENERAL. For purposes of this Section 402, the terms referenced below are defined as follows:

An “unidentified” underground main or trunk line utility is one that is not indicated at all on the Plans, and a “misidentified” underground main or trunk line utility is one that is not indicated on the Plans with reasonable accuracy (a “misidentification”). An underground main or trunk line utility is indicated on the Plans with reasonable accuracy unless its actual location is substantially and materially different from that indicated on the Plans.

The term “rearrangement” of utilities means the relocation, alteration, reinstallation, and/or reconstruction of utilities (including removal of existing utilities incidental thereto) as necessary in order to accommodate the Work. Whenever in this Section 402 reference is made to any one or more of these rearrangement activities, such reference shall be deemed to include all other such activities as required in order to accommodate the Work.

402-1 LOCATION. *MODIFY to ADD the following:*

A list of utility companies that have facilities located within or near the construction area is included in the Special Provisions. The Engineer has endeavored to determine the existence of utility substructures at the site of the Work by reviewing the records of the owners of known utilities in that vicinity and consulting with those owners, and based on that information has indicated on the Plans those utility substructures (except for service connections) that may affect the Work.

The Contractor acknowledges that the utility information provided on the Plans and Special Provisions has not been verified and may not be accurate or complete. Except as expressly provided in this Section 402, the Contractor may not rely upon such utility information and the City assumes no responsibility for its accuracy or completeness. Changed conditions within the scope of 2-9 do not include utilities.

The Contractor shall determine the exact location (both horizontal and vertical), type, and size of all existing utilities, including service connections, prior to commencing work which could result in damage to such utilities or could otherwise affect or be affected by such utilities or interfere with the service they provide. Where underground main distribution conduits such as water, gas, sewer, electric power, telephone or cable television are shown on the Plans, the Contractor shall assume that every adjacent property parcel will be served by a service connection for each type of utility shown. The Contractor shall do such investigation, research, surveys, and potholing as the Contractor deems necessary to make such determinations. The Contractor shall immediately notify the Engineer as to any utility discovered by it which is in a different position than indicated on the Plans or is not indicated at all on the Plans.

The Contractor's cost of locating any unidentified or misidentified underground main or trunk line utility will be paid for as an addition to the Work in accordance with Section 2; provided, however, that the Contractor will not be entitled to such additional compensation if the existence and location (with reasonable accuracy) of such utility was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. The cost of locating all other utilities shall be considered as included in prices in the Bid for other items of the Work.

The information regarding underground and internal utilities and appurtenances which the Contractor is required to record in the Record Documents as specified in 5-10 shall include (but not be limited to) the accurate locations of underground utilities determined pursuant to this 402-1 and remaining in place, as well as utilities rearranged by either the Contractor or the utility owners.

At least two (2) Working Days prior to commencing any excavation, the Contractor shall contact the regional notification center (Underground Service Alert of Southern California [USA] at 1-800-422-4133) to obtain an inquiry identification number. The Contractor shall comply in all respects with California Government Code § 4216 *et seq.*

Caltrans is not required by Section 4216 *et seq.* to become a member of the regional notification center. The Contractor shall contact Caltrans for the location of its subsurface installations. In addition, the Contractor shall be aware that non-pressurized sewer lines, non-pressurized storm drains, and other non-pressurized drain lines are not required by § 4216 *et seq.* to be marked by the respective owners. The Contractor shall contact those utility owners as necessary to locate their subsurface installations.

The Contractor shall request the City of Irvine Traffic Operations Division at 949-724-7649 to locate any existing traffic signal conductors and interconnect within the construction area before performing Work that may affect or be affected by the existing facilities.

Except as expressly provided in this Section 402 with respect to unidentified or misidentified underground main or trunk line utilities, the failure of any utility company to accurately mark its facilities shall not be justification for a time extension or for additional compensation from the City.

<u>The Contractor shall obtain photographs of all markings made by its forces as well as all USA markings. All such photographs shall show the subject markings in relation to one or more identifiable landmarks that will remain in place after completion of the Work and completion of any utility removal and/or rearrangement work in the vicinity.</u>

The right is reserved to governmental agencies and to the owner of utilities to enter at any time upon any street, alley, right of way, or easement for the purpose of maintaining and making repairs to their property.

402-1.2 Payment. *DELETE in its entirety and SUBSTITUTE with the following:*

Payment for utility location by the Contractor shall be included in the various items of work and no additional compensation will be allowed therefor.

402-2 PROTECTION. *DELETE in its entirety and SUBSTITUTE with the following:*

The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the utility owner or direction from the Engineer. Valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Where protection is required to ensure support of utilities potentially impacted by the Work, the Contractor shall, unless otherwise specified on the Plans or in the Special Provisions, furnish and place the necessary protection and support.

Any additional cost incurred by the Contractor for protecting and supporting an unidentified underground main or trunk line utility or resulting from the misidentification of an underground main or trunk line utility will be paid for as an addition to the Work in accordance with Section 2, unless such utility's existence and location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. The cost of protecting and supporting all other utilities shall be considered as included in prices in the Bid for other items of the Work.

The Contractor shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged in the course of the Work. The Contractor shall, if directed by the Engineer, restore, repair or replace any such disturbed or damaged utility.

For any unidentified or misidentified underground main or trunk line utility that is disturbed or damaged in the course of the Work, the cost of restoration, repair or replacement incurred by the Contractor, if not made necessary by the Contractor's failure to perform its obligations pursuant to the Contract Documents (including without limitation Section 402-1) or to otherwise exercise reasonable care, will be paid for as an addition to the Work in accordance with Section 2. Except where additional compensation is allowed pursuant to this paragraph, all utilities disturbed or damaged in the course of the Work shall be restored, repaired or replaced at the Contractor's cost and expense, either by the utility owner or by the Contractor.

To the maximum extent permitted by law, all obligations of the Contractor stated in 5-4.2 shall apply in the case of any claims or liabilities (as defined therein) that may be asserted or claimed by any person or entity arising out of any disturbance or damage to utilities caused by the act or omission of the Contractor, whether or not such utilities are accurately marked either on the Plans or by the utility owner in the field, and whether or not there is concurrent active or passive negligence on the part of City and/or City Personnel, but excluding any such claims or liabilities arising from the sole active negligence or willful misconduct of City or City Personnel. All claims and liabilities for which

the Contractor is responsible pursuant to this paragraph are sometimes referred to herein as “Utility Damage Claims.”

When placing concrete around or contiguous to any non-metallic utility installation, the Contractor shall at its expense:

a) Furnish and install a 2-inch (50 mm) cushion of expansion joint material or other similar resilient material; or

b) Provide a sleeve or other opening which will result in a 2-inch (50 mm) minimum-clear annular space between the concrete and the utility; or

c) Provide other acceptable means to prevent embedment in or bonding to the concrete.

Where concrete is used for backfill or for a structure which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the Contractor’s operations, the Contractor shall notify the Engineer, shall arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of the system, and shall implement such procedures at the Contractor's expense.

402-4 RELOCATION. *DELETE in their entirety 2nd and 3rd paragraphs and SUBSTITUTE with the following:*

If utilities are found to interfere with the Work after award of the Contract, such utilities will be rearranged by the respective utility owners, or the Engineer may order the Contractor to perform such rearrangement, as an addition to the Work in accordance with Section 2. Alternatively, the Engineer may order changes in the Work to avoid such interference, in accordance with Section 2. All work by the Contractor on utilities shall be done to the reasonable satisfaction of the utility owner as well as complying with the requirements of the Contract Documents.

When the Plans or Special Provisions provide for the Contractor to rearrange a utility as part of the Work, all costs for such work shall be considered included in the Bid for the items of work necessitating such work. However, if an underground main or trunk line utility to be rearranged by the Contractor is misidentified in the Plans, any additional cost incurred by the Contractor for such work resulting from the misidentification shall be treated as an addition to the Work in accordance with Section 2, unless the utility's location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. Except as provided in this paragraph, the Contractor shall not be entitled to any additional compensation on account of inaccuracies in the Plans with respect to rearrangements of utilities that are included in the Work.

Temporary or permanent rearrangement of utilities requested by the Contractor for its convenience shall be its responsibility and the Contractor shall make all arrangements

necessary for such work and bear all related costs. The Contractor shall not be entitled to any additional compensation on account of any such utilities or work.

ADD the following at the beginning of the last paragraph:

The provisions of this paragraph are subject to the provisions of the previous paragraph. Where the Plans or Special Provisions provide for the Contractor to rearrange any service connections, such work is considered included in the Bid for the items of work necessitating such work.

402-5 DELAYS DUE TO UTILITY CONFLICTS. *DELETE in its entirety and SUBSTITUTE with the following:*

The construction schedule developed in accordance with 6-1 shall allow adequate time for the necessary protection, removal, and rearrangement of utilities by either the utility owner or the Contractor, as applicable. For work to be performed by a utility owner, the construction schedule shall allow for the time period required by the utility owner for such work. The Contractor shall notify the Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or rearrangement of utilities, and shall obtain the Engineer's approval of such changes.

The Contractor will not be entitled to any extensions of the Contract time or compensation for damages incurred due to delays attributable to utilities at the site of the Work except as otherwise provided in 6-4.1 or as provided below. Delays described below will not be considered delays for which the City is responsible within the meaning of 6-4.3.

a) Subject to 6-4.2 and 6-4.4, the Contractor shall be entitled to an extension of the Contract time to the extent that any delay in the Work is directly attributable to an unidentified underground main or trunk line utility or the misidentification of an underground main or trunk line utility in the Plans, unless the utility's location (with reasonable accuracy) was (or should have been) known to the Contractor as of the date on which the Bids were due or could otherwise have been inferred at that time from the presence of visible facilities such as buildings, meters, junction boxes or identifying markers. If the Contractor is entitled to such a time extension, the Contractor also shall be entitled to compensation for idle time of equipment on account of such delay, determined by the Engineer in the same manner as determinations are made for equipment used in the performance of Extra Work in accordance with Section 2. The Contractor shall not be entitled to any other compensation or damages on account of such delay.

b) The Contractor may be given an extension of time (but no additional compensation) for unforeseen delays attributable to failure of a utility owner to complete utility rearrangement work within the time period reasonably scheduled for such work in the construction schedule, or to timely complete utility rearrangement work which the Contract Documents indicate will be completed in advance of the Contractor's construction operations.

The Contractor shall not be entitled to any time extension or additional compensation for any delays or losses described in 402-5: (a) to the extent resulting from the Contractor's actions or omissions or which could have been avoided by any reasonable means, such as the judicious handling of forces, equipment or plant, or (b) arising in connection with utilities being rearranged for the Contractor's convenience. The determination of what damages the Contractor could have avoided will be made by the Engineer.

The Contractor shall immediately notify the Engineer of any delays to the Contractor's operations described in 402-5. Delays described in 402-5 are not considered right of way delays within the scope of 2-3.

ADD:

402-7 CONTRACTOR RESPONSIBILITIES.

The Contractor shall:

a) Cooperate with utility personnel; provide access to work site.

b) Coordinate Work of the Contract with affected utilities. All USA markings shall be removed after completion of the work for which the markings were provided, and before Agency's Acceptance and/or approval of the Work.

c) Asphalt concrete pavement not overlaid or slurry sealed as part of the project bid items which is damaged by trenching, potholing or where the contractor otherwise damages pavement shall be slurry sealed after the pavement section is repaired. "Perpendicular" street cuts shall be slurry sealed ten (10) feet each side of the cut and for "longitudinal" cuts shall be slurry sealed from pavement lane to pavement lane line for the entire damaged area or as directed by the Agency Representative. Type I slurry shall be used on non-arterial streets and Type II slurry shall be used on arterial streets. Damaged traffic striping, legends and markers shall also be replaced if damaged. "Patchwork" application of slurry shall be avoided by joining closely grouped areas of slurry applications. Compensation for this requirement shall be considered as included in the prices paid for the related items of work and no additional compensation will be allowed therefor.

ADD:

402-8 PERMANENT UTILITIES. Contractor shall contact and make all arrangements with utility owners and coordinate all provisions for installation and connection of all permanent utilities that are necessary for the Work, such as, but not limited to, natural gas, electricity, water, sewer, and telephone. All costs for such installation and connection, as well as costs for operating permanent utilities prior to acceptance of the Work by the Agency, shall be considered as included in the prices in the Bid for the related items of work.

PART 6 – TEMPORARY TRAFFIC CONTROL

SECTION 600 – ACCESS

REVISE as follows:

600-2 VEHICULAR ACCESS. *DELETE in its entirety and SUBSTITUTE with the following:*

Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time. If backfill has been completed to the extent that safe access may be provided, and the street is opened to local traffic, the Contractor shall immediately clear the street and driveways and provide and maintain access.

Safe, adequate, continuous, and unobstructed vehicular access shall be maintained to fire hydrants, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, bus stops, hospitals, etc., unless otherwise approved by the Engineer.

During non-working hours or when work is not scheduled, all roadway lanes shall be returned to their full traffic use by backfilling and paving open trenches unless otherwise approved by the Engineer. At the end of the workday, the Contractor shall remove all Traffic Control Devices not in use.

The Contractor shall replace vehicle loop detectors damaged by the Contractor's operations, at its own expense within 24 hours of the damage. The Contractor shall replace existing loop detectors, shown on the plans to be replaced, within 24 hours from when they are removed from service.

Should the Contractor fail to replace the vehicle loop detectors within 24 hours from when they are damaged or removed from service, or the installed signal loops are not functional, the Agency, at its option and at the Contractor's sole cost and expense, may install such temporary detection methods as may be necessary. The Agency will deduct cost of such work from any monies due the Contractor. Failure of the Agency, however, to install such temporary detection methods, shall not relieve the Contractor of his full responsibility for public safety per 5-7 of the Standard Specifications and the Special Provisions.

If the Contractor proposes temporary alternate detection methods, video or wireless, the Contractor shall provide submittals of the alternate methods for acceptance by the Engineer in accordance with 3-8 of the Standard Specifications and the Special Provisions. The cost for providing all temporary detection methods shall be as included in the various items of Work and no additional compensation will be allowed therefor.

600-3 PEDESTRIAN ACCESS.

DELETE in its entirety and SUBSTITUTE with the following:

Safe, adequate, continuous and unobstructed pedestrian access shall be maintained to sidewalks, cross walks, residences, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, etc., unless other arrangements satisfactory to the Agency have been made by the Contractor and accepted by the Agency. Pedestrian access and paths shall meet federal, state, and Agency ADA requirements.

ADD:

600-4 CONSTRUCTION PARKING CONTROL.

The Contractor shall control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, owners operations, or construction operations, and monitor parking or construction personnel private vehicles by maintaining free vehicular access to and through parking areas and prohibit parking on or adjacent to access roads, or in non-designated areas.

ADD:

600-5 SITE ACCESS.

When entering or leaving roadways carrying public traffic, contractors' equipment, whether empty or loaded, shall in all cases yield to public traffic.

The Contractor shall comply with the following City of Irvine truck route restrictions:

DESIGNATED TRUCK ROUTES – ORD. NO. 92-09

Name of Street	Portion Designated
a) Alton Parkway	Sand Canyon Avenue to Irvine Boulevard
b) Bake Parkway	Rockfield Boulevard to easterly City limit
c) Barranca Parkway	Red Hill Avenue to Jamboree Road
d) Campus Drive	Jamboree Road to MacArthur Boulevard
e) Irvine Boulevard	Culver Drive to Jeffrey Road
f) Irvine Boulevard	Alton Parkway to easterly City limit
g) Jamboree Road	Warner Avenue to MacArthur Boulevard
h) Laguna Canyon Road	Alton Parkway to State Route 133
i) Laguna Freeway (133)	
j) MacArthur Boulevard	Daimler Street. to Campus Drive

k)	MacArthur Boulevard	Jamboree Road to Ford Road
l)	Main Street	Jamboree Road to westerly City limit
m)	Red Hill Avenue	Barranca Parkway to San Diego Fwy. (I-405)
n)	Rockfield Boulevard	Bake Parkway to easterly City limit
o)	Sand Canyon Avenue	San Diego Fwy. (I-405) to northerly City limit
p)	San Diego Fwy. (I-405)	
q)	Santa Ana Fwy. (I-5)	

RESTRICTED ROUTES, SEVEN TON (14,000 POUNDS) GROSS WEIGHT - ORD. NOS. 92-09 AND 98-16

	Name of Street	Portion Designated
a)	Campus Drive	Jamboree Road to University Drive
b)	Culver Drive	Santa Ana Fwy. (I-5) to northerly City limit
c)	Jeffrey Road	Irvine Center Drive to Santa Ana Fwy. (I-5)
d)	Jeronimo Road	Goodyear to 400 feet westerly of Bake Pkwy.
e)	Toledo Way	Goodyear to 400 feet westerly of Bake Pkwy.
f)	Trabuco Road	400 feet easterly of the northbound Santa Ana Freeway off-ramp near Culver Drive and the easterly City limits
g)	Walnut Avenue	Harvard Avenue to Culver Drive
h)	Harvard Avenue	Walnut Avenue to Irvine Center Drive

THREE TON (6,000 POUNDS) GROSS WEIGHT - ORD. NO. 92-09

	Name of Street	Portion Designated
a)	Bonita Canyon Road/Shady Canyon	Newport Coast Drive to Sunnyhill
b)	Culver Drive	Michelson Drive to Bonita Canyon Road
c)	University Drive	Ridgeline Drive to Harvard Avenue

SECTION 601 – TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES

REVISE as follows:

601-1 GENERAL.

DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall provide and maintain all construction area traffic controls in accordance with Part 6 of the Standard Specifications, the latest version of the (MUTCD), and Work Area Traffic Control Handbook (WATCH), and these Special Provisions.

Portable delineators (traffic cones are not allowed) which conform to the current California Manual of Uniform Traffic Control Devices (CA MUTCD) shall be spaced as necessary for proper delineation of the travel way. The spacing between delineators shall not exceed 50 feet. The minimum lane transitions shall be a 50 to 1 taper unless otherwise shown on the plans. Double base delineators will be required.

If the portable delineators are damaged, displaced or are not in an upright position, from any cause, said portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Where construction detours and signing conflict with existing signing, the Contractor shall cover existing signs in a manner approved by the Agency's Representative. The Contractor shall also provide temporary traffic delineation per Section 601-4 at the conclusion of each working day, if not sooner, as approved by the Agency's Representative, for any centerline, painted median or lane line which is obliterated by construction.

The Contractor shall provide temporary delineation as directed/accepted. Temporary delineation shall include removal of conflicting markings by accepted means; installation and removal of temporary centerlines or lane lines, detour signing, barricading; and replacement of traffic lines and markings in their proper locations upon termination of the detour. Conflicting existing and temporary striping, as required for traffic control during construction, shall be removed by the Contractor by methods accepted by the Engineer. Blacking out the pavement will not be allowed. Temporary reflective striping tape may be used, except that it shall not be applied to final asphalt surfaces. Tape shall be removed from temporary surfaces prior to placement of additional asphalt.

The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and shall furnish to the Agency's Representative, names and telephone numbers of three persons responsible for this emergency service. In the event the Contractor does not promptly respond when notified, the Agency may make corrections at Contractor’s expense.

Each workday, the Contractor shall ensure traffic control is in place prior to starting construction.

Should the Contractor appear, in the opinion of the Engineer, to be lacking in providing adequate warning devices and protective measures as above provided, the Engineer may direct attention to the existence of a hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor, at his/her expense. Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate its obligation to furnish and pay for these devices.

The Contractor shall notify local Police and Fire Departments of its intent to begin work at each location at least ten (10) days before work is to begin. The Contractor shall cooperate with local authorities relative to handling traffic through the area. The Contractor shall also coordinate with OCTA to ensure the safe operation of buses and access to bus stops in the construction area.

Existing traffic loop detector replacement shall be required as necessary such that no traffic signal loop is out of operation at the end of the workday. The cost for providing all temporary traffic signal loop detectors shall be included into the various related items of work and no additional compensation will be allowed; this includes traffic signal loop detectors damaged by the Contractor's operations not designated for replacement in the contract plans.

Areas requiring edge cold mill shall be cold milled not more than three (3) Calendar Days prior to AC paving. Areas requiring digouts shall be repaved and open for traffic at the end of the same day.

The Contractor shall maintain access to all driveways at all times.

ADD:

601-7 STREET CLOSURE, DETOURS, BARRICADES.

Unless shown on the plans, no street closure shall be allowed.

The Contractor shall construct the proposed improvements to minimize public inconvenience. The Contractor shall provide ADA accessible pedestrian detours around construction areas.

The Contractor shall have all Traffic Control Devices properly installed prior to commencing construction and shall maintain these devices to ensure proper flow and safety of traffic while working in the street.

The contractor shall be responsible for any additional Traffic Control Devices deemed necessary by the Engineer to assure public safety at all times.

ADD:

601-8 STORAGE OF EQUIPMENT.

Unless otherwise authorized in writing by the Engineer, construction materials may not be stored in streets, roads, or highways beyond the end of each Working Day. No equipment shall be stored within limits of the acquired temporary construction easements at any time.

Construction equipment shall not be stored at the work site before its actual use on the Work nor for more than two (2) Calendar Days after it is no longer needed on the Work. Time necessary for repair or assembly of equipment may be authorized by the Agency.

Excavated materials, except that which is to be used as backfill in the adjacent trench, may not be stored in public streets, roads, temporary construction easements, or highway unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.

The Contractor shall submit an equipment-staging plan for approval by the Engineer. The plan shall address the use of private property for the staging, unloading, loading, and storing of equipment. The Contractor shall obtain an agreement from private property owners prior to the start of the project. The agreement shall release and hold the Agency, the Engineer, the Agency Representative and their consultants harmless from claims for damages. Failure to file a plan or obtain written approval from private property owners is considered a breach of Contract and subject to all remedies and enforcement procedures specified in the Contract Documents.

ADD:

601-9 TRAFFIC REGULATIONS.

601-9.1 General. Furnish, install, and maintain Traffic Control Devices, equipment, materials, and other safeguards to provide safe and effective work areas, and to warn, control, protect and expedite vehicular and pedestrian traffic.

On daily basis, remove temporary traffic delineation, signage and other devices when no longer required. Restore areas to original or to specified conditions.

601-9.2 Related Requirements. Traffic control work and Traffic Control Devices for construction shall conform to the latest edition of:

a) MUTCD

b) Work Area Traffic Control Handbook (WATCH manual)

c) Standard Specifications

d) O.S.H.A. requirements

e) California Vehicle Code

601-9.3 Construction Area Signs. The Contractor shall:

a) Use only signs that conform to the dimension, color, legend, reflectorization and lighting requirements of the current WATCH, MUTCD and the Contract Documents.

b) All sign panels shall be the product of a commercial sign manufacturer, but need not be new. Used sign panels clean and in good repair, as determined by the Agency Representative, may be used.

c) Sign panels for portable signs may be metal, cotton drill fabric, flexible industrial nylon fabric or other approved fabric.

d) Temporary stop signs shall have a minimum clearance of seven (7) ft. from bottom of sign to existing ground or pavement.

e) Further requirements as discussed in the Contract Documents.

601-9.4 Flaggers. The Contractor shall provide flaggers as deemed necessary by the Engineer to give adequate warning to traffic or to the public of any dangerous conditions to be encountered, and employ only flaggers trained in flagging fundamentals and procedures referred to in the "Flagger Handbook" available on the Internet at the following website: **https://dot.ca.gov/programs/construction/safety-traffic/flagging-handbook**. Payment for flagging is considered as included in the various items of work and no additional compensation will be allowed therefor.

601-9.5 Temporary Closure of Existing Traffic Lanes. Unless the traffic control, working hours and lane requirements are modified in the Special Provisions, the following requirements shall be followed:

a) When permitted by the Engineer, one (1) lane on each roadway adjacent to the working area may be closed to public traffic. Use of reflective or lighted traffic delineators to direct traffic away from excavations or other obstructions will be considered as a lane closure.

b) A minimum of one (1) lane of traffic, twelve (12) feet wide, fourteen (14) feet wide if a lane is adjacent to an outside curb, in each direction, shall be maintained through the work area at all times.

c) A minimum of two (2) lanes of traffic, each being twelve (12) feet wide, fourteen (14) feet wide if a lane is adjacent to an outside curb, in each direction, shall be maintained through the work area at all times when the work area is within a major arterial highway unless otherwise approved.

d) When work is in progress within three (3) feet of a lane being used by public traffic, Contractor shall close the lane adjacent to the work. Reflective or lighted traffic delineators shall be placed to direct public traffic around the construction area in accordance with the requirements of this section. During non-working hours or when work is not in progress, position and maintain reflective traffic delineators in the 1 to 1-1/2 foot width of the existing traffic lane adjacent to the work.

e) On roads open to public travel, temporary lane closures are limited between the hours of 9:00 a.m. and 3:00 p.m. Closures of roads on Sundays, holidays, or between the hours of 3:00 p.m. and 9:00 a.m. are prohibited unless otherwise approved by the Engineer.

All Traffic Control Devices used between dusk and 6:00 a.m. shall be lighted or reflectorized. Agency approved arrow board(s) shall be used to direct public traffic on all roads.

Prior to the start of each work day, the Contractor shall perform all necessary work incidental to and commensurate with the proper signing, detouring, barricading, etc., that is required for that particular day's schedule of operations. No construction shall be permitted until such signing and detouring operations have been completed.

601-9.6 Lane Requirements/Working Hours.

Working Hours:

Monday through Friday: 7:00 a.m. to 5:00 p.m.
Saturday: No work permitted
Sunday: No work permitted
Legal holidays: No work permitted

Work requiring lane closures may be in progress during the following hours:
Monday through Friday: 9:00 a.m. to 3:00 p.m.
Saturday: No work permitted
Sunday: No work permitted
Legal holidays: No work permitted

Lane closures are permitted and will only occur in accordance with the lane closure chart below, unless otherwise approved by the Engineer.

601-9.7 Closure Schedule. The Engineer shall be provided a list of any street lane closures, ramp closures, trail closures, sidewalk closures or detours for review and acceptance at least three (3) weeks advance of the closure.

Contractor shall submit a written schedule of planned closures utilizing the closure schedule request form, furnished by the Engineer. The closure schedule shall show the number of lanes, locations and times of the proposed closures, a precise description of work to be performed. Closure schedules submitted to the Engineer with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Upon approval of the closure schedule by the Engineer and at least three (3) Working Days in advance of closing a lane, the Contractor shall notify the Police, Fire, Orange County Transportation Authority (OCTA) bus service, the Agency Representative and all other affected jurisdictional agencies, and comply with their requirements.

Closure schedule amendments, including adding additional closures, shall be submitted by noon to the Engineer, in writing, at least five (5) Working Days in advance of a planned closure. Approval of closure schedule amendments will be at the discretion of the Engineer.

The Engineer, the Police, Fire, Orange County Transportation Authority (OCTA) bus service, and all other affected jurisdictional agencies shall be notified of cancelled closures two (2) Working Days before the date of closure

The Contractor shall notify by email the City of Irvine four (4) Working Days prior to commencing any work within 250 feet of any signalized intersection (measured from the nearest cross street curb), implementing any road closure, and/or implementing any detour of traffic. Email notifications shall be sent to roadworkcoordination@cityofirvine.org.

Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer.

601-9.8 Late Reopening of Closures and Required Contingency Plan. If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in 6-6 of the Special Provisions. No further closures shall be made until the Engineer has accepted a contingency plan, submitted by the Contractor that will ensure future closures will be reopened to public traffic at the specified time. A detailed contingency plan shall be prepared and submitted to the Engineer within one business day of the Engineer's request. The Engineer will have two (2) Working Days to accept or reject the Contractor's proposed contingency plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

601-9.9 Compensation. The Engineer shall be notified of delays in the Contractor's operations due to the following conditions:

a) The Contractor's proposed closure schedule is denied and his planned closures are within the time frame allowed for closures in the Special Provisions, except that the Contractor will not be entitled to compensation for amendments requested by the Contractor to the closure schedule that are not approved.

b) The Contractor is denied a confirmed closure.

If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of these conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay and will be compensated in conformance with the provisions in 2-8 of the Standard Specifications and the Special Provisions.

Should the Engineer direct the Contractor to remove a closure before the time designated in the approved closure schedule, delay to the Contractor's schedule due to removal of the

closure will be considered a right of way delay and compensation for the delay will be determined in conformance with the provisions in 2-3 of the Standard Specifications and these Provisions.

ADD:

601-10 AUTHORITY OF AGENCY REPRESENTATIVE.

Provisions of this section may be modified or altered if, in the opinion of the Agency Representative, public traffic will be better served and work expedited.

601-10.1 Execution. The Contractor shall field check all temporary traffic control signs, barricades, and other devices at least three (3) times every day, including Saturdays, Sundays and holidays to insure their proper maintenance and conformance to the Contract Documents and detailed instructions by the Agency Representative.

Should Contractor fail to properly place and/or maintain delineated lane closures or work areas, the Agency, at its option and at Contractor's sole cost and expense, may place delineation, barricades, or other devices, as may be necessary, to protect the public. Agency may in its discretion withhold the cost of such work from any monies due the Contractor at an amount equal to the rates shown below:

Delineation	
Delineator	$2.00/day plus-labor & equipment
Lighted Barricade	$5.00/day plus-labor & equipment
8 Foot Wood Barricade	$7.50/day plus-labor & equipment
Temporary Signs	$25.00/day plus-labor & equipment
Type III Barricade	$10.00/day plus-labor & equipment

Labor (2 Hour Minimum) – Regular Time	
Lead Street Maintenance Technician	$52.88
Street Maintenance Technician	$40.82
Equipment Operator I	$46.14
Equipment Operator II	$49.74
Street Maintenance Supervisor	$62.99
Street Superintendent	$79.80

Equipment	
Arrow Board	$15.00/hour
Pickup	$10.00/hour
Sweeper	$45.00/hour

5-Yard Dump	$25.00/hour
Loader	$25.00/hour
Water Truck	$25.00/hour
1-Ton Truck	$10.00/hour

Agency shall have no obligation to Contractor with respect to Agency's decision whether or not to exercise Agency's options pursuant to this subsection.

ADD:

601-11 PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS).

Portable changeable message signs shall be furnished, placed, operated, and maintained as designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the State Standard Specifications and these Provisions. The Contractor shall furnish (2) two PCMS. PCMS shall be in place a minimum of two (2) weeks prior to start of construction.

Approximate locations of the PCMS are as follows:

a) Portola Parkway at Pearblossom

b) Tomato Springs Road at Pearblossom

601-11.1 Payment. Full compensation for conforming to the requirements for PCMS, including furnishing all labor, tools, equipment, materials and incidentals required for doing all the work involved in furnishing, installing, maintaining, relocating, changing sign message (regardless of the number of times directed by the Engineer), replacing, repairing, and when no longer required, removing of all PCMS as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, shall be considered as included in the Contract Lump Sum price paid for Traffic Control and no separate compensation will be allowed therefor.

601-12 FLASHING ARROW SIGNS.

Flashing arrow sign shall be mounted on a truck or on a trailer and shall be capable of operating while the vehicle is moving or as directed by the Engineer. Signs mounted on the cab of a truck shall be mounted to provide a minimum of 7 feet between the bottom of the sign and the roadway. Signs mounted on a trailer, or on anything other than the cab of a truck, shall be mounted to provide a minimum of 8 feet between the bottom of the sign and the roadway.

The total weight of trailer mounted flashing arrow sign including the trailer, sign, power source and other components shall not exceed 1,500 pounds and the height of the level trailer bed shall be no higher than 21 inches above the roadway. The trailer shall be equipped with a minimum of 3 leveling jacks.

Electrical energy to operate the sign shall be obtained from the vehicle on which the sign is mounted. The supply of electrical energy shall be capable of operating the sign in the manner specified. The electronic circuitry shall provide between 30 and 45 complete operating cycles of the sign per minute in each of the modes specified.

Alternative types of lamps may be used in flashing arrow signs if visibility is equal to the specified lamps. Each type AX flashing arrow sign shall be a minimum of 2 feet high and 4 feet wide, and shall be furnished with flat black enamel. A minimum of 13 No. 4414AX 12-volt, yellow or amber lamps shall be installed in the panel. The lamp configuration shall be for 3 arrowheads or an arrow shaft with 2 arrowheads, one pointing in each direction on the face of the sign with a minimum of 5 lamps forming each arrowhead. Each lamp shall be provided with a visor.

The lamp shall be activated by a switch on a control panel and shall be controlled by electronic circuitry to provide a minimum of 4 selectable modes of operation as follows:

Pass Left Mode – Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the left or a flashing left arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

Pass Right Mode – Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the right or a flashing right arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

Simultaneous Mode – Either the outside arrowheads pointing in opposite directions are continuously illuminated, except for the center lamp forming each arrowhead, while the arrow shaft lamps flash on and off simultaneously or the outside arrowhead pointing in opposite directions and the arrow shaft lamps all flash simultaneously to indicate passing on either side.

Travel Mode – Travel or caution mode shall flash in a manner not resembling any other mode.

Full compensation for conforming to the requirements of this section shall be considered as part of Bid Item **Mobilization/Demobilization** and no additional compensation will be allowed therefor.

PART 8 – LANDSCAPING AND IRRIGATION

SECTION 800 – MATERIALS

REVISE as follows:

800-1 LANDSCAPING MATERIALS.

800-1.2 Soil Fertilizing and Conditioning Materials

800-1.2.3 Commercial Fertilizer. *DELETE entire section and SUBSTITUTE with the following:*

Commercial fertilizer for back fill mix shall be free-flowing material delivered in unopened sacks. Material which becomes caked or otherwise damaged shall not be used. Exact composition and type of fertilizer to be determined by the agronomic soils test and will be supplied by the Contractor at no additional cost to the City. Organic/JTM Complete is the city's preferred fertilizer.

Organic/JTM fertilizer application applied at the following rates:

For pre-plant landscape application (Turf and Groundcover)	Apply 30 pounds per 1000 square feet		
Container Size	1 gallon	5 gallon	15 gallon
Application Rates	2 oz.	6 oz.	19 oz.

800-1.2.4 Organic Soil Amendment. *DELETE entire section and SUBSTITUTE with the following:*

Organic Soil Amendment for back fill mix shall be Type 1. Nitrogen Stabilized Organic soil amendment shall be redwood sawdust free of shavings or particles of other woods such as fir or pine, supplied in bulk and 0.5% nitrogen stabilized by standard techniques. An acceptable substitute is nitrogen stabilized fir or cedar sawdust ground to 0-1/4" particle size and 1.0% nitrogen stabilized.

800-1.2.5 Mulch. *DELETE entire section and SUBSTITUTE with the following:*

Contractor shall install 3" thick layer of mulch in all planter areas. Install mulch per Irvine standard plan #601, 602, 606, and 607. Mulch to be installed after the planting of shrubs.

The Contractor shall maintain a 6” clear “no-mulch” zone around the base of each new and existing shrub and tree.

Mulch to be “Forest Floor” (0-2”), or approved equal:

a) Available from

Tierra Verde Industries
7913 Marine Way
Irvine, CA 92618
(949) 551-0363

b) Product shall be woodchips ½” to 3” in length, meet Caltrans Standard Specifications 20-2.08 for Mulch, contain only toxic free mineral based colorant, **and contain reused City of Irvine Green Waste.**

c) The Contractor shall submit one sample of mulch materials for City approval.

d) The Engineer has the right to reject all samples and request additional samples until a suitable mulch material is approved.

800-1.4 Plants. *ADD the following:*

Contractor to provide 1-year guarantee for all shrubs.

800-1.4.1 General. *DELETE entire section and SUBSTITUTE with the following:*

Shrubs and ground covers shall be grown by an established nursery having been in the business of growing shrubs and ground covers a minimum of five (5) years. At the option of the Engineer, plants shall be inspected and tagged at the nursery prior to shipment to the planting site. Shrubs shall be of the specified type and size, selected from high quality, well-shaped nursery stock. Plant names indicated or listed in the “Plant Legend” on the Plans, conform to the approved names given in “An Annotated Checklist of Woody Ornamental Plants in California, Oregon, and Washington, Manual 4091”, published by the University of California (1979), and in accordance with American Nurseryman standards. Except for names not covered therein, the established custom of the nursery shall be followed. Condition of plants shall be in accordance with the California State Department of Agriculture’s regulations for nursery inspections, rules, and grading and shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests, or their eggs, and shall have healthy normal root systems, well filling their containers, but not to the point of being root bound.

Plants shall not be pruned prior to delivery, except as authorized by the City. The size of the plants shall correspond with that normally expected for species and variety of commercially available nursery stock, or as specified on the Plans. The minimum acceptable size of all plants, measured before pruning with the branches in normal position, shall conform to the measurements, if any, specified on the Plans. Plants larger in size than specified may be used with the approval of the City, but the use of larger

plants shall not serve as the basis for a change order. All plant material shall be subject to the inspection and acceptance of the City before planting. A representative number of plants as determined by the City may be inspected for size and condition of root growth, insects, injuries and defects. Plants not accepted are to be removed from the site immediately and replaced with suitable plants. The City reserves the right to reject entire lots of plants represented by defective samples. The contractor shall provide a plant material order invoice to the Engineer at the preconstruction meeting.

800-1.6 Miscellaneous Landscape Materials. *ADD the following Section:*

800-1.6.1 General. Whenever a material or process is delineated or specified by patent, proprietary name or process, or manufacturer's name, such specifications are used for the purpose of facilitating the description of material or process desired. Approved equals are acceptable as approved by the engineer. Suppliers and manufacturer's directions, specifications and recommendations will be followed in all cases where the materials used furnish directions and cover points not delineated on the Plans or in the Specifications. The specifications only indicate the quality and workmanship to be performed rather than a detailed description of the performance of the work. In the event of any discrepancies between the Plans or Specifications, the final decision as to which will be followed shall be made by the Engineer. In the event the installation is contradictory to the direction of the Engineer, the installation shall be rectified by the Contractor at no additional cost to the City.

All workmanship and materials incorporated shall be the best available grade of their respective kind. Provide a sample of each material specified. Accepted samples may be used in the Work. Submit three (3) sets of a type written list of materials as specified to the Engineer within twenty-one (21) days after award of contract. This list shall give the name, material number, and the manufacturer, and shall be accompanied by cut sheets or reproductions of catalog pages for all of the material to be installed. Approval of substitutions will not relieve the Contractor from complying with the requirements of the Contract Documents, Plans and Specifications. Pay at Contractor's sole expense for all changes caused by approved substitution which affect other items of work.

800-1.6.2 Herbicide. All herbicides shall be organic. Organic herbicide for weed abatement shall be Suppress EC, or approved equal.

800-1.6.3 Pre-emergent. Pre-emergent weed control material shall be Organic.

800-2 IRRIGATION SYSTEM MATERIALS.

800-2.1.3 Plastic Pipe for Use with Solvent Weld Socket or Threaded Fittings.
DELETE 2nd Paragraph and REPLACE with the following:

All pressure supply lines downstream of the strainer assembly unit shall be Schedule 40 solvent weld PVC 1-1/2" or smaller and Class 315 solvent weld PVC for 2" or larger. Piping shall conform to ASTM 1785. All non-pressure lines downstream of the remote control valve shall be Schedule 40 solvent weld PVC conforming to ASTM D1785. Pipe shall be marked continuously with manufacturer's name, nominal pipe size,

schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion. All plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2241 or ASTM D1785.

All solvent weld PVC fittings shall be standard weight Schedule 80 and shall be injection molded of an improved virgin PVC fitting compound. Slip PVC fittings shall be the "deep socket" bracketed type. Threaded plastic fittings shall be injection molded. All tees and angled fittings shall be side gated.

All fittings shall conform to ASTM D2466. All threaded nipples shall be standard weight Schedule 80 with molded threads and shall conform to ASTM D1785.

All solvent cementing of plastic pipe and fittings shall be a two-step process, using primer and solvent cement applied per the manufacturer's recommendations. Cement shall be of a fluid consistency, not gel-like or ropy. Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855. When connection is plastic to metal, female adapters shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be non-lead base Teflon paste, tape, or approved equal.

800-2.2.2 Gate Valves. *DELETE entire section and SUBSTITUTE with the following:*

Gate valves shall be of the manufacturer, size, and type indicated on the Plans.

800-2.2.4 Remote Control Valves. *DELETE entire section and SUBSTITUTE with the following:*

Automatic control valves shall be of the manufacturer, size, and type indicated on the Plans. Automatic control valves shall be electrically operated. Drip zone valves shall be accompanied with pressure regulators and filters per the manufacturer.

800-2.2.7 Valve Boxes. *DELETE entire section and SUBSTITUTE with the following:*

Valve boxes shall be fabricated from a durable, weather-resistant plastic material resistant to sunlight and chemical action of soils. The valve box cover shall be green in color and secured with dual locks to be supplied. The cover and box shall be capable of sustaining a load of 1,500 pounds. Valve box extensions shall be by the same manufacturer as the valve box. Automatic control valve boxes shall be rectangular and sized per plan. Valve box covers shall be marked "RCV" with the valve identification number "heat branded" onto the cover in 2 inch high letters / numbers. Gate valve boxes shall be 10" circular size. Valve box covers shall be marked with either "GV" "heat branded" onto the cover in 2 inch high letters. Line flushing valve boxes shall be 10" circular size. Valve box covers shall be marked with either "FV" "heat branded" onto the cover in 2 inch high letters. Heat branding method, craftsmanship, and lettering orientation to be approved by city prior to branding lids.

800-2.2.8 Line Flushing Valves. *ADD the following Subsection:*

Line flushing valves shall be the size and type as indicated on the plans.

800-2.4 Sprinkler Equipment. *DELETE entire section and SUBSTITUTE with the following:*

Irrigation heads and nozzles shall be of the manufacturer, size, type, with radius of throw, operating pressure, and discharge rate indicated on the Plans. Irrigation heads and nozzles shall be used as indicated on the Plans.

Drip line shall be of the manufacturer, size, type with discharge rate, emitter spacing and operating pressure as indicated on the Drawings. All fittings, line flushing valves and anchor staples shall be of the same manufacturer as the drip line.

800-2.5 Miscellaneous Landscape Materials. *ADD the following Section:*

All materials supplied for this project shall be new and free from any defects. All defective materials shall be replaced immediately at no additional cost to City. After award of contract and before any irrigation system materials are delivered to the job site, submit to the Engineer a complete list of all irrigation systems, materials, or processes proposed to be furnished and installed as part of this Contract. Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, furnish the manufacturer's recommendations as to the method of installation. No substitutions will be allowed without prior written acceptance by the Engineer. Manufacturer's warranties shall not relieve the Contractor of liability under the guarantee. Such warranties shall only supplement the guarantee. If the Contractor wishes to substitute any equipment or materials for equipment or materials listed on the irrigation Drawings and Specifications, it may do so by providing the following information to the Engineer for approval:

a) Provide a written statement indicating the reason for making the substitution.

b) Provide catalog cut sheets, technical data, and performance information for each substitute item.

c) Provide in writing the difference in installed price if the item is accepted.

The contractor shall furnish all materials as specified in the plans and specifications and turn over a fully functional irrigation system complete with programming as coordinated by the City and accommodating for the new irrigation controller within the new landscape.

Additionally, the contractor shall be responsible for repairing any landscape damaged or removed for the purpose of installation of the irrigation.

All irrigation materials provided and installed shall be specifically designed and manufactured for use within reclaimed irrigation systems.

800-3 ELECTRICAL MATERIALS.

800-3.2.2 Conductors. *DELETE entire section and SUBSTITUTE with the following:*

Remote control wire shall be direct-burial AWG-UF type, size as indicated on the Drawings, and in no case smaller than 14 gauge. Connections shall be Scotchlok 3M DBY Direct Bury Splice Kit per city std. plan 516. Kit shall include a Scotchlok Y Spring connector, a Polypropylene tube prefilled with waterproof sealing gel. Ground wires shall be white in color. Control wires shall be red (where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" Plans located on controller door). The Contractor shall provide 4 spare control wires per City of Irvine Landscape Manual, Section V Irrigation Specifications (under Products and Installation, item 24, item c).

800-3.3 Controller Unit. *DELETE entire section and SUBSTITUTE with the following:*

The Controller unit shall be of the manufacturer, and type indicated on the plans.

SECTION 801 – INSTALLATION

REVISE as follows:

801-2 EARTHWORK AND TOPSOIL PLACEMENT.

801-2.2 Topsoil Preparation and Conditioning.

801-2.2.1 General. *DELETE 1st sentence in the 4th paragraph, and ADD at end of section the following:*

WEED ABATEMENT OPERATIONS. The irrigation system, soil preparation operations, and finish grade shall be approved by the Engineer prior to weed abatement operations.

Contractor shall operate the irrigation system to keep planting areas uniformly moist for a period of two (2) weeks (14 calendar days). At the end of the two (2) week period, Contractor shall spray all visible weeds with an approved organic, non-selective, post emergent herbicide. Application rate and method shall be recommended by the manufacturer. After spraying, planting areas shall remain unwatered for a minimum of forty-eight (48) hours.

After seven (7) calendar days from the chemical application, weeds and debris shall be disposed of off-site.

Contractor shall apply spray chemicals when air currents are still; preventing drifting onto adjoining property and preventing any toxic exposure to persons whether or not they are in or near the project.

After weed abatement operations, and as determined by the Engineer, planting areas shall be scarified to a depth not to exceed one inch (1”).

Weeds and debris shall be disposed of off-site.

801-2.2.2 Fertilizing and Conditioning Procedures. *ADD the following after the last paragraph:*

Fertilizing and soil amendment guidelines under agronomic soils testing shall be used for bidding purposes for planting areas, however, Contractor shall amend it as necessary per the soils test report at no additional cost to the City.

801-2.3 Finish Grading. *DELETE 2nd paragraph and ADD the following after the last paragraph:*

Finish grades are existing having been previously established the contractor shall maintain the existing finished grade elevations. Finish grading will only be required in raking out/feathering spoils from planting installations.

801-4 PLANTING.

801-4.1 General. *ADD the following after the last paragraph:*

Prior to excavation for planting or placing of stakes, locate all utilities, electric cables, conduits, underground irrigation lines, heads, valves and valve control wires, and all utility lines so that proper precautions may be taken not to damage such improvements. In the event of a conflict between utilities and plant locations, promptly notify the Engineer who will arrange for one or the other to be relocated. If contractor fails to follow this procedure it shall repair all damages resulting from the work at contractor's sole expense. Plant materials shall be furnished in the quantities and/or spacing as shown or noted for each location, and shall be of the species, kinds, sizes, etc., as symbolized, and/or described in the Plant Legend, as indicated on the Plans. Verify all sizes and quantities on the Plans. Promptly report any discrepancy to the Engineer.

Any plant material or any development materials specified by trade name or equal, shall be according to these Plans and Specifications. Installation and use of substitute items shall not be made until the Contractor is in receipt of written approval from the Engineer. Substitution proposals for plant material must be accompanied by written proof of non-availability within a five hundred mile radius of the project site for material originally specified and proof that material was ordered in a timely manner upon award of contract. Regularly water all nursery stock in containers and place them in a cool area protected from sun and drying winds. Do not allow plants to dry out before or while being planted. Keep exposed roots moist by means of wet sawdust, peat moss or burlap at all times during planting operations. Do not expose roots to the air except while being placed in the ground. Wilted or diseased plants, whether in place or not, will not be accepted and shall be replaced at the Contractor's sole expense. Moisten prepared surface immediately prior to installing plant material. Install plant material immediately after delivery to site, within 24 hours after delivering to prevent deterioration. Hand water landscaped areas immediately after installation with a minimum of 1" of water.

801-4.5 Tree and Shrub Planting. *DELETE 4th paragraph and REPLACE with the following:*

In the event that underground construction work or obstructions are encountered in the planting operation, alternate locations for plant material will be selected by the City. Operation shall be done at no extra cost to the City. The following material shall be thoroughly blended and used as a backfill mix:

a) 6 parts by volume on-site soil

b) 4 parts by volume Organic Amendment 1 lbs. 16-20-0 per cubic yard of mix

c) 2 lbs. Iron Sulfate per cubic yard of mix

The actual material and amounts, as determined by the agronomic soils test, shall be supplied by the Contractor at no additional cost to the City. No mixing for individual planting holes is permitted. Mix planting soil prior to backfilling and stockpile at the site. Iron sulfate shall not contact cement surfaces because severe staining could occur; repair

or replace stained cement at Contractor's sole cost. Remove all plants from their containers and set so that, when settled, they bear the same relation to the required grade as they bore to the natural grade before being transplanted. Set the directed amount of plant fertilizer to be used with each plant on the top of the root ball so the required fertilizer amount to be used in each hole can be easily verified and approved by the Engineer. Improper planting may delay the maintenance period and extend working days causing liquidated damages. Planting holes shall be compacted with no more than 1" settlement from finished grade.

Add:

801-4.5.1 Mulch. *ADD the following Subsection:*

All shrubs and ground cover areas shall be mulched after planting with 3 inches of mulch. Maintain a 6 inch clear "no-mulch" zone around the base of each tree and shrub.

801-5 IRRIGATION SYSTEM INSTALLATION.

801-5.1 General. *ADD the following after the last paragraph:*

Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that irrigation system may be installed in strict conformance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations. In the event of discrepancy, immediately notify the Engineer.

Do not proceed with installation in areas of discrepancy until all discrepancies have been resolved. Before starting work, carefully check all grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.

The Contractor shall request acceptance of and the Engineer will approve final grades before work on this Section will be allowed to begin. Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Coordinate the installation of all irrigation materials with all other work.

All scaled dimensions are approximate. Check and verify all size dimensions prior to proceeding with work under this Section. Exercise extreme care in excavating and working near existing utilities. Repair damages to utilities, which are caused by Contractor's operations or neglect, at no additional cost to City. Prior to installation, stake out all pressure supply lines, routing and location of sprinkler heads, valves, and automatic controller. Layout irrigation system and make minor adjustments required due to differences between site and Drawings. Where piping is shown on Drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas. Connections to, or the installation of, the water supply shall be at the locations shown on the Drawings. Minor changes caused by actual site conditions shall be made at no additional expense to the City.

Existing irrigation equipment to be replaced including valves, spray heads, and rotors shall be salvaged and delivered to the City.

Verify and be familiar with the locations, size and detail of points of connection provided as the source of water and connection to the irrigation system. Irrigation design is based on the available static water pressure shown on the Drawings. Verify static water pressure on the project prior to the start of construction. Should a discrepancy exist, notify the Engineer's authorized representative prior to beginning construction. Prior to cutting into the soil, locate all cables, conduits, sewer septic tanks, and other utilities as are commonly encountered underground and take proper precautions not to damage or disturb such improvements. If a conflict exists between the obstacles and the proposed work, promptly notify the Engineer who will arrange for relocations. Proceed in the same manner if a rock layer or any other such conditions are encountered. Protect all existing utilities and features to remain on and adjacent to the project site during construction. Repair, at its sole cost, all damage resulting from its operations or negligence.

The Agency Representative shall have, at all times, safe access to the Work. Where the Specifications require work to be tested by the Contractor, it shall not be covered over until accepted by the Engineer. Notify the Engineer, a minimum of 48 hours in advance of where and when the work is ready for testing. Should any work be covered without testing or acceptance, it shall be, if so ordered, uncovered at the Contractor's sole expense. Inspections will be required for the following at a minimum:

a) System layout

b) Pressure test irrigation main line (Six hours at 125 PSI) lateral lines (2 hours at 100 psi).

c) Coverage test of irrigation system

d) Final inspection prior to start of maintenance period

e) Final acceptance

Work that fails testing and is not accepted will be re-tested. Hourly rates and expenses of the Engineer for re-inspection or re-testing will be paid by the Contractor at no additional expense to City.

Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installation work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the acceptance of the Engineer and at no additional cost to the City. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings under cover until ready to install. Transport plastic pipe only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load. Dispose of waste, trash, and debris in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. Do not bury waste material and debris on the site. Burning of trash and debris will not be permitted. Remove and dispose of rubbish and debris generated by his work and workmen at frequent intervals or when ordered to do so by the Engineer. At the

time of completion the entire site will be cleared of tools, equipment, rubbish and debris which shall be disposed of off-site in a disposal area that is fully and legally licensed.

Temporary Repairs: The City reserves the right to make temporary repairs as necessary to keep the irrigation system in operating condition. The exercise of this right by the City shall not relieve the Contractor of his responsibilities under the terms of the guarantee as herein specified.

Supply the following items:

a) Two (2) wrenches for disassembly and adjustment of each type of sprinkler head used in the irrigation system.

b) Two (2) 30-inch sprinkler keys for manual operation of control valves.

c) One (1) valve box cover key.

d) Four (4) extra sprinkler heads of each size and type.

e) 250 feet of additional drip line and 100 feet blank roll.

f) 200 drip line stapes.

The above equipment shall be turned over to the Engineer at the final inspection.

At the time of the pre-maintenance period inspection, the Engineer and governing agencies will inspect the work and, if not accepted, prepare a list of items to be completed by the Contractor. At the time of the post-maintenance period or final inspection the work will be re-inspected and final acceptance will be in writing by the Engineer. The City Engineer shall have final authority on all portions of the work.

801-5.3 Irrigation Pipeline Installation.

801-5.3.1 General. *ADD the following after the last paragraph:*

Excavations shall be straight with vertical sides, even grade, and support pipe per City Landscape Standard Plan No. 501. Trenching excavation shall follow layout indicated on Drawings to the depths below finished grade and as noted. Where lines occur under paved areas, these dimensions shall be considered below subgrade. Provide minimum cover of 24 inches on pressure supply lines. Provide minimum cover of 24 inches for control wires. Provide minimum cover of 12 inches for non-pressure lines unless lines are designated as “ON GRADE” per the plans. Backfill material on all lines shall be the same as adjacent soil free of debris, litter, and rocks over 1/2 inch in diameter. Backfill shall be tamped in 4-inch layers under the pipe and uniformly on both sides for the full width of the trench and the full length of the pipe. Backfill materials shall be sufficiently damp to permit thorough compaction, free of voids. Backfill shall be compacted to 90% relative compaction and shall conform to adjacent grades. Flooding in lieu of tamping is not allowed. Under no circumstances shall truck wheels be used to compact backfill. Provide sand backfill a minimum of 6 inches over and under all piping under paved areas.

Piping under existing pavement may be installed by jacking, boring, or hydraulic driving. No hydraulic driving is permitted under asphalt pavement. Cutting or breaking of existing pavement is not permitted. Carefully inspect all pipe and fittings before installation, removing dirt, scale, burrs, and reaming. Install pipe with all markings up for visual inspection and verification.

Remove all dented and damaged pipe sections. All lines shall have a minimum clearance of 6 inches from each other and 12 inches from lines of other trades. Parallel lines shall not be installed directly over each other. In solvent welding, use only the specified primer and solvent cement and make all joints in strict conformance with the manufacturer's recommended methods including wiping all excess solvent from each weld. Allow solvent welds at least 15 minutes setup time before moving or handling and 24 hours curing time before filling. PVC pipe shall be installed in a manner, which will provide for expansion and contraction as recommended by the pipe manufacturer. Center load all plastic pipe prior to pressure testing. All threaded plastic-to-plastic connections shall be assembled using Teflon tape or Teflon paste. For plastic-to-metal connections, work the metal connections first. Use a non-hardening pipe dope an all threaded plastic-to-metal connections, except where noted otherwise. All plastic-to-metal connections shall be made with plastic female adapters.

801-5.4 Installation of Valves, Valve Boxes, and Special Equipment. *ADD the following after the last paragraph:*

Automatic control valves, and gate valves shall be installed in the approximate locations indicated on the Drawings. Valves shall be installed in shrub areas whenever possible. Install all valves as indicated in the detail Drawings. Valves to be installed in valve boxes shall be installed one valve per box.

801-5.5.1 General. *ADD the following after the last paragraph:*

Irrigation heads shall be installed as indicated on the Drawings. Riser nipples shall be of the same size as the riser opening in the sprinkler body. Install all assemblies specified herein according to the respective detail Drawings or Specifications, using best standard practices.

801-5.6 Automatic Control System Installation. *ADD the following after the last paragraph:*

All Automatic Irrigation valves shall be connected to the existing irrigation controllers.

Three (3) sets of laminated 11”x17” new controller charts and 8.5”x11” data sheets shall be provided for all irrigations systems.

801-5.7.3 Sprinkler Coverage Test. *ADD the following after the last paragraph:*

Coverage testing shall be performed for overhead irrigation.

Adjust valves, align heads, and check the coverage of each system prior to coverage test. If it is determined by the Engineer that additional adjustments or nozzle changes will be required to provide proper coverage, make all necessary changes or adjustments prior to any planting. The entire system shall be operating properly before any planting operations commence.

Do not allow or cause any of the work of this Section to be covered up or enclosed until it has been observed, tested and accepted by the Engineer. Notify the Engineer a minimum of 48 hours in advance where and when the work is ready for testing. When the sprinkler system is completed, perform a coverage test of each system in its entirety to determine if the water coverage for the planted areas is complete and adequate in the presence of the Engineer.

Irrigation drip line to be installed per plans. The contractor shall be responsible for making field adjustments to provide proper drip coverage. Install drip line on finish grade per manufacturer's instructions. Immediately after installing drip line, flush system to the satisfaction of the Engineer. Drip line coverage to be observed, tested, and approved by the Engineer prior to burying with top soil. Notify the Engineer a minimum of 48 hours in advance where and when the work is ready for testing.

801-5.7.4 Operational Test. *ADD the following after the last paragraph:*

Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the Plans, or where the system has been willfully installed as indicated on the Drawings when it is obviously inadequate, without bringing this to the attention of the Engineer. This test shall be accepted by the Engineer and accomplished before starting any planting. Final inspection will not commence without record Drawings as prepared by the Contractor. During the maintenance period adjust and maintain the irrigation system in a fully operational condition providing complete irrigation coverage to all intended plantings. Clean-up shall be made as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed, and any damage sustained on the work of others shall be repaired to original conditions.

801-6 MAINTENANCE AND PLANT ESTABLISHMENT.

DELETE entire section and SUBSTITUTE with the following:

Landscape maintenance and plant establishment period shall be a minimum of ninety (90) days after "Date of Acceptance of Installation" of all planting areas. Request in writing from the Engineer, notification of the date of the start of the maintenance and planting establishment period. At the acceptance of all planting areas, request in writing from the Engineer notification of the date of the completion of the maintenance period. The maintenance period shall not officially begin or end without written notification from the Engineer. Construction fencing shall remain until after the maintenance period is complete or as directed by the Engineer. Maintain all planted areas on a continuous basis as they are completed during the progress of the work and during the establishment and

maintenance period, and shall continue to maintain them until final acceptance in accordance with the following:

a) Water, weed, fertilize, edge, prune, spray as necessary to promote a healthy growing condition. Maintain lawn at a mowing height recommended by the city. All planted areas shall be kept free of debris and weeds. Keep project neat and attractive throughout the maintenance period.

b) Apply organic herbicides for weed control, as needed or directed by City, in accordance with manufacturer's instructions and applicable laws and regulations. Organic pre-emergent herbicide shall be required in all planter, shrub and ground cover areas. Remedy damage resulting from weed control.

c) Exterminate rodents and insects as required and in accordance with applicable City of Irvine policies, State and Federal laws and regulations. Remedy damage from pest control.

d) Adjust the irrigation system to sufficiently saturate root zone without rotting trees, shrubs, and ground cover. Do not exceed IRWD allocation.

e) Repair or replace any damaged item caused by vehicles, vandals, rabbits, rodents, bicycles, or foot traffic during the maintenance period.

f) Fertilize with "Organic/JTM Complete" at 30 lbs./1,000 s.f. at the beginning and end of the maintenance period (twice) or as indicated by the agronomic soils test.

All inspections herein specified shall be made by the City. Request inspection at least forty-eight (48) hours in advance of the time the inspection is required. Requested inspections, subsequently canceled without twenty-four (24) hours-notice, will be billed to the Contractor.

Inspection is required for, and not necessarily limited to, the following parts of the work:

a) Incorporation of soil amendments and fine grading.

b) Prior to digging plant pits for shrubs.

c) During backfilling of plant pits with amended backfill.

d) Final inspection at the end of the maintenance period.

e) Irrigation Inspection / Coverage Test prior to planting.

801-8 PAYMENT.

DELETE entire section and SUBSTITUTE with the following:

Payment for **Mobilization/Demobilization** shall be made at the contract lump sum price per **Bid Item No. 1** and shall be considered full compensation for furnishing labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing

and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Demolition and Site Clearing** shall be made at the contract lump sum price per **Bid Item No. 2** - **Site Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Weed Abatement** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Soil Preparation & Fine Grading** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Shrub – 1 gallon** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Shrub – 5 gallon** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Shrub – 15 gallon** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **24" Box Tree** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **36" Box Tree** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **48" Box Tree** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Irrigation System** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Wood Mulch – 3" Depth** shall be made at the contract lump sum price per **Bid Item No. 4 – Landscape/Irrigation Improvements** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

Payment for **Maintenance and Plant Establishment** shall be made at the contract lump sum price per **Bid Item No. 5 – Maintenance and Plant Establishment** and shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in furnishing and installing, complete in place, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

801-9 GUARANTEE.

ADD the following Subsection:

The guarantee shall be valid unless existing equipment utilized on the project fails within the guarantee period. Should any problem with the irrigation system be discovered within the guarantee period the Contractor shall correct it within ten (10) calendar days after receipt of written notice from City(and at no additional expense to City). When the nature of the repairs, as determined by the City, constitute an emergency (i.e. broken pressure line) the City may proceed to make repairs at the Contractor's expense. Any and all damages to existing improvement resulting either from faulty materials or workmanship, or from the necessary repairs to correct same, shall be repaired to the satisfaction of the owner by the Contractor, all at no additional cost to the City. Guarantee shall be submitted on Contractors own letterhead as follows:

GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications, ordinary wear and tear and unusual abuse, or neglect excepted. We shall repair or replace any defective material during the period of one year after date of filing of the Notice of Completion and also repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the owner. We shall make such repairs or replacements within 10 calendar days following written notification by the owner. In the event of our failure to make such repairs or replacements within the time specified after receipt of written notice from owner, we authorize the owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

SECTION 802 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Protection of trees that are to remain, but interfere with, or are affected by, execution of the Work, whether temporary or new construction.
   2. Pruning of trees that are to remain.

B. Related sections:
   1. 312301 – Excavation and Fill for Landscape.
   2. 329119 – Landscape Grading

1.2 DEFINITIONS

A. Arborist or Certified Arborist: As referenced here in all “arborists” or “certified arborists” shall be at minimum an ISA Certified Arborist or and ASCA Registered Consulting Arborist unless other specified.

B. Caliper: Diameter of a trunk measured by a diameter tape at 4’-6” above the ground or DBH (diameter at breast height). (Standard as defined by the ISA – International Society for Arboriculture).

C. Tree Protection Zone (TPZ): Area surrounding individual trees or groups of trees to be protected during construction, and defined by calculating the critical root radius (crr). The crr is the tree trunk caliper (diameter) at 4’-6” above the ground multiplied by 1.5, the result expressed in feet. The root protection zone is the outside edge of a concentric circle with the crr as its radius extending from the truck of the tree or as indicated on the drawings whichever is larger. Note that a particular tree/plant sensitivity or tolerance to construction disturbance may require a larger TPZ area than the area based on this calculation. This is to ensure that both the feeder and structural support roots are undamaged to maintain the integrity of the tree.

D. Vegetation: Trees, shrubs, groundcovers, grass and other plants.

1.3 SUBMITTALS

A. See Division 01 – General Requirements.

B. Qualifications: Provide qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with South Pointe Infrastructure Phase 1s and addresses, names and addresses of architects and owners, and other information specified.

C. Certification: Provide certification by a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

1.4 QUALITY ASSURANCE

A. Tree Service Qualifications: Engage an experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will maintain an experienced, qualified arborist on the Project site on a full-time basis during execution of the Work.

1. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where the Project is located.

1.2 GENERAL PROVISIONS

A. Trees and areas scheduled for work under this contract shall be identified in the field and indicated on plans and specifications where practical. Where this is not practical, work shall be directed in field by Project Manager.

B. Provision for access to the site for heavy equipment will be as directed by Owner. Equipment shall use prescribed temporary roadways and shall not be allowed in areas other than designated construction areas and designated roadways. Open grass areas which are altered or disturbed by equipment during the Work shall be returned to pre- existing conditions at no additional cost to Owner.

C. Contractor shall protect root areas and crowns of trees not designated for work under this contract from damage from operations and equipment. The Contractor shall repair such damage at no cost to Owner. Provide fences or other barricades where necessary for such protection.

D. The Owner shall be compensated for damage to existing trees designated to remain, by this Contractor Compensation shall be in the following manner:

1. 0" to 4" Caliper $500.00 / Tree 2. 4" to 8" Caliper $2,000.00 / Tree

3. 8" Caliper and Over $5,000.00 / Tree

37. This amount will be deducted from the final payment.

1.3 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

B. Before commencing tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities. Review tree protection and trimming procedures and responsibilities. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch (25 mm) in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches (100 mm) or more; do not obtain from bogs or marshes.

B. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

2.2 FENCES, BARRICADES AND ARMORING

A. Fencing:

1. Provide temporary fencing for construction operations.

2. Construction: Commercial grade chain link.

a. Install to comply with ASTM F 567 and with manufacturer’s written instructions.

3. Height: 6 feet.

4. Locations to be outside the dripline of trees or as indicated in drawings.

B. Barricades and Armoring:

1. Southern Yellow Pine or Douglas Fir.

2. Posts: Four (4") inches X four (4") inches, eight (8') feet long.

3. Rails: Two (2") inches X eight (8") inches, twelve (12') feet long.

4. Armoring: Two (2") inches X four (4") inches, five (5') feet long.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Protection: Provide temporary fencing, barricades, or other suitable guards located outside the drip line (outer perimeter of branches) to protect remaining trees and other plants from damage.

B. Protect tree root systems from damage due to noxious materials caused by run-off or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

C. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line, and prevent soil compaction over root systems.

D. Do not allow fires under or adjacent to remaining trees or other plants.

3.2 FENCES AND BARRICADES

A. Fences and/or barricades shall be placed where shown on the Drawings or as herein described.

B. In general, fences and barricades are intended to alert those working on the project that equipment and machinery are not to be stored or operated in the feeder root zone. Where not shown, the fences and barricades shall be placed not closer than nine (9x) times the caliper of the tree to the tree, or at the dripline. The exact location of fences or barricades shall be determined by the Project Manager.

C. Posts shall be installed six (6') feet on center maximum, three (3') feet deep. Rails shall be installed approximately two feet, six inches (2'-6") and five (6') feet above existing finished grade. Post shall be installed plumb and rails level, and as approved. Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing pavement or concrete to remain, provide appropriate means of post support acceptable to owner. Other means of support may be required in archaeological areas where excavation is not allowed and will need approval by Owner's representative.

1. Posts are prohibited to be set in the ground within the Tree Protection Zone.

3.3 TREE PROTECTION

A. All trees to be preserved on the property shall be protected against damage during construction operations by fencing as shown; subject to the approval of the Owner. The tree protection shall be placed before any excavating or grading is begun and maintained in repair for the duration of the construction work unless otherwise directed. No material shall be stored or construction operation shall be carried on within a distance as shown, of any tree to be saved, or within the tree protection fencing. Tree protection shall remain until all work is completed.

B. Armoring: In close quarters, as approved, a single tree shall be protected by strapping (not nailing) a continuous shield of wood two (2") inches X four (4") inches X five (5') feet around the trunk.

3.4 REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations to prevent progressive deterioration.

3.5 DISPOSAL OF WASTE MATERIAL

A. Burning on Owner's Property: Burning is not permitted on Owner's property

B. Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property. Cost of disposal to be paid by Contractor.

SECTION 803 – OPERATION AND MAINTENANCE OF PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Scheduling of maintenance.
2. Monitoring, adjustment and repair of sprinkler irrigation.
3. Mowing, edging and trimming of lawn areas.
4. Pruning and trimming of trees and shrubs.
5. Weeding of lawn and bed areas.
6. Application of fertilizers and pesticides.
7. General site cleanup and removal of trash.
8. Provide long term landscape maintenance instructions.
9. Cold Weather Maintenance of Irrigation System.

C. RELATED SECTIONS

1. Section 320192 – Landscape Maintenance – 1 year (if accepted by Owner).
2. Section 328000 – Irrigation.
3. Section 329219 – Seeding.
4. Section 329223 – Sodding.
5. Section 329300 – Plants.

1.2 REFERENCES

A. ANSI Z60.1 - American Standard for Nursery Stock; 1996.

B. ANSI A300 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 1995.

1.3 SUBMITTALS

A. See Section 013300 - Submittal Requirements, for submittal procedures, if applicable.

B. Prior to commencing the landscape installation, submit to Owner's Representative for approval, two (2) copies each of the following items:

1. Proposed schedule of establishment operations.

2. All licenses and insurances required by the Owner, City, County, State of Texas, or any other entity pertaining to this Work.

C. During the landscape establishment period at monthly intervals submit to Owner's Representative two (2) copies each of the following items:

1. Written application recommendation by a licensed pesticide applicator for any proposed weed, pest and disease control which is intended to be used where restrictions are required by the Department of Agriculture.

2. Provide monthly records of all fertilizers and pesticides used for the project.

3. Provide each month of the establishment period, written reports and logs as follows:

a. Provide monthly status report of site conditions outlined weekly.

b. Provide monthly status report of irrigation controller operations and adjustments required.

D. At the completion of Work, furnish two (2) copies of written maintenance instructions to the Owner and one (1) copy to the Owner's Representative for maintenance and care of the sprinkler irrigation system, lawns and all planting area throughout the year.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Perform all Work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such Work.

2. Provide for all inspections and permits required by Federal, State, or local authorities in furnishing, transporting, and installing of all agricultural chemicals.

3. Provide monthly records of all fertilizers and pesticides used for the project.

B. Work Force:

1. Experience: The landscape establishment firm shall have a full time foreman assigned to the job for the duration of the contract. He shall have a minimum of four years experience in landscape establishment supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.

2. Labor Force: The landscape establishment firm's labor force shall be thoroughly familiar and trained in the Work to be accomplished and perform the task in a competent, efficient manner acceptable to the Owner.

3. Supervision: The designated foreman shall directly supervise the Work force at all times. Notify the Owner of all changes in supervision.

4. Identification: Provide proper identification at all times for landscape establishment firm's labor force. Be uniformly dressed in a manner satisfactory to the Owner.

1.5 SCHEDULING

A. Perform all establishment during hours mutually agreed upon between Owner and Contractor.

B. Work force shall be present at the project site at least once a week, and as often as necessary, to perform specified establishment in accordance with the approved establishment schedule.

1.6 PROJECT CONDITIONS

A. Site Visit: At beginning of establishment period, visit and walk the site with the Owner's Representative to clarify scope of Work and understand existing project/site conditions.

B. Documentation of Conditions: Document general condition of existing trees, shrubs, vines, ground covers and lawn and replace all plant materials which are damaged or dying, if any.

C. Irrigation System: Document general condition of existing irrigation system, making sure that faulty electrical controllers, broken or inoperable sprinklers are repaired or replaced.

1.7 WARRANTY

A. Refer to Sections:

1. 328000 – Irrigation. 2. 329300 – Plants.

1.8 MAINTENANCE

A. Ninety (90) Day Establishment Period and Maintenance Service:

1. The Contractor's Ninety (90) Day Establishment Period shall commence upon the issuance of the Certificate of Substantial Completion from the Landscape Architect.

2. The cost of landscape maintenance until the end of the Ninety (90) Day Establishment Period will be at the expense of the Contractor.

3. Sprinkler Irrigation System: Monitor and adjust the duration and frequency of the watering schedule, adjustment of heads for coverage and elevation, repair leaks, and all other Work required to maintain a complete Working sprinkler irrigation system.

4. Trees, Shrubs, Ground covers and Vines: The Contractor's responsibilities for the new planting shall consist of, but not be limited to; watering, fertilization, weeding, mulching, re-staking, adjustment of tree staking and/or guying, resetting plants to proper grades or upright position, maintenance of the tree rings, and protecting the plantings from insects and disease infestation.

5. Lawns: The Contractor's maintenance of new lawns shall consist of mowing, edging, watering, fertilization, weeding, repair of all erosion and reseeding and

re- sodding as necessary to establish a full and uniform stand of the specified grasses.

B. Certificate of Substantial Completion:

1. Date of Review: Submit a written request to the Owner's Representative and Landscape Architect at least five (5) Working days prior to anticipated date of review.

2. Substantial Completion will be granted when the progress of the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

C. Certificate of Final Acceptance:

1. Date of Review: Submit a written request to the Owner's Representative at least five (5) Working days prior to anticipated date of review at the end of the Establishment Period.

2. Work will be accepted by the Owner's Representative upon satisfactory completion of all Work, including Establishment Period, but exclusive of replacement of materials under the Warranty Period.

3. Should the Contractor’s own Work prevent Final Acceptance of the site, the site shall be maintained at the Contractor’s expense until Final Acceptance of the Contractor’s Work.

D. Corrective Work:

1. Work requiring corrective action or replacement in the judgment of the Owner’s Representative shall be performed within ten (10) calendar days after the Final Review.

2. Corrective Work and materials replacement shall be performed in accordance with the Drawings and Specifications, and shall be made by the Contractor at no cost to the Owner.

3. After corrective Work is completed, the Contractor shall again request a Final Review for Final Acceptance as outlined above.

4. Continue establishment of all landscaped areas until such time as all corrective measures have been completed and accepted.

E. Conditions for Acceptance of Work at End of Establishment Period:

1. Each plant shall be alive and thriving, showing signs of growth and no signs of stress, disease, or any other weaknesses.

2. All plants not meeting these conditions shall be replaced and a 90 Day Establishment Period commenced for such plants.

1.9 COMISSIONING

A. Upon Final Acceptance, the Owner will assume responsibility for maintenance of the Work unless the proposal described within Section 320192 – Landscape Maintenance– 1 Year is submitted by the Contractor and accepted by the Owner. Issuance of Final Acceptance will not relieve the Contractor of their warranty obligations.

B. If accepted, the One (1) Year of Landscape Maintenance will commence on the date of Final Acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials and equipment necessary for maintenance operations will be provided by the Contractor. The selection of materials to be used for maintenance operations will be left to the discretion of the Contractor. Any materials, and the application of those materials, must comply with all federal, state, county, city and local laws and codes. The Contractor shall use established and accepted horticultural practices. Failure to do so may result in plant replacement at the Contractor's expense.

B. Water: Clean, potable and fresh, furnished and paid for by the Owner.

C. Annuals/Perennials: Nursery-grown in pots, full, healthy plants just ready to bloom matching on site materials.

D. Lawn Seed for Re-seeding: Match existing lawn mix.

E. Lawn Sod for Re-sodding: Match existing sodded lawn.

F. Replacement Tree Guys, Stakes, Ties and Wires: Match existing materials on the site. Provide detail(s) in 8-1/2 in. x 11 in. format for staking which will vary from the site staking due to unusual or unknown site conditions.

G. Required maintenance equipment:

1. Contractor's option, well maintained in first class condition, capable of successfully executing the Work.

PART 3 - EXECUTION

3.1 PREPARATION

A. Debris and Litter Removal:

1. It shall be the responsibility of the Contractor to inspect the site weekly and remove all litter and debris accumulations.

3.2 APPLICATION

A. Supplemental Watering:

1. It shall be the responsibility of the Contractor to assure that the correct watering of plant materials is being accomplished through the use of the irrigation system, hand-watering, ‘gator’ bags, water truck, etc.

2. Contractor shall monitor settings of automatic sprinkler controls and make necessary adjustments according to climatic changes.

3. Contractor shall not be responsible for supplemental watering areas that do not have irrigation systems, unless required by the Contract.

4. Contractor shall be responsible for damages to irrigation system caused by mowing and other maintenance operations. Such damage will be repaired immediately at the Contractor’s expense.

B. Trees, Shrubs and Vines:

1. The Contractor shall use established and accepted horticultural practices in the care of the plant material.

2. Maintain originally specified depth of mulch to reduce evaporation and frequency of watering.

3. Check for moisture penetration throughout the root zone at least once per week.

4. Weed Control:

a. All materials and equipment necessary for maintenance operations will be provided by the Contractor. The selection of materials to be used for maintenance operations will be left to the discretion of the Contractor. Any materials, and the application of those materials, must comply with all federal, state, county, city and local laws and codes. The Contractor shall use established and accepted horticultural practices. Failure to do so may result in plant replacement at the Contractor's expense.

b. All lawn areas, tree rings and planting areas will be maintained in a healthy weed-free condition.

5. Pruning:

a. Remove any broken, damaged, or crossing branches not removed at installation.

b. No stripping of lower branches ('raising' or 'skirting') or cutting back ('heading' or 'topping') of trees will be permitted. The Contractor shall use established and accepted horticultural practices in the care of the plant material.

c. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.

d. Do not use pruning paint or pruning compounds on pruning cuts. Allow the cuts to callous naturally.

e. Do not prune or clip shrubs into balled or boxed forms unless specifically called for by design.

C. Groundcovers:

1. Check for moisture penetration throughout the root zone at least twice a month.

2. Water as frequently as necessary to maintain healthy growth of ground covers.

3. Weed Control:

a. All planting areas will be maintained in a healthy weed-free condition by the use of pre- and post-emergent herbicides or hand-pulling.

b. To avoid root damage to young plants, minimize weed growth and protect the chemical barrier of pre-emergent herbicides, cultivation of beds and tree wells will not be permitted.

D. Lawns:

1. Water lawns at such frequency as weather conditions require replenishing soil moisture to 6 in. below soil surface.

2. Apply enough water to newly sodded areas to wet the soil to a depth of 2”-3” (approx. ¼ inch in clay soils). In newly seeded areas; provide only enough water to keep the soil surface moist, but not water logged. In established lawn areas, apply enough water to wet the soil to a depth of 6” (approx. ½ inch in clay soils). These application rates are suggestions only. The frequency and actual duration of watering cycles will vary according to weather, soil type, slopes, etc. The Contractor will be solely responsible for providing the optimum watering schedule for the project.

3. In established areas, water during early morning hours when the wind is calmest.

4. Weed Control:

   a. All lawn areas will be maintained in a healthy weed-free condition by the use of pre- and post-emergent herbicides or hand-pulling. Any materials, and the application of those materials, must comply with all federal, state, county, city and local laws and codes. The Contractor shall use established and accepted horticultural practices. Failure to do so may result in plant replacement at the Contractor’s expense.

   b. Provide the Owner with 48 hour notice of chemical applications. Within 48 hours of application, provide Owner with a copy of the applicator’s log book showing the time, date, and type and amount of chemical used.

5. Mowing and Edging:

   a. Mowing lawn/grass areas shall be accomplished with sharp, properly adjusted mowers of the correct size for the various areas

   b. Mowing frequency shall be weekly. Blade heights shall be set according to the type of turf and weather conditions.

   c. Trim edges with each mowing or as required for neat appearance. Edging shall be performed with a blade type mechanical edger, shovel or herbicide. String whips shall not be permitted. Remove clippings.

d. In the event of a prolonged rainy period and a surge of leaf growth is anticipated, the mower height may be re-adjusted to prevent "scalping" or skinning of lawn on preceding cuts. At no time shall more than 1/3 of the leaf blade be removed in one mowing.

6. Lawn Fertilizer: Applied during the establishment period at 45 days after turf installation.

   a. Preparation: Water areas to receive fertilizer 48 hour prior to application. Allow leaf surface to dry before fertilizer application. Do not apply fertilizer to turf wet from dew, rain or irrigation. Water lightly after application to remove fertilizer granules from leaf blades.

   b. Application: Apply no more than ½ lb. of actual nitrogen per 1000 square feet.

7. Reseeding of Lawn Areas: Match existing seed mix of adjacent areas.

8. Until the establishment of the turf, the Contractor will be responsible for replacing soils that have eroded onto the paved areas. Residual soils on paving will be removed and if not mingled with objectionable materials, may be re-used in eroded areas.

9. Immediately upon observing any lawn grass spreading into shrub or ground cover areas, the Contractor shall initiate a program of mechanical removal and maintain this program throughout the maintenance period.

10. Treat any lawn grass appearing in paved areas with a non-selective foliar herbicide. Do not use brush killers or soil sterilants.

11. Special effort shall be given to the control of fire ants infesting the site. After control is accomplished, the ant mounds shall be removed.

E. Annuals and Perennials:

1. Care for all seasonal color and perennial beds per established and accepted horticultural practices. Failure to use proper horticultural practices may result in replacement of the plant material at the Contractor’s expense.

2. Weed Control:

   a. All planters with annuals and perennials shall be weed-free at all times.

3. Pruning:

a. Limit pruning to removal of damaged or dead twigs and foliage.

b. Remove spent flowers on a weekly basis.

4. Replacements of Annuals:

a. Replace annuals when materials exhibit a "spent" condition or as directed by the Owner or Landscape Architect.

5. Thoroughly cultivate soil, incorporate slow release fertilizers and rake smooth.

F. Insects, Pests and Disease Control:

1. Contractor shall be continuously alert for signs of the presence of insect or disease infestation. The Contractor shall immediately take action to control to infestation. Plant material that is damage or that dies from insect or disease infestation while under the Contractor’s care shall be immediately replaced at the Contractor’s expense.

2. Application: Perform spraying for insect, pest and disease control only by licensed personnel. Spray with extreme care to avoid all hazards to any person or animals in the area or adjacent areas.

G. Irrigation System:

1. Repair without charge to the Owners all damages to system caused by Contractor's operations. Perform all repairs within 24 hours of the damage occurring.

2. Report promptly to the Owner all accidental damage not resulting from Contractor's negligence or operations.

3. Do not run the irrigation system during periods of rain. Set and program automatic controllers for seasonal water requirements.

4. Twice a month, use a probe or other acceptable tool to check the rootball moisture of representative plants as well as the surrounding soil.

5. Cleaning and Monitoring the System:

a. Continually monitor the irrigation systems to verify that they are functioning properly as designed. Make program adjustments required by changing field conditions.

b. If applicable clean pump filter and strainer as often as necessary to keep the irrigation systems free of sand and other debris.

c. Prevent spraying on windows, building walls, (game courts) by balancing the flow control on the remote control valves and the adjustment screws on the sprinkler heads. Do not allow spray to atomize and drift.

6. Winterization:

a. Normally, the irrigation system should be left operational during the winter. While the frequency may be as little as one cycle per month, the landscape will need supplemental water if winter rainfall is not adequate.

b. Should winterization be necessary, the Contractor shall take any and all steps necessary to protect the irrigation system. It shall also be the Contractor's responsibility to take whatever steps necessary to protect the landscape and pavement from icing caused by the irrigation system.

c. The Contractor will re-activate the system as soon as the freezing conditions have ended.

3.3 CLEAN-UP

A. All areas shall be kept neat and orderly at all times. Debris from maintenance operations shall be gathered and shall not be allowed to remain in place in excess of two (2) hours. Remove all such debris from the site at the end of each day.

3.4 PROTECTION

A. Protect planting areas and lawns at all times against damage of all kinds for duration of maintenance period. Maintenance includes temporary protection fences, barriers and signs as required for protection. If any plants become damaged or injured, because sufficient protection was not provided, treat or replace as directed by Owner at no additional cost to the Owner.

SECTION 804 – LANDSCAPE MAINTENANCE – 90 DAY

PART 1 - GENERAL

1.1 SUMMARY

A. Following written notice to proceed from the Owner the Contractor shall begin a Ninety (90) Maintenance Period of all planting and irrigation installed per the Contract Documents. At this time the contractor will be responsible for all existing conditions in regard to the landscape planting and irrigation system.

1. Contact the Owner's Representative a minimum of 60 days prior to completion of the Ninety (90) Day Maintenance Period for consideration to extend the maintenance period.

2. Prior to beginning the extended maintenance period the Certificate of Final Acceptance must be approved by the Owner.

3. The Owner's signature date of the Certificate of Final Acceptance will designate the start of the Ninety (90) Day Maintenance Period.

B. The offer to extend the maintenance period will be at the discretion of the Owner and shall be bid separately of the Work necessary to complete the Contract Documents.

C. RELATED SECTIONS

1. Section 320190 – Operation and Maintenance of Planting.

2. Section 328000 – Irrigation.

3. Section 329219 – Seeding.

4. Section 329223 – Sodding.

5. Section 329300 – Plants.

1.2 SUBMITTALS

A. Refer to Section 320190 – Operation and Maintenance of Planting

B. Submit required materials to Owner's Representative upon completion of the Ninety (90) Maintenance Agreement.

1.3 PROJECT CONDITIONS

A. Site Visit: Prior to the beginning of the 90 Day maintenance period, the Contractor shall walk the site with the Owner's representative to clarify scope of work and understand existing project/site conditions.

B. Documentation of Conditions: Document general condition of existing trees, shrubs, vines, ground covers and lawn recording all plant materials which are damaged or dying, if any.

C. Irrigation System: Document general condition of existing irrigation system, making sure that faulty electrical controllers, broken or inoperable sprinklers are repaired or replaced

1.4 SCHEDULING

A. Perform all maintenance during hours mutually agreed upon between Owner and Contractor.

B. Work force shall be present at the project site at least twice a week and as often as necessary to perform specified maintenance in accordance with the approved maintenance schedule.

1.5 WARRANTY

A. Refer to Section 320190 – Operation and Maintenance of Planting.

PART 2 - PRODUCTS

38. Not Applicable

PART 3 - EXECUTIONS

39. Not Applicable

PART 9 – SITE FURNISHINGS

SECTION 900 – SITE FURNISHINGS

PART 1 - GENERAL

SUMMARY

A. Furnish all labor, material, equipment, supervision and related services necessary or incidental to the installation of the Work as shown or indicated on the Drawings and/or as specified.

B. Section Includes:

1. Furnish and install benches.
2. Furnish and install trash receptacles.
3. Furnish and install planter pots.
4. Furnish and install fire pits.
5. Furnish and install bollards.
6. Warranty and replacements.

C. Related Sections:

1. Drawings and General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
2. Section 329300 – Plants

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's current literature for the following items:

1. Color, finish and size for each type of furnishing.
2. Installation instructions and recommendations for general maintenance.
3. Shop drawings as noted.

B. Samples:

1. Material Color Chips and Samples: Required for each furnishing. Chip to be constructed using same material as the manufactured product and shall illustrate texture, color and configuration.

2. Physical Samples: Provide as requested by the landscape architect for review and approval. Sample to be identical to the specified product.

C. Shop Drawings: Installation and anchorage details for all manufactured items. Construction details for all pre-cast concrete or custom metal items.

1. Shop Drawings shall fully illustrate the full construction, connections, anchorage and attachment of all items. Shop Drawings shall be drawn to scale and shall include dimensioned and noted plans, elevations, sections and details.

1.3 QUALITY ASSURANCE

A. Applicable Standards: Review by Owner and Landscape Architect.

B. Compatibility with Adjacent Materials: Verify that all site furnishings are compatible with adjacent site improvements and that their installation shall not adversely affect either the site furnishings of existing or proposed site improvements.

C. Deliver and transfer manufacturer's warranty to owner.

1.4 DELIVERY, STORAGE AND HANDLING

A. Labeling: Furnish all materials in the manufacturers' unopened, original containers, bearing original labels showing quantity, description and name of manufacturer.

B. Delivery: Deliver and unload at the site on pallets and bound in such a manner that no damage occurs to the product.

C. Storage: Store products in a manner that will preclude all damages, stains, weathering etc. Damaged materials will be rejected. Remove all damaged materials from the job site immediately, and replace at no cost to Owner.

D. Handling: Furnish suitable equipment to locate all site furnishings carefully and efficiently. The installing contractor will be held responsible for damage during handling and installation. Remove, replace and/or repair as directed such damaged products at no cost to Owner.

1.5 SCHEDULING

A. Coordinate shop drawings and approvals, lead times, ordering, deliveries and installation of all furnishings such that there will be no delay in either opening the project or in delays to other trades work surrounding and adjacent to the furnishings.

1.6 WARRANTY

A. Manufacturer's Warranty: Contractor shall arrange manufacturer's warranty to the effect that all manufactured products shall carry a minimum one year manufactures warranty which shall be transferred to the owner at time of acceptance. The warranty period shall commence based on written documentation to be provided by the Landscape Architect establishing the date of acceptance of the installation. Early delivery shall not limit the installed warranty period.

B. Contractor's Warranty: Contractor shall warrant all workmanship in addition to the manufacturer's warranty for a period of one year from the date of acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Benches:

1. Provide benches as shown and specified on plans.

B. Trash Receptacles:

1. Provide receptacles as shown and specified on plans.

C. Planter Pots:

1. Provide pots as shown and specified on plans.

D. Fire Pits:

1. Provide firepits as shown and specified on plans.

E. Bollards:

1. Provide bollards as shown and specified on plans.

F. Alternate manufacturers if requested by contractor for consideration will be required to meet or exceed the selected manufacturer's finish design including shape and size, color, material, and warranty.

G. Condition:

1. All products are to be new and in first class condition.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Acceptance: Area will be accepted when furnishings are permanently installed in accepted positions.

B. Locations: Layout each item for approval in the general location as shown on the Drawings. Review with the Landscape Architect to confirm exact installation locations prior to final installation.

C. Special Precautions: Guard against staining or damaging of existing pavements and plantings where site furnishings are to be installed.

D. Paint exposed installation hardware to match furnishing color if required by drawings.

E. Shim all furnishings to level as directed in the field.

F. Acceptance: Do not install site and street furnishings prior to acceptance by Landscape Architect of area to receive such materials.

G. Special Precautions: Guard against staining or damaging of furnishings until acceptance by Landscape Architect.

H. Concrete Pads and Footings:

1. As shown in the Landscape Drawings.

3.2 REPAIRS

A. Replace all products, materials and workmanship found to be defective through the end of the warranty period.

B. Repair any scratches per the Manufacturer's recommendation.

C. Provide owner with Manufacturer's touch-up paint (1 – US quart minimum) for each painted furnishing. Supply literature necessary for ordering touch-up paint at a later date.

3.3 CLEANING

A. Keep all areas of work clean, neat and orderly at all times.

B. Clean up and remove all stains, packing and debris from the entire work area prior to Final Acceptance.

CITY OF IRVINE

PORTOLA SPRINGS COMMUNITY PARK
INDIGENOUS INTERPRETIVE SPACE – PHASE 1
Bid No. PK-26-0041

APPENDICES

APPENDIX A

COMMUNITY WORKFORCE AGREEMENT ATTACHMENTS

COMMUNITY WORKFORCE AGREEMENT
CORE EMPLOYEES LIST
PRE-JOB CONFERENCE FORM

COMMUNITY WORKFORCE AGREEMENT

BY AND BETWEEN

THE CITY OF IRVINE

AND

LOS ANGELES/ORANGE COUNTIES

BUILDING AND CONSTRUCTION TRADES COUNCIL

AND THE SIGNATORY CRAFT COUNCILS AND UNIONS

TABLE OF CONTENTS

		Page
ARTICLE 1	DEFINITIONS	3
ARTICLE 2	SCOPE OF THE AGREEMENT	5
ARTICLE 3	UNION RECOGNITION AND EMPLOYMENT	8
ARTICLE 4	UNION ACCESS AND STEWARDS	12
ARTICLE 5	WAGES AND BENEFITS	13
ARTICLE 6	HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAYS	14
ARTICLE 7	WORK STOPPAGES AND LOCKOUTS	16
ARTICLE 8	WORK ASSIGNMENTS AND JURISDICTIONAL DISPUTES	20
ARTICLE 9	MANAGEMENT RIGHTS	21
ARTICLE 10	SETTLEMENT OF GRIEVANCES AND DISPUTES	23
ARTICLE 11	REGULATORY COMPLIANCE	25
ARTICLE 12	SAFETY AND PROTECTION OF PERSON AND PROPERTY	25
ARTICLE 13	TRAVEL AND SUBSISTENCE	26
ARTICLE 14	APPRENTICES	26
ARTICLE 15	WORKING CONDITIONS	27
ARTICLE 16	PRE-JOB CONFERENCES	28
ARTICLE 17	LABOR/MANAGEMENT COOPERATION	28
ARTICLE 18	SAVINGS AND SEPARABILITY	29
ARTICLE 19	WAIVER	29
ARTICLE 20	AMENDMENTS	29
ARTICLE 21	DURATION OF THE AGREEMENT	30
ARTICLE 22	MISCELLANEOUS PROVISIONS	32
ATTACHMENT A – LETTER OF ASSENT		34
ATTACHMENT B – ZIP CODES		36
ATTACHMENT C – CRAFT REQUEST FORM		37
ATTACHMENT D – LIST OF NEUTRAL ARBITRATORS		39

CITY OF IRVINE
COMMUNITY WORKFORCE AGREEMENT

This Community Workforce Agreement ("**Agreement**") is entered into effective as of November 1, 2023, by and between the City of Irvine, a municipal corporation ("**City**"), the Los Angeles/ Orange Counties Building and Construction Trades Council ("**Trades Council**"), and the signatory craft councils and local unions signing this Agreement (collectively, the "**Union**" or "**Unions**"). This Agreement establishes certain labor relations policies and procedures for the City, the Contractors awarded contracts for Project Work and for the crafts persons employed by the Contractors and represented by the Unions engaged in the Project Work as more fully described below. The City, Trades Council and Unions are hereinafter referred to herein, as the context may require, as "Party" or "Parties."

It is understood by the Parties that for the duration of this Agreement, it shall be the policy of the City for all Project Work (as defined in Section 2.2.) to be contracted exclusively to Contractors who agree to execute and be bound by the terms of this Agreement, directly or through the Letter of Assent (a form of which is attached as **Attachment A**), and to require each of their subcontractors, of whatever tier, to become so bound; provided, however, that this obligation shall be fully discharged by including a provision in City's agreements with Contractors that requires execution of the Letter of Assent by each of Contractors subcontractors. The City shall include, directly or by incorporation by reference, the requirements of this Agreement in the advertisement of and/or specifications for each and every contract for Project Work to be awarded by the City.

It is further understood that the City shall administer and enforce the obligations of this Agreement to ensure that the benefits envisioned from it flow to all Parties, the Contractors and crafts persons working under it, and the residents of the City. The City shall therefore designate a "CWA Administrator," either from its own staff or an independent contractor. The CWA Administrator will be charged with responding to inquiries about the CWA, to serve as the City's liaison for Contractors and other persons related to the CWA, to monitor compliance with this Agreement; and to assist, as the authorized representative of the City, in developing and implementing the programs referenced herein.

ARTICLE 1
DEFINITIONS

Section 1.1 "**Agreement**" or "**CWA**" means this Community Workforce Agreement.

Section 1.2 "**Apprentice**" means those craft employees indentured and participating in a Joint Labor/Management Apprenticeship Program approved by the State of California, Department of Industrial Relations, Division of Apprenticeship Standards.

Section 1.3 "**City Residents**" means individuals residing in those U. S. Postal Service zip codes which overlap all of the City of Irvine, as set forth in "**Attachment B**" attached hereto.

Section 1.4 "**Construction Contract**" or "**Construction Contracts**" means any contract entered into by the City, for the construction of Project Work as specified in Section 2.2.

Section 1.5 "**Contractor**" means any individual firm, partnership or corporation, or combination thereof, including joint ventures, which is an independent business enterprise and which has entered into a Construction Contract with the City or any of its contractors or any of the City's or contractor's subcontractors of any tier, with respect to the performance of any non-excluded Project Work under contract terms and conditions approved by the City and which incorporate this Agreement.

Section 1.6 "**City**" means the City of Irvine.

Section 1.7 "**CWA Administrator**" means the City's authorized representative who will be the liaison between the City, Contractors, and the Unions. The CWA Administrator is charged with responding to inquiries about the CWA and, in the City's sole discretion, reasonably monitoring compliance with the CWA.

Section 1.8 "**Joint Labor/Management Apprenticeship Program**" means a joint Union and Contractor administered apprenticeship program certified by the State of California, Department of Industrial Relations, Division of Apprenticeship Standards.

Section 1.9 "**Letter of Assent**" means the document that each Contractor (of any tier) must sign and submit to the City and the Trades Council, before beginning any non-excluded Project Work, which formally binds such Contractor(s) to adherence to all the forms, requirements and conditions of this Agreement. The approved form of the Letter of Assent is attached hereto as "**Attachment A.**"

Section 1.10 "**Master Labor Agreements**" means the local collective bargaining agreements of the signatory Unions having jurisdiction over the Project Work and which have signed this Agreement.

Section 1.11 "**Project**", "**Project Work**", "**City Project**", or "**City Project Work**" means the demolition and construction work to be performed on City property or within easements secured by the City consisting of the construction of public works, pursuant to a Construction Contract entered into by the City.

Section 1.12 "**Specialty Contract**" means a contract for Project Work let by the City with a specialty contractor which is either limited to a particular single trade or craft or limited to a singular scope of work (*i.e.,* installing a toilet.)

Section 1.13 "**Specialty Contractor**" means a contractor which is either limited to a particular single trade or craft or limited to a singular scope of work (*i.e.,* installing a toilet.)

Section 1.14 "**Steward**" means a person designated by a signatory Union pursuant to perform the functions defined in Section 4.2.

Section 1.15 "**Subscription Agreement**" means the contract between a Contractor and a Union's Labor/Management Trust Fund(s) that allows the Contractor to make the appropriate fringe benefit contributions in accordance with the terms of the Master Labor Agreements.

Section 1.16 "**Veteran**" means a veteran as defined in Title 38, Section 101(2) of the United States Code as the same may be amended or re-codified from time to time.

ARTICLE 2
SCOPE OF THE AGREEMENT

Section 2.1 General. This Agreement shall apply to all of the City Project Work performed by those Contractor(s) of whatever tier that have contracts awarded for such work.

Section 2.2 Specific. Project Work covered by this Agreement is defined and limited to:

2.2.1 All construction and major rehabilitation work pursuant to prime multi-trade Construction Contracts that exceed five hundred thousand dollars ($500,000) and all subcontracts flowing from those prime multi-trade Construction Contracts; and

2.2.2 All prime Specialty Contracts, that exceed one hundred fifty thousand dollars ($150,000) and all subcontracts flowing from those prime Specialty Contracts; and

2.2.3 The thresholds set forth in sections 2.2.1 and 2.2.2 shall also apply to work contracted for, in whole or in part, by the City to be performed at the Great Park (such as the planned amphitheater project); and

2.2.4 The City may, at any time and at its sole discretion, determine to build additional buildings, facilities, and other projects under this Agreement which are not otherwise covered as Project Work.

2.2.5 This Agreement is not intended to apply to and shall not apply to any work performed at any time prior to the effective date of this Agreement, or after the expiration or termination of this Agreement, except as otherwise provided herein. This Agreement shall in no way limit the City's right to terminate, modify or rescind any Construction Contract and/or any related subcontract or agreement. Should the City terminate, modify, or rescind any contract or agreement for construction that does not fall within the scope of this Agreement and thereafter, during the term of this Agreement, authorize that work be commenced on any contract for such construction (where such work qualifies as Project Work under Sections 2.2.1 through 2.2.4), such contract for construction shall be performed under the terms of this Agreement.

Section 2.3 Bundling of Contracts.

2.3.1 The City, in its sole discretion, may seek to group (or "bundle") for bidding, contracts not meeting the threshold of Section 2.2 above, in which case, if the bundled contracts exceed the thresholds under Sections 2.2.1 through 2.2.4, such bundled contracts shall be within the scope of this Agreement. Small contracts for like types of work, scheduled to be undertaken at the same facility or on the same project site, and within the same timeframe, will be considered for such bundling, consistent with economies of scale, and the purposes of this Agreement; and

2.3.2 Project Work will not be intentionally split, divided or otherwise separated for contract award purposes to avoid application of this Agreement.

Section 2.4 Applicability. This Agreement shall not apply to any work of any Contractor other than that on Project Work specifically covered by this Agreement.

Section 2.5 Exclusions. Items specifically excluded from the scope of this Agreement include the following:

2.5.1 Work of non-manual employees, including but not limited to: superintendents; teachers; supervisors (except those covered by Master Labor Agreements above the level of general foreman); staff engineers; timekeepers; mail carriers; clerks; office workers; messengers; guards; safety personnel; emergency medical and first aid technicians; and other professional, engineering, executive, administrative, supervisory and management employees;

2.5.2 Equipment and machinery owned or controlled and operated by the City;

2.5.3 All off-site manufacture and handling of materials, equipment or machinery; provided, however, that lay down or storage areas for equipment or material and manufacturing (prefabrication) sites, dedicated solely to the Project, and the movement of materials or goods between such locations and a Project site are within the scope of this Agreement;

2.5.4 All work performed by City employees and/or the CWA Administrator;

2.5.5 All work performed by design teams (including, but not limited to architects engineers and master planners), or any other consultants for the City (including, but not limited to, project managers and construction managers and their employees where not engaged in Project Work) and their sub-consultants; employees of professional service organizations, not performing manual labor within the scope of this Agreement; provided, however, that it is understood and agreed that surveyors, building/construction inspectors and field soils and materials testers (collectively, "Inspectors") are a covered craft under the Agreement. This inclusion applies to the scope of work defined in the State of California Wage Determination for said crafts. This shall also specifically include such work where it is referred to by utilization of such terms as "quality control" or "quality assurance." Every Inspector performing under a professional services agreement or a construction contract shall be bound to all applicable requirements of this Agreement. Project Work as defined by this Agreement shall be performed pursuant to the terms and conditions of this Agreement regardless of the manner in which the work was awarded

2.5.6 Any work performed near, or leading to a Project site and undertaken by state, county or other governmental bodies, or their contractors; or by public utilities, or their contractors; and/or by adjacent third party landowners; and/or by the City or its Contractors (for work which is not within the scope of this Agreement);

2.5.7 Off-site maintenance of leased equipment and on-site supervision of such off-site maintenance;

2.5.8 Work by employees of a manufacturer or vendor supervising the work of Craft employees under this Agreement, necessary to maintain such manufacturer's or vendor's warranty(ies) or guaranty(ies);

2.5.9 Non-construction support services contracted by the City, City consultants, the CWA Administrator, or Contractors in connection with a Project;

2.5.10 Off-site laboratory work for testing.

2.5.11 Any otherwise qualifying Project Work for which the City receives funding or assistance from any Federal, State, local or other public entity for the Construction Contract, if a requirement, condition or other term of receiving that funding or assistance, at the time of the awarding of the contract, is that the City not require, bidders, contractors, or other persons or entities to enter into an agreement with one or more labor organizations. The City agrees that it will make reasonable efforts to establish the enforcement of this Agreement with any governmental agency or granting authority.

Section 2.6 Awarding of Contracts for Project Work.

2.6.1 The City and/or the Contractors, as appropriate, have the absolute right to award contracts or subcontracts on Project Work to any Contractor notwithstanding the existence or non-existence of any agreements between such Contractor and any Union parties, provided only that such Contractor is ready, willing, and able to execute and comply with this Agreement should such Contractor be awarded work covered by this Agreement.

2.6.2 It is agreed that all Contractors of whatever tier, who have been awarded Project Work contracts, shall be required to accept and be bound to the terms and conditions of this Agreement, and shall evidence their acceptance by the execution of the Letter of Assent, prior to the commencement of any Project Work. At the time that any Contractor enters into a subcontract with any subcontractor of any tier providing for the performance of the construction contract, the Contractor shall provide a copy of this Agreement to said subcontractor and shall require the subcontractor, as a part of accepting the award of a construction subcontract, to agree in writing in the form of a Letter of Assent to be bound by each and every provision of this Agreement prior to the commencement of work on the Project. No Contractor or subcontractor shall commence Project Work without having first provided a copy of the Letter of Assent as executed by it to the CWA Administrator and to the Trades Council before the commencement of Project Work.

Section 2.7 Master Labor Agreements.

2.7.1 The provisions of this Agreement, including the Master Labor Agreements as such may be changed from time-to-time and which also are incorporated herein by reference, shall apply to Project Work. This Agreement is not intended to supersede such Master Labor Agreements between any of the Contractors performing construction work on the Project and a Union signatory thereto except to the extent the provisions of this Agreement are inconsistent with such Master Labor Agreements, in which event the provisions of this Agreement shall apply. However, such does not apply to work performed under the National Cooling Tower Agreement, the National Stack Agreement, the National Transit Division Agreement (NTD), work within the jurisdiction of the International Union of Elevator Constructors, and all instrument calibration and loop checking work performed under the terms of the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians except that Articles 7, 8, and 10 of this Agreement dealing with Strikes, Work Stoppages and Lock-Outs, Work Assignments and Jurisdictional Disputes, and Settlement of Grievances and Disputes shall apply to such work. Where a subject is covered by the provisions of a Master Labor Agreement and not in conflict with the provisions of this Agreement, the provisions of the Master Labor Agreement shall apply. It is specifically agreed that no later agreement shall be deemed to have precedence over this Agreement unless signed by all parties signatory hereto who are then currently employed or represented at the Project. Any

dispute as to the applicable source between this Agreement and any Master Labor Agreements for determining the wages, hours of working conditions of employees on this Project shall be resolved under the procedures established in Article 10.

2.7.2 It is understood that this Agreement, together with the referenced Master Labor Agreements, constitutes a self-contained, stand-alone agreement and by virtue of having become bound to this Agreement, the Contractor will not be obligated to sign any other local, area or national collective bargaining agreement as a condition of performing work within the scope of this Agreement (provided, however, that the Contractor may be required to sign a uniformly applied, non-discriminatory Subscription Agreement at the request of the trustees or administrator of a trust fund established pursuant to Section 302 of the Labor Management Relations Act, and to which such Contractor is bound to make contributions under this Agreement, provided that such Subscription Agreement does not purport to bind the Contractor beyond the terms and conditions of this Agreement and/or expand its obligation to make contributions pursuant thereto). It shall be the responsibility of the prime Contractor to have each of its subcontractors sign the appropriate Subscription Agreement, with the appropriate Union prior to the subcontractor beginning work on Project Work.

Section 2.8 Other City Work. Nothing contained herein shall be interpreted to prohibit, restrict, or interfere with the performance of any other operation, work or function not covered by this Agreement, which may be performed by City employees or contracted for by the City for its own account, on its property or in and around a Project site.

Section 2.9 Separate Liability. It is understood that the liability of the Contractor(s) and the liability of the separate Unions under this Agreement shall be several and not joint. The Unions agree that this Agreement does not have the effect of creating any joint employment status between or among the City or CWA Administrator and/or any Contractor.

Section 2.10 Completed Project Work. As areas of Project Work are accepted by the City, this Agreement shall have no further force or effect on such items or areas except where the Contractor is directed by the City or its representatives to engage in repairs, modification, check- out and/or warranties functions required by its contract(s) with the City under the Construction Agreement.

ARTICLE 3
UNION RECOGNITION AND EMPLOYMENT

Section 3.1 Recognition. The Contractor recognizes the Trades Council and the Unions as the sole and exclusive bargaining representative for the employees engaged in Project Work. Contractors further recognize that the Unions shall be the primary source of all craft persons employed on the Projects. In the event that a Contractor has its own core workforce, said Contractor shall follow the procedures outlined below.

Section 3.2 Contractor Selection of Employees. Each Contractor shall have the right to determine the competency of all employees, the number of employees required, the duties of such employees within their craft jurisdiction, and shall have the sole responsibility for selecting employees to be laid off, consistent with Section 3.3 and Section 4.3, below. Each Contractor shall also have the right to reject any applicant referred by a Union for any reason, subject to any reporting pay required by Section 6.6; provided, however, that such right is exercised in good faith and not for

the purpose of avoiding the Contractor's commitment to employ qualified workers through the procedures provided for in this Agreement.

Section 3.3 Referral Procedures.

3.3.1 For signatory Unions having a job referral system contained in a Master Labor Agreement as of the effective date of this Agreement, each Contractor agrees to comply with such system and it shall be used exclusively by such Contractor, except as modified by this Agreement. Such job referral system will be operated in a nondiscriminatory manner and in full compliance with federal, state, and local laws and regulations which require equal employment opportunities and non-discrimination. All of the foregoing hiring procedures, including related practices affecting apprenticeship, shall be operated so as to consider the goals of the City to encourage employment of City Residents on the Project, and to facilitate the ability of all Contractors to meet their employment needs.

3.3.2 The Unions will exert their best efforts to recruit and refer sufficient numbers of skilled craft persons to fulfill the labor requirements of each Contractor, including specific employment obligations to which such Contractor may be legally and/or contractually obligated; and to refer Apprentices as requested to develop a larger, skilled workforce. The Unions will work with their affiliated regional and national unions to identify and refer competent craft persons as needed for Project Work, and to identify and hire individuals, particularly City Residents, for entrance into joint labor/management apprenticeship programs, or to participate in other identified programs and procedures to assist individuals in qualifying and becoming eligible for such apprenticeship programs, all maintained to increase the available supply of skilled craft persons for Project Work to be undertaken by the City.

3.3.3 Each Union shall not knowingly refer an employee currently employed by a Contractor on a Project to any other Contractor.

Section 3.4 Non-Discrimination in Referral, Employment, and Contracting. Each Union and Contractor agree that they will not discriminate against any employee or applicant for employment in hiring and dispatching on the basis of race, color, religion, sex, gender, national origin, age, membership in a labor organization, sexual orientation, political affiliation, marital status or disability. Further, to the extent the City currently has or hereafter adopts policies, programs, and goals for the utilization of local small business enterprises, the Parties shall jointly endeavor to assure that these commitments are fully met, and that any provisions of this Agreement which may appear to interfere with local small business enterprises successfully bidding for work within the scope of this Agreement shall be carefully reviewed, and adjustments made as may be appropriate and agreed upon among the Parties, to ensure full compliance with the spirit and letter of the City's policies and commitment to its goals for the significant utilization of local small businesses as direct Contractors or suppliers for Project Work.

Section 3.5 Employment of Local Residents.

3.5.1 Each Union and Contractor agrees that, to the extent allowed by law, they shall each use their best efforts to refer and recruit sufficient numbers of Local Residents to fulfill the requirements of the Contractors, so long as such Local Residents possess the requisite skills and qualifications. Towards that end, the Unions shall exert their best efforts to encourage and provide

referrals and utilization of qualified workers, who reside in those first tier zip codes which cover the City of Irvine, as reflected on the attached list of zip codes on **Attachment B** ("**City Residents**"). If the Unions cannot provide the Contractors with referrals of City Residents sufficient to meet the Contractor's needs, then the Unions, as a second priority, shall refer qualified Veterans residing in Orange County. If the Unions cannot provide the Contractors with referrals from City Residents and Veterans residing in Orange County, then the Unions, as a third priority, shall refer graduates from the Building Trades Multi-Craft Core Curriculum ("MC3 Graduates") residing in Orange County. If the Unions cannot provide the Contractors with referrals of City Residents, Veterans living in Orange County, and MC3 Graduates living in Orange County, then the Unions, as a fourth priority shall refer qualified persons residing within Orange County. For dispatch purposes, employees described in this Section 3.5.1 shall be referred to as "Local Residents."

3.5.2 A goal of thirty percent (30%) of the total work hours on each Construction Contract for Project Work shall be performed by Local Residents ("**Local Employment Threshold**").

3.5.3 To help reach the Local Employment Threshold, the Trades Council and Unions shall encourage and assist residents of the City of Irvine that desire to participate in the Santa Ana College apprenticeship training program to enroll in that program.

Section 3.6 Requirements on Contractors. To facilitate the dispatch of Local Residents and Veterans, all Contractors will be required to utilize the "Craft Employee Request Form" whenever they are requesting the referral of any employee from a Union referral list for any Project Work, a sample of which is attached as **Attachment C**. When Local Residents, MC3 Graduates and Veterans are requested by the Contractors, the Unions will refer such workers regardless of their place in the Unions' hiring halls' list and normal referral procedures.

Section 3.7 Helmets to Hardhats. The Contractors and the Unions recognize a desire to facilitate the entry of interested Veterans into the building and construction trades. The Contractors and Unions agree to utilize the services of non-profit Veterans support organizations, including but not limited to, the Center for Military Recruitment, Assessment and Veterans Employment (hereinafter "**Center**") and the Center's "Helmets to Hardhats" program to serve as a resource for preliminary orientation, assessment of construction aptitude, referral to apprenticeship programs or hiring halls, counseling and mentoring, support network, employment opportunities and other needs as identified by the Parties. It shall be the responsibility of each qualified applicant to provide the Unions with proof of his/her status as a Veteran for the Helmets to Hardhats program.

3.7.1 The Unions and Contractors agree to coordinate with non-profit Veteran organizations, including, the Center to create and maintain an integrated database of Veterans interested in working on Project Work and of apprenticeship and employment opportunities for working on Project Work. To the extent permitted by law, the Unions will give credit to such Veterans for bona fide, provable past experience.

Section 3.8 Core Employees.

3.8.1 Contractors not currently signatory to a Master Labor Agreement may employ, as needed, first, a member of his core workforce (as defined in Section 3.8.2), then an employee through a referral from the appropriate Union hiring hall, then a second core employee, then a second employee through the referral system, and so on until a maximum of five (5) core employees are employed, thereafter, all additional employees in the affected trade or craft shall be requisitioned from the craft hiring hall in accordance with Section 3.3. In the laying off of employees, the number of core employees shall not exceed one-half plus one of the workforce for an employer with 10 or fewer employees, assuming the remaining employees are qualified to undertake the work available. As part of this process, all Contractors shall require their core employees and any other persons employed other than through the referral process, to register with the appropriate Union hiring hall, if any, prior to their first day of employment at a Project site.

3.8.2 The core workforce is comprised of those employees whose names appeared on the Contractor's active payroll for sixty (60) of the one hundred (100) working days immediately before award of Project Work to the Contractor; who have worked at least two-thousand (2,000) hours in the construction craft in which they are employed, during the prior four (4) years; who possess any license required by state or federal law for the Project Work to be performed; who have the ability to safely perform the basic functions of the applicable trade.

3.8.3 Prior to each Contractor performing any work on the Project, each Contractor shall provide a list of the employees in its core workforce to the Trades Council. Failure to do so will prohibit the Contractor from using any of its core workforce for work on the Project. Upon request by any Party to this Agreement, the Contractor hiring any employee for its core workforce shall provide satisfactory proof (i.e., payroll records, quarterly tax records, driver's license, voter registration, postal address and such governmental documentation) evidencing the employee's qualification for the core workforce to the Trades Council.

Section 3.9 Time for Referral. If any Union's registration and referral system does not fulfill the requirements for specific classifications requested by any Contractor within forty-eight (48) hours (excluding Saturdays, Sundays and holidays), that Contractor may use employment sources other than the Union registration and referral services, and may employ applicants meeting such classification from any other available source. Contractors shall inform the Union of any applicants hired from other sources and such applicants shall register with the appropriate hiring hall, if any, before commencing work.

Section 3.10 Lack of Referral Procedure. If a signatory Union does not have a job referral system as set forth in Section 3.3 above, the Contractors shall give the Union equal opportunity to refer applicants. Contractors shall notify the Union of employees so hired, as set forth in Section 3.5.

Section 3.11 Individual Seniority. Except as provided in Section 4.3, individual seniority shall not be recognized or applied to employees working on Project Work; provided, however, that group and/or classification seniority in a Union's Master Labor Agreement as of the effective date of this Agreement shall be recognized for purposes of layoffs.

Section 3.12 Foremen. The selection and number of craft foreman and/or general foreman shall be the responsibility of the Contractor. All foremen shall take orders exclusively from the designated

Contractor representatives. Craft foreman shall be designated as working foreman at the request of the Contractors.

Section 3.13 Out of State Workers. In determining compliance with the targeted hiring goals of Section 3.5 above, hours of Project Work performed by residents of states other than California will be excluded from the calculation.

Section 3.14 Union Security. Employees are not required to become or remain union members or pay dues or fees as a condition of performing Project Work under this Agreement. Employers shall make and transmit all deductions for union dues, fees, and assessments that have been authorized by employees in writing in accordance with the applicable Master Labor Agreement. Nothing in this Section 3.14 is intended to supersede independent requirements of applicable Master Labor Agreements as to those Employers otherwise signatory to such Master Labor Agreements and as to the employees of those Employers who are performing Project Work.

ARTICLE 4
UNION ACCESS AND STEWARDS

Section 4.1 Access to Project Sites. Authorized representatives of the Union shall have access to Project Work, provided that they do not interfere with the work of employees and further provided that such representatives shall notify the person charged with on-site Project supervision and fully comply with posted visitor, security and safety rules.

Section 4.2 Stewards.

4.2.1 Each signatory Union shall have the right to dispatch a working journeyperson as a Steward for each shift, and shall notify the Contractor in writing of the identity of the designated Steward prior to the assumption of such person's duties as Steward. Such designated Steward shall not exercise any supervisory functions. There will be no non-working Stewards. Stewards will receive the regular rate of pay for their respective crafts.

4.2.2 In addition to his/her work as an employee, each Steward shall have the right to receive, but shall not to solicit, complaints or grievances and to discuss and assist in the adjustment of the same with the employee's appropriate supervisor. Each Steward shall be concerned only with the employees of the Steward's Contractor and, if applicable, subcontractor(s), and not with the employees of any other Contractor. A Contractor will not discriminate against the Steward in the proper performance of his/her Union duties.

4.2.3 When a Contractor has multiple, non-contiguous work locations at one site, the Contractor may request, and the Union shall appoint, such additional Stewards as the Contractor requests to provide independent coverage of one or more such locations. In such cases, each Steward may not service more than one work location without the approval of the Contractor.

4.2.4 No Steward shall have the right to determine when overtime shall be worked or who shall work overtime.

Section 4.3 Steward Layoff/Discharge. Contractor agrees to notify the appropriate Union twenty-four (24) hours before the layoff of a Steward, except in the case of disciplinary discharge for just

cause. If the Steward is protected against such layoff by the provisions of the applicable Master Labor Agreement, such provisions shall be followed when the Steward possesses the necessary qualifications to perform the remaining work. In any case in which the Steward is discharged or disciplined for just cause, the appropriate Union will be notified immediately by the Contractor, and such discharge or discipline shall not become final (subject to any later filed grievance) until twenty-four (24) hours after such notice has been given.

ARTICLE 5
WAGES AND BENEFITS

Section 5.1 Wages. All employees covered by this Agreement shall be classified in accordance with work performed and paid by the Contractors the hourly wage rates for those classifications in compliance with the applicable prevailing wage rate determination established pursuant to applicable law. If a prevailing rate increases under law, the Contractor shall pay that rate as of its effective date under the law. This Agreement does not relieve Contractors directly signatory to a Master Labor Agreement with one of the Unions signing this Agreement from paying all of the wages set forth in such Agreements.

Section 5.2 Benefits.

5.2.1 Contractors shall pay contributions to the established employee benefit funds in the amounts designated in the appropriate Master Labor Agreement on behalf of all employees and make all employee–authorized deductions in the amounts designated in the appropriate Master Labor Agreement; provided, however, that such contributions shall not exceed the contribution amounts set forth in the applicable prevailing wage determination. This Agreement does not relieve Contractors directly signatory to one or more of the Master Labor Agreements from making all contributions set forth in those Master Labor Agreements without reference to the foregoing.

5.2.2 Contractors shall adopt and agree to be bound by the written terms of the applicable, legally established, trust agreement(s) specifying the detailed basis on which payments are to be made into, and benefits paid out of, such trust funds for its employees. Contractors shall authorize the Parties to such trust funds to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor.

5.2.3 Each Contractor is required to maintain records evidencing that it has paid all benefit contributions due and owing to the appropriate trust(s) prior to the receipt of its final payment and/or retention. Further, a Union shall work with any prime Contractor or subcontractor who is delinquent in payments to assure that proper benefit contributions are made. In the event of failure of a Contractor to timely make the delinquent payments, a Union may request that the City or the prime Contractor withhold payments otherwise due such Contractor, until such contributions have been made or otherwise guaranteed.

Section 5.3 Wage Premiums. Wage premiums, including but not limited to pay based on height of work, hazard pay, scaffold pay, and special skills shall not be applicable to work under this Agreement, except to the extent provided for in any applicable prevailing wage determination.

ARTICLE 6
HOURS OF WORK, OVERTIME, SHIFTS AND HOLIDAYS

Section 6.1 Hours of Work. Eight (8) hours per day between the hours of 6:00 a.m. and 5:30 p.m., plus one-half (½) hour unpaid lunch approximately mid-way through the shift, shall constitute the standard workday. Forty (40) hours per week shall constitute a regular week's work. The work week will start on Sunday and conclude on Saturday. The foregoing provisions of this Article are applicable unless otherwise provided in the applicable prevailing wage determination, or unless changes are permitted by law and such are agreed upon by the Parties. Nothing herein shall be construed as guaranteeing any employee eight (8) hours per day or forty (40) hours per week, or a Monday through Friday standard work schedule.

Section 6.2 Place of Work. Craft Employees shall be at their place of work (as designated by the Contractor), at the starting time and shall remain at their place of work, performing their assigned functions, until quitting time. The place of work is defined as the gang or tool box or equipment at the employee's assigned work location or the place where the appropriate foreman gives instructions. The Parties reaffirm their policy of a fair day's work for a fair day's wage. Except as provided in Section 6.6, there shall be no pay for time not worked unless the employee is otherwise engaged at the direction of the Contractor.

Section 6.3 Overtime. Overtime shall be paid in accordance with the requirements of the applicable prevailing wage determination. There shall be no restriction on the Contractor's scheduling of overtime or the nondiscriminatory designation of employees who will work overtime. There shall be no pyramiding of overtime (payment of more than one form of overtime compensation for the same hour) under any circumstances.

Section 6.4 Shifts and Alternate Work Schedules.

6.4.1 Alternate starting and quitting time and/or shift work may be performed at the option of the Contractor upon three (3) days' prior notice to the affected Union(s), unless a shorter notice period is provided for in the applicable Master Labor Agreement If two shifts are worked, each shall consist of eight (8) hours of continuous work exclusive of a one-half (½) hour non-paid lunch period, for eight (8) hours pay. The last shift shall start on or before 6:00 p.m. The first shift starting at or after 6:00 a.m. is designated as the first shift, with the second shift following.

6.4.2 Contractors, the Trades Council and the Union recognize the economic impact upon the City and City residents of the Project being undertaken by the City and agree that all Parties to this Agreement desire and intend Project Work to be undertaken in a cost efficient and effective manner to the highest standard of quality and craftsmanship. Recognizing the economic conditions, the Parties agree that, except to the extent permitted by law, employees performing Project Work shall not be entitled to any differentials or additional pay based upon the shift or work schedule of the employees. Instead, all employees working on Project Work shall be paid at the same base rate regardless of shift or work schedule worked, unless required under the applicable prevailing wage determination.

6.4.3 Because of operational necessities, the second shift may, at the City's direction, be scheduled without the preceding shift having been worked. It is recognized that the City's operations and/or mitigation obligations may require restructuring of normal work schedules.

Except in an emergency or when specified in the City's bid specification, the Contractor shall give affected Union(s) at least three (3) days' notice of such schedule changes.

Section 6.5 Holidays. Recognized holidays for Project Work shall be those set forth and governed by the prevailing wage determination(s) applicable to such Project Work.

Section 6.6 Show-up Pay.

6.6.1 Except as otherwise required by State law, employees reporting for work and for whom no work is provided, except when given prior notification not to report to work, shall receive pay in accordance with the applicable Master Labor Agreement.

6.6.2 An employee called out to work outside of his/her shift shall receive a minimum of two (2) hours pay at the appropriate rate. This does not apply to time worked as an extension of (before or after) the employee's normal shift.

6.6.3 When an employee leaves the job or work location of his/her own volition, or is discharged for cause or is not working as a result of the Contractor's invocation of Section 12.2, the employee shall only be paid for actual time worked.

Section 6.7 Meal Periods. The Contractor will schedule a meal period in accordance with the applicable Master Labor Agreement.

Section 6.8 Make-up Days. To the extent permitted by the applicable general wage determination, when an employee has been prevented from working for reasons beyond the control of the employer, including, but not limited to inclement weather or other natural causes, during the regularly scheduled work week, a make-up day may be worked on a non-regularly scheduled work day for which an employee shall receive eight (8) hours pay at the straight time rate of pay or any premium rate required for such hours under the state prevailing wage law.

ARTICLE 7
WORK STOPPAGES AND LOCK-OUTS

Section 7.1 No Work Stoppages or Disruptive Activity. The Trades Council and the Unions signatory hereto agree that neither they, and each of them, nor their respective officers or agents or representatives, shall incite or encourage, condone or participate in any strike, walk-out, slow-down, picketing, observing picket lines or other activity of any nature or kind whatsoever, for any cause or dispute whatsoever with respect to or in any way related to Project Work, or which interferes with or otherwise disrupts, Project Work, or with respect to or related to the City or Contractors, including, but not limited to, economic strikes, unfair labor practice strikes, safety strikes, sympathy strikes and jurisdictional strikes whether or not the underlying dispute is arbitrable. Any such actions by the Trades Council, or Unions, or their members, agents, representatives or the employees they represent shall constitute a violation of this Agreement. The Trades Council and the Union shall take all steps necessary to obtain compliance with this Article.

Section 7.2 Employee Violations. The Contractor may discharge any employee violating Section 7.1 above and any such employee will not be eligible for rehire under this Agreement.

Section 7.3 Standing to Enforce. The City, the CWA Administrator, or any Contractor affected by an alleged violation of Section 7.1 shall have standing and the right to enforce the obligations established therein.

Section 7.4 Expiration of Master Labor Agreement. If the Master Labor Agreement, or any local, regional, and other applicable collective bargaining agreements expire during the term of the Project, the Union(s) agree that there shall be no work disruption of any kind as described in Section 7.1 above as a result of the expiration of any such agreement(s) having application on this Project and/or failure of the involved Parties to that agreement to reach a new contract. Terms and conditions of employment established and set at the time of bid shall remain established and set. Otherwise to the extent that such agreement does expire and the Parties to that agreement have failed to reach concurrence on a new contract, work will continue on the Project on one of the following two (2) options, both of which will be offered by the Unions involved to the Contractors affected:

7.4.1 Each of the Unions with a Master Labor Agreement expiring must offer to continue working on the Project under interim agreements that retain all the terms of the expiring contract, except that the Unions involved in such expiring contract may each propose wage rates and employer contribution rates to employee benefit funds under the prior contract different from what those wage rates and employer contributions rates were under the expiring contracts. The terms of the Union's interim agreement offered to Contractors will be no less favorable than the terms offered by the Union to any other employer or group of employers covering the same type of construction work in Orange County.

7.4.2 Each of the Unions with a Master Labor Agreement expiring must offer to continue working on the Project under all the terms of the expiring contract, including the wage rates and employer contribution rates to the employee benefit funds, if the Contractor affected by that expiring contract agrees to the following retroactive provisions: if a new Master Labor Agreement, local, regional or other applicable labor agreement for the industry having application at the Project is ratified and signed during the term of this Agreement and if such new labor agreement provides for retroactive wage increases, then each affected Contractor shall pay to its employees who performed work covered by this Agreement at the Project during the hiatus between the effective dates of such expired and new labor agreements, an amount equal to any such retroactive wage increase established by such new labor agreement, retroactive to whatever date is provided by the new labor agreement for such increase to go into effect, for each employee's hours worked on the Project during the retroactive period. All Parties agree that such affected Contractors shall be solely responsible for any retroactive payment to its employees.

7.4.3 Some Contractors may elect to continue to work on the Project under the terms of the interim agreement option offered under paragraph 7.4.1 and other Contractors may elect to continue to work on the Project under the retroactivity option offered under paragraph 7.4.2. To decide between the two options, Contractors will be given one week after the particular labor agreement has expired or one week after the Union has personally delivered to the Contractors in writing its specific offer of terms of the interim agreement pursuant to paragraph 7.4.1, whichever is the later date. If the Contractor fails to timely select one of the two options, the Contractor shall be deemed to have selected the provisions of 7.4.2.

Section 7.5 No Lockouts. Contractors shall not cause, incite, encourage, condone or participate in any lock-out of employees with respect to Project Work during the term of this Agreement. The term "**lock-out**" refers only to a Contractor's exclusion of employees in order to secure collective bargaining advantage, and does not refer to the discharge, termination or layoff of employees by the Contractor for any reason in the exercise of rights pursuant to any provision of this Agreement, or any other agreement, nor does "**lock-out**" include the City's decision to stop, suspend or discontinue any Project Work or any portion thereof for any reason.

Section 7.6 Best Efforts to End Violations.

7.6.1 If a Contractor contends that there is any violation of this Article or Section 8.3, it shall notify, in writing, the Executive Secretary of the Trades Council ("**Executive Secretary**"), the Senior Executive of the involved Union(s) ("**Senior Executive**"), and the City. The Executive Secretary and the leadership of the involved Union(s) will immediately instruct, order, and use their best efforts to cause the cessation of any violation of the relevant Article or Section.

7.6.2 If the Union contends that any Contractor has violated this Article, it will notify that Contractor and the City, setting forth the facts which the Union contends violate the Agreement, at least twenty-four (24) hours prior to invoking the procedures of Section 7.8. If the City determines, after reasonable investigation, that the information presented by the Union demonstrates a violation of this Article, the City shall promptly order the involved Contractor(s) to cease such violation.

Section 7.7 Withholding of Services for Failure to Pay Wages and Fringe Benefits.

7.7.1 Notwithstanding any provision of this Agreement to the contrary, it shall not be a violation of this Agreement for any Union to withhold the services of its members (but not the right to picket) from a particular Contractor who:

(a) fails to timely pay its weekly payroll; or

(b) fails to make timely payments to the Union's Joint Labor/Management Trust Funds in accordance with the provisions of the applicable Master Labor Agreements. Prior to withholding its members' services for the Contractor's failure to make timely payments to the Union's Joint Labor/Management Trust Funds, the Union shall give at least ten (10) days (unless a lesser period of time is provided in the Union's Master Labor Agreement, but in no event less than forty-eight (48) hours) written notice of such failure to pay by registered or certified mail, return receipt requested, and by facsimile transmission to the involved Contractor and to the City. Union will meet within the ten (10) day period to attempt to resolve the dispute.

7.7.2 Upon the payment of the delinquent Contractor of all monies due and then owing for wages and/or fringe benefit contributions, the Union shall direct its members to return to work and the Contractor shall return all such members back to work. Notwithstanding anything to the contrary, the provisions for liquidated damages or any other delay related damages under the Construction Contract remain in full force and effect.

Section 7.8 Expedited Enforcement Procedure. Any party, including the City, which the Parties agree is a Party to the Agreement for purposes of this Article and an intended beneficiary of this

Article, or the CWA Administrator, may institute the following procedures, in lieu of or in addition to any other action at law or equity, when a breach of Section 7.1 or 7.5, above, or Section 8.3 is alleged.

7.8.1 The Party invoking this procedure shall notify Fred Horowitz, or Louis Zigman, who have been selected by the negotiating Parties, and whom the Parties agree shall be the permanent arbitrators under this procedure ("**Permanent Arbitrators**"). If the Permanent Arbitrators are unavailable at any time, any one of the Permanent Arbitrators who is notified shall appoint his alternate to hear the matter. Expenses incurred in arbitration shall be borne equally by the Parties involved in the arbitration and the decision of the arbitrator shall be final and binding on the Contractor(s) and Union(s), provided, however, that the arbitrator shall not have the authority to alter or amend or add to or delete from the provisions of this Agreement in any way. Notice to the arbitrator shall be by the most expeditious means available, with notices to the Parties alleged to be in violation, and to the Trades Council if it is a Union alleged to be in violation. For purposes of this Article, written notice may be given by hand delivery or overnight mail and will be deemed effective upon receipt.

7.8.2 Upon receipt of said notice, the arbitrator named above or his/her alternate shall sit and hold a hearing within twenty-four (24) hours if it is contended that the violation still exists, but not sooner than twenty-four (24) hours after notice has been dispatched to the Executive Secretary and the Senior Executive(s) as required by Section 7.6, as above.

7.8.3 The arbitrator shall notify the Parties of the place and time chosen for this hearing. Said hearing shall be completed in one session, which, with appropriate recesses at the arbitrator's discretion, shall not exceed 24 hours unless otherwise agreed upon by the Contractor(s) or Union(s). A failure of any Contractor or Union to attend said hearings shall not delay the hearing of evidence or the issuance of any award by the arbitrator.

7.8.4 The sole issue at the hearing shall be whether or not a violation of Sections 7.1 or 7.5, above, or Section 8.3 has in fact occurred. The arbitrator shall have no authority to consider any matter in justification, explanation, or mitigation of such violation. The award shall be issued in writing within three (3) hours after the close of the hearing and may be issued without an opinion. If any Contractor or Union desires a written opinion, one shall be issued within fifteen (15) days, but its issuance shall not delay compliance with, or enforcement of, the award. The arbitrator may order cessation of the violation of the Article and other appropriate relief, and such award shall be served on all Parties by hand or registered mail upon issuance.

7.8.5 Such award shall be final and binding on the affected Contractors and Unions and may be enforced by any court of competent jurisdiction upon the filing of this Agreement and all other relevant documents referred to herein above in the following manner. Written notice of the filing of such enforcement proceedings shall be given to the affected Contractor or Union. In any judicial proceeding to obtain a temporary order enforcing the arbitrator's award as issued under this Article, all affected Contractors and Unions waive the right to a hearing and agree that such proceedings may be ex parte. Such agreement does not waive any Contractor's or Union's right to participate in a hearing for a final order of enforcement. The court's order or orders enforcing the arbitrator's award shall be served on the affected Contractors and Unions by hand or by delivery to their address as shown on this Agreement (for a Union), as shown on their business contract for work under this Agreement (for a Contractor) and to the representing Union (for an employee), by

certified mail by the Contractor(s) or Union(s) first alleging the violation.

7.8.6 Any rights created by statute or law governing arbitration proceedings inconsistent with the above procedure or which interfere with compliance hereto are hereby waived by the Contractor(s) or Union(s) to whom they accrue.

7.8.7 The fees and expenses of the arbitrator shall be equally divided between the Party(ies) initiating this procedure and the respondent Contractor(s) or Union(s).

ARTICLE 8
WORK ASSIGNMENTS AND JURISDICTIONAL DISPUTES

Section 8.1 Assignment of Work. The assignment of Project Work will be solely the responsibility of the Contractor performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "**Plan**") or any successor Plan.

Section 8.2 The Plan. All jurisdictional disputes on Project Work between or among the building and construction trades Unions and the Contractor Parties to this Agreement, shall be settled and adjusted according to the present Plan or any other successor plan or method of procedure that may be adopted in the future by the North America's Building Trades Unions. Decisions rendered shall be final, binding and conclusive on the Contractor and Union Parties to this Agreement.

8.2.1 If a dispute arising under this Article involves the Southwest Mountain States Regional Council of Carpenters or any of its subordinate bodies, an arbitrator shall be chosen by the procedures specified in Article V, Section 5, of the Plan from a list composed of John Kagel, Robert Hirsch, and Thomas Pagan, and the arbitrator's hearing on the dispute shall be held at the offices of the Trades Council within 14 days of the selection of the arbitrator. All other procedures shall be as specified in the Plan.

Section 8.3 No Work Disruption Over Jurisdiction. All jurisdictional disputes shall be resolved without the occurrence of any strike, work stoppage, or slow-down of any nature, and the Employer's assignment shall be adhered to until the dispute is resolved. Individuals violating this Section shall be subject to immediate discharge.

Section 8.4 Pre-Job Conferences. As provided in Article 16, each Contractor will conduct a pre-job conference with the appropriate affected Union(s) prior to commencing work. The Trades Council and the CWA Administrator shall be advised in advance of all such conferences and may participate if they wish.

Section 8.5 Resolution of Jurisdictional Disputes. If any actual or threatened strike, sympathy strike, work stoppage, slow down, picketing, hand-billing or otherwise advising the public that a labor dispute exists, or interference with the progress of Project Work by reason of a jurisdictional dispute or disputes occurs, the Parties shall exhaust the expedited procedures set forth in the Plan, if such procedures are in the Plan or successor Plan then currently in effect, or otherwise as in Article 7 above.

ARTICLE 9
MANAGEMENT RIGHTS

Section 9.1 Contractor and City Rights. The Contractors and the City have the sole and exclusive right and authority to oversee and manage construction operations on Project Work, as set forth in this Article, without any limitations unless expressly limited or required by a specific provision of this Agreement or a Master Labor Agreement. In addition to the following and other rights of the Contractors enumerated in this Agreement, the Contractors expressly reserve their management rights and all the rights conferred upon them by law. The Contractor's rights include, but are not limited to, the right to:

(a) Plan, direct and control operations of all work;

(b) Hire, promote, transfer and layoff their own employees, respectively, as deemed appropriate to satisfy work and/or skill requirements;

(c) Promulgate and require all employees to observe reasonable job rules and security and safety regulations;

(d) Discharge, suspend or discipline their own employees for just cause;

(e) Utilize, in accordance with City approval, any work methods, procedures or techniques, and select, use and install any types or kinds of materials, apparatus or equipment, regardless of source of manufacture or construction; assign and schedule work at their discretion; and

(f) Assign overtime, determine when it will be worked and the number and identity of employees engaged in such work, subject to such provisions in the applicable Master Labor Agreement (s) requiring such assignments be equalized or otherwise made in a nondiscriminatory manner.

Section 9.2 Specific City Rights. In addition to the following and other rights of the City enumerated in this Agreement, the City expressly reserves its management rights and all the rights conferred on it by law. The City's rights (and those of any City employee authorized to administer this Agreement on its behalf) include but are not limited to the right to:

(a) Inspect any construction site or facility to ensure that the Contractor follows the applicable safety and other work requirements;

(b) Require Contractors to establish a different work week or shift schedule for particular employees as required to meet the operational needs of the Project Work at a particular location;

(c) At its sole option, terminate, delay and/or suspend any and all portions of the Project Work at any time; prohibit some or all work on certain days or during certain hours of the day to accommodate the ongoing operations of the City's facilities and/or to mitigate the effect of ongoing Project Work on businesses and residents near the Project site; and/or require such other operational or schedule changes that City deems necessary, in its sole judgment, to effectively maintain its primary mission and remain a good neighbor to those in the area of its facilities. To

permit Contractors and Unions to make appropriate scheduling plans, the City will provide the affected Contractor(s) and Union(s) with reasonable notice of any changes it requires pursuant to this Section; provided, however, that if notice is not provided in time to advise employees not to report for work, show-up pay shall be due pursuant to the provision of Section 6.6;

(d) Approve any work methods, procedures and techniques used by Contractors whether or not these methods, procedures or techniques are part of industry practices or customs; and

(e) Investigate and process complaints, through the CWA Administrator, in the matter set forth in Articles 7 and 10.

Section 9.3 Use of Materials. There should be no limitations or restriction by Unions upon a Contractor's choice of materials or design, nor, regardless of source or location, upon the full use and utilization, of equipment, machinery, packaging, precast, prefabricated, prefinished, or preassembled materials, tools or other labor saving devices, subject to the application of the State Public Contracts and Labor Codes as required by law. The onsite installation or application of such items shall be performed by the craft having jurisdiction over such work.

Section 9.4 Special Equipment, Warranties and Guaranties

9.4.1 It is recognized that certain equipment of a highly technical and specialized nature may be installed at Project Work sites. The nature of the equipment, together with the requirements for manufacturer's warranties and/or guaranties, may dictate that it be prefabricated pre-piped and/or pre-wired and that it be installed under the supervision and direction of the City's and/or manufacturer's personnel. Unless otherwise required to prevent the loss of or negation of manufacturer warranties, the Unions agree to cause the installation of such equipment without incident and as required by the manufacturer.

9.4.2 The Parties recognize that the Contractor will initiate from time to time the use of new technology, equipment, machinery, tools, and other labor-savings devices and methods of performing Project Work. The Unions agree that they will not restrict the implementation of, or cause others to restrict the implementation of, such devices or work methods. The Unions will accept and will not refuse to handle, install or work with any standardized and/or catalogue: parts, assemblies, accessories, prefabricated items, preassembled items, partially assembled items, or materials whatever their source of manufacture or construction.

9.4.3 If any disagreement between the Contractor and the Unions concerning the methods of implementation or installation of any equipment, or device or item, or method of work, arises, or whether a particular part or pre-assembled item is a standardized or catalog part or item, the work will proceed as directed by the Contractor and the Parties shall immediately consult over the matter. If the disagreement is not resolved, the affected Union(s) shall have the right to proceed through the procedures set forth in Article 10.

ARTICLE 10
SETTLEMENT OF GRIEVANCES AND DISPUTES

Section 10.1 Cooperation and Harmony on Site.

10.1.1 This Agreement is intended to establish and foster continued close cooperation between management and labor. The Trades Council shall assign a representative to this Project for the purpose of assisting the local Unions, and working with the City, together with the Contractors, to complete the construction of the Project economically, efficiently, continuously and without any interruption, delays or work stoppages.

10.1.2 The Contractors, Unions, and employees collectively and individually, realize the importance to all Parties of maintaining continuous and uninterrupted performance of Project Work, and agree to resolve disputes in accordance with the grievance provisions set forth in this Article or, as appropriate, those of Article 7 or 8.

10.1.3 The Unions and/or Council shall oversee the processing of grievances under this Article and Articles 7 and 8, including the scheduling and arrangements of facilities for meetings, selection of the arbitrator from the agreed-upon panel to hear the case, and any other administrative matters necessary to facilitate the timely resolution of any dispute; provided, however, it is the responsibility of the principal parties to any pending grievance to ensure the time limits and deadlines are met.

Section 10.2 Processing Grievances. Any questions arising out of and during the term of this Agreement involving its interpretation and application, which includes applicable provisions of the Master Labor Agreement, but not jurisdictional disputes or alleged violations of Section 7.1 and 7.4 and similar provisions, shall be considered a grievance and subject to resolution under the following procedures.

Step 1. Employee Grievances. When any employee subject to the provisions of this Agreement feels aggrieved by an alleged violation of this Agreement, the employee shall, through his local Union business representative or, job steward, within ten (10) working days after the occurrence of the violation, give notice to the work site representative of the involved Contractor stating the provision(s) alleged to have been violated. A business representative of the local Union or the Steward and the work site representative of the involved Contractor shall meet and endeavor to resolve the matter within ten (10) working days after timely notice has been given. If they fail to resolve the matter within the prescribed period, the grieving party may, within ten (10) working days thereafter, pursue Step 2 of this grievance procedure provided the grievance is reduced to writing, setting forth the relevant information, including a short description thereof, the date on which the alleged violation occurred, and the provision(s) of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 shall be non-precedential except as to the parties directly involved.

Union or Contractor Grievances. Should the Union(s) or any Contractor have a dispute with the other Party(ies) and, if after conferring within ten (10) working days after the disputing Party knew or should have known of the facts or occurrence giving rise to the dispute, a settlement is not reached within five (5) working days, the dispute shall be reduced to writing and processed to Step 2 in the same manner as outlined in Step 1 above for the adjustment of an

employee complaint.

Step 2. The business manager of the involved Union or his designee, together with the site representative of the involved Contractor, shall meet within five (5) working days of the referral of the dispute to this second step to arrive at a satisfactory settlement thereof. If the Union(s) and Contractor(s) fail to reach an agreement, the dispute may be appealed in writing in accordance with the provisions of Step 3 within five (5) working days after the initial meeting at Step 2.

Step 3.

(a) If the grievance shall have been submitted but not resolved under Step 2, either the Union(s) of Contractor(s) may request in writing to the other Party(ies) to the grievance within five (5) working days after the initial Step 2 meeting, that the grievance be submitted to an arbitrator selected from the agreed upon list in **Attachment D** attached hereto, on a rotational basis in the order listed. The Contractor shall notify the parties to the grievance of the date, time and location of the hearing. The failure of any Contractor or Union to attend said hearing shall not delay the hearing of evidence or the issuance of any decision by the arbitrator. The decision of the arbitrator shall be final and binding on all parties. Should any Party seek confirmation of the award made by the arbitrator, the prevailing party shall be entitled to receive its reasonable attorney fees and costs.

(b) Failure of the grieving Contractor(s) or Union(s) to adhere to the time limits established herein shall render the grievance null and void. The time limits established herein may be extended only by consent of the Contractor(s) and Union(s) involved at the particular step where the extension is agreed upon. The arbitrator shall have the authority to make decisions only on issues presented and shall not have the authority to change, amend, add to or detract from any of the provisions of this Agreement.

(c) The fees and expenses incurred by the arbitrator, as well as those jointly utilized by the Parties (i.e. conference room, court reporter, etc.) in arbitration, shall be divided equally by the Contractor(s) and Union(s) to the arbitration, including Union(s) and Contractor(s) involved; for the avoidance of doubt, no fees or expenses shall be shared by or imposed upon the City.

Section 10.3 Limit on Use of Procedures. The procedures contained in this Article shall not be applicable to any alleged violation of Articles 7 or 8, with a single exception that any employee discharged for violation of Section 7.2, or Section 8.3, may resort to the procedures of this Article to determine only if he/she was, in fact, engaged in that violation.

Section 10.4 Notice. The City shall be notified by the involved Contractor of all actions at Steps 2 and 3, and further, the City may, in its sole discretion, designate a City staff member to participate fully as a party in all proceedings at such steps.

ARTICLE 11
REGULATORY COMPLIANCE

Section 11.1 Compliance with All Laws. The Trades Council and all Unions, Contractors, and their employees shall comply with all applicable federal and state laws, ordinances and regulations

including, but not limited to, those relating to safety and health, employment and applications for employment. All employees shall comply with the safety regulations established by the City, the CWA Administrator or the Contractor. Employees must promptly report any injuries or accidents to a supervisor.

Section 11.2 Prevailing Wage Compliance. All Contractors shall comply with the state and local laws and regulations on prevailing wages. Compliance with this obligation may be enforced by the appropriate parties through Article 10 above, or by pursing the remedies available under state law through the Labor Commissioner or the Department of Industrial Relations, and/or as otherwise authorized by state or local law.

Section 11.3 Violations of Law. Should there be a finding by a Court or administrative tribunal of competent jurisdiction that a Contractor has violated federal and/or state law or regulation, the City, upon notice to the Contractor that it or its subcontractors is in such violation (including any finding of non-compliance with the California prevailing wage obligations as enforced pursuant to DIR regulations), the City, and in the absence of the Contractor or subcontractor remedying such violation, may take such action as it is permitted by law or contract to encourage that Contractor to come into compliance, including, but not limited to, assessing fines and penalties and/or removing the offending Contractor from Project Work, subject to the applicable Construction Contract.

ARTICLE 12
SAFETY AND PROTECTION OF PERSON AND PROPERTY

Section 12.1 Safety.

12.1.1 It shall be the responsibility of each Contractor to ensure safe working conditions and employee compliance with any safety rules contained herein or established by the City or the Contractor, whichever is most restrictive shall apply. It is understood that employees have an individual obligation to use diligent care to perform their work in a safe manner and to protect themselves and the property of the Contractor and the City.

12.1.2 Employees shall be bound by the safety, security and visitor rules established by the Contractor and/or the City. These rules will be published and posted. An employee's failure to satisfy his/her obligations under this section will subject him/her to discipline, up to and including discharge.

12.1.3 Unions and the Contractors shall adopt both the Substance Abuse Policy attached hereto as **Attachment E,** and the City's Drug and Alcohol Free Workplace Policy (Policy No. 1017) which shall be the policies and procedure utilized under this Agreement.

Section 12.2 Suspension of Work for Safety. A Contractor may suspend all or a portion of the job to protect the life and safety of employees. In such cases, employees will be compensated only for the actual time worked; provided, however, that where the Contractor requests employees to remain at the site and be available for work, the employees will be compensated for stand-by time at their basic hourly rate of pay.

Section 12.3 Water and Sanitary Facilities. The Contractor shall provide adequate supplies of drinking water and sanitary facilities for all employees as required by state law or regulation.

ARTICLE 13
TRAVEL AND SUBSISTENCE

Travel expenses, travel time, subsistence allowances, zone rates and parking reimbursements shall be paid in accordance with the applicable Master Labor Agreement unless superseded by the applicable prevailing wage determination.

ARTICLE 14
APPRENTICES

Section 14.1 Importance of Training. The Parties recognize the need to maintain continuing support of the programs designed to develop adequate numbers of competent workers in the construction industry, the obligation to capitalize on the availability of the local work force in the area served by the City, and the opportunities to provide continuing work under the construction program. To these ends, the Parties will facilitate, encourage, and assist Local Residents to commence and progress in Joint Labor/Management Apprenticeship Programs and/or training programs in the construction industry leading to participation in such apprenticeship programs. The City and the Trades Council, will work cooperatively to identify, or establish and maintain, effective programs and procedures for persons interested in entering the construction industry and which will help prepare them for the formal joint labor/management apprenticeship programs maintained by the signatory Unions; such efforts include but are not limited to the obligations set forth in Section 3.5.3, above.

Section 14.2 Use of Apprentices.

14.2.1 Apprentices used on Projects under this Agreement shall be registered in Joint Labor Management Apprenticeship Programs approved by the State of California. Apprentices may comprise up to thirty percent (30%) of each Craft's work force (calculated by hours worked) at any time, unless the standards of the applicable joint apprenticeship committee confirmed by the Division of Apprenticeship Standards ("**DAS**"), establish a lower or higher maximum percentage. Where the standards permit a higher percentage, such percentage shall apply on Project Work. Where the applicable standards establish a lower percentage, the applicable Union will use its best efforts with the Joint Labor Management Apprenticeship Program committee and, if necessary, the DAS to permit up to thirty percent (30%) Apprentices on the Project.

14.2.2 The Unions agree to cooperate with the Contractor in furnishing Apprentices as requested up to the maximum percentage. The Apprentice ratio for each Craft shall be in compliance, at a minimum, with the applicable provisions of the Labor Code relating to utilization of apprentices. The City shall encourage such utilization, both as to Apprentices and as to the overall supply of journeyperson. The Unions and Trades Council will work to provide appropriate and maximum utilization of Apprentices and the continuing availability of both apprentices and journey-level craft workers.

14.2.3 The Parties agree that Apprentices will not be dispatched to Contractors working under this Agreement unless there is a journeyperson working on the project where the Apprentice

is to be employed who is qualified to assist and oversee the apprentice's progress through the program in which he/she is participating.

14.2.4 All apprentices shall work under the direct supervision of a journeyperson from the trade in which the apprentice is indentured. A journeyperson shall be defined as set forth in the California Code of Regulations, Title 8 [apprenticeship] section 205, which defines a journeyperson as a person who has either completed an accredited apprenticeship in his or her craft, or has completed the equivalent of an apprenticeship in length and content of work experience and all other requirements in the craft which has workers classified as journeyperson in the apprenticeable occupation. Should a question arise as to a journeyperson's qualification under this subsection, the Contractor shall provide adequate proof evidencing the worker's qualification as a journeyperson to the Trades Council.

ARTICLE 15
[RESERVED]

ARTICLE 16
PRE-JOB CONFERENCES

Section 16.1 Each prime Contractor which is awarded a Construction Contract by the City for Project Work shall conduct a pre-job conference with the appropriate affected Union(s) prior to commencing work. All Contractors who have been awarded contracts by the prime Contractor shall attend the pre-job conference. The Trades Council and the CWA Administrator shall be advised in advance of all such conferences and may participate if they wish. All work assignments shall be disclosed by the prime Contractor and all Contractors at the pre-job conference in accordance with industry practice. Should there be any formal jurisdictional dispute raised under Article 8, the CWA Administrator shall be promptly notified. prime Contractor shall have available at the pre-job conference the plans and drawing for the work to be performed on the Project. Should additional Project Work not previously included within the scope of the Project Work be added, the Contractors performing such work will conduct a separate pre-job conference for such newly included Project Work. At no time shall the City be responsible for additional costs related to, associated with, or resulting from jurisdictional disputes or newly included work not previously identified in the Construction Contract.

ARTICLE 17
WORK OPPORTUNITIES PROGRAM

Section 17.1 The Parties to this Agreement support the development of increased numbers of skilled construction workers from among the residents residing within the City of Irvine to meet the labor needs of the Contractors. Towards that end the Parties agree to cooperate respecting the establishment of a work opportunities programs for these City Residents. In furtherance of the foregoing, the Unions specifically agree to all of the following:

a) Encourage the referral and utilization of qualified City Residents as journeypersons and apprentices on Project Work, to the extent permitted by law.

b) Encourage the referral and entrance, to the extent permitted by the apprentice training programs, of City Residents into pre-apprentice and apprentice training programs, and encourage the

referral and utilization, to the extent permitted by law and hiring hall practices, of qualified City Residents as journeypersons and apprentices on the Project.

c) To increase construction industry work opportunities for City Residents, assist City Residents in contacting pre-apprenticeship programs that utilize the Building Trades multi-craft core curriculum (MC3) and the Apprenticeship Training Committees for the crafts and trades they are interested in. The Unions shall assist City Residents who are seeking Union jobs on the Project and Union membership in assessing their work experience and giving them credit for provable past experience in their relevant craft or trade, including experience gained working for non-union Contractors. The Unions shall put on their rolls qualified bona fide City Residents for work on this Project; and

d) Conduct joint outreach to recent graduates of high schools in Irvine through participation in job fairs or other career events.

e) Support outreach to and collaborate with nonprofits and high schools in Irvine to inform individuals (including without limitation current and former students of high schools in Irvine who continue to reside in Irvine) about career opportunities through apprenticeships and employment opportunities through the Unions.

f) Assist City Residents in contacting pre-apprenticeship programs in Orange County, including without limitation the program at Santa Ana College, the Building Trades Multi-Craft Core Curriculum (MC3) and the Apprenticeship Training Committees for the crafts and trades they are interested in.

g) Assist City Residents who are seeking Union jobs in assessing their work experience and giving them credit for provable past experience in their relevant craft or trade, including experience gained working for non-union Contractors.

h) Support local events and programs designed to recruit and develop adequate numbers of qualified workers in the construction industry.

Section 17.2 The requirements in Section 17.1 shall apply throughout the term, without regard to whether the Local Employment Threshold is satisfied.

ARTICLE 18
LABOR/MANAGEMENT COOPERATION

Section 18.1 Joint Committee. The Parties to this Agreement may establish a six (6) person Joint Administrative Committee ("**JAC**"). This JAC shall be comprised of three (3) representatives selected by the City and three (3) representatives selected by the Trades Council to monitor compliance with the terms and conditions of this Agreement and to recommend amendments to this Agreement, with the exception of the dollar threshold specified in Section 2.2(a) and the term of this Agreement under Section 21.1, when doing so would be to the mutual benefit of the Parties. Each representative shall designate an alternate who shall serve in his or her absence for any purpose contemplated by this Agreement. A quorum will consist of at least two (2) representatives selected by the City and at least two (2) representatives selected by the Trades Council. For voting

purposes, only an equal number of City and Union representatives present may constitute a voting quorum.

Section 18.2 Functions of Joint Administrative Committee. The JAC shall meet on a schedule to be determined by the JAC or at the call of the joint chairs, to discuss the administration of the Agreement, the progress of the Project, general labor management problems that may arise, and any other matters consistent with this Agreement. Substantive grievances or disputes arising under Articles 7, 8 or 10 shall not be reviewed or discussed by this JAC, but shall be processed pursuant to the provisions of the appropriate Article. The CWA Administrator shall be responsible for the scheduling of the meetings, the preparation of the agenda topics for the meetings, with input from the Unions the Contractors and the City. Notice of the date, time and place of meetings, shall be given to the JAC members at least three (3) days prior to the meeting.

ARTICLE 19
SAVINGS AND SEPARABILITY

Section 19.1 Savings Clause. It is not the intention of the City, the CWA Administrator, Contractor, or the Union parties to violate any laws governing the subject matter of this Agreement. The Parties hereto agree that in the event any provision of this Agreement is finally held or determined to be illegal or void as being in contravention of any applicable law or regulation, the remainder of the Agreement shall remain in full force and effect unless the part or parts so found to be void are wholly inseparable from the remaining portions of this Agreement. Further, the Parties agree that if and when any provision(s) of this Agreement is finally held or determined to be illegal or void by a court of competent jurisdiction, the Parties will promptly enter into negotiations concerning the substantive effect of such decision for the purposes of achieving conformity with the requirements of any applicable laws and the intent of the Parties hereto. If the legality of this Agreement is challenged and any form of injunctive relief is granted by any court, suspending temporarily or permanently the implementation of this Agreement, then the Parties agree that all Project Work that would otherwise be covered by this Agreement should be continued to be bid and constructed without application of this Agreement so that there is no delay or interference with the ongoing planning, bidding and construction of any Project Work.

Section 19.2 Effect of Injunctions or Other Court Orders. The Parties recognize the right of the City to withdraw, at its absolute discretion, the utilization of the Agreement as part of any bid specification should a Court of competent jurisdiction issue any order, or any applicable statute which could result, temporarily or permanently in delay of the bidding, awarding and/or construction on the Project. Notwithstanding such an action by the City, or such court order or statutory provision, the Parties agree that the Agreement shall remain in full force and effect on covered Project Work to the maximum extent legally possible; provided however, that the continuance of the Project is not determined to be financially or legally detrimental to the City.

ARTICLE 20
WAIVER

A waiver of or a failure to assert any provisions of this Agreement by any or all of the Parties hereto shall not constitute a waiver of such provision for the future. Any such waiver shall not constitute a modification of the Agreement or change in the terms and conditions of the Agreement

and shall not relieve, excuse or release any of the Parties from any of their rights, duties or obligations hereunder.

ARTICLE 21
AMENDMENTS

The provisions of this Agreement can be renegotiated, supplemented, rescinded or otherwise altered only by mutual agreement in writing, hereafter signed by the negotiating Parties hereto. In the event of any conflict or ambiguity between this Agreement and any Attachment or exhibit, the provisions of this Agreement shall govern.

ARTICLE 22
DURATION OF THE AGREEMENT

Section 22.1 Duration.

22.1.1 This Agreement shall be effective from the date signed by all Parties and shall remain in effect for an initial period of five (5) years. Any Project Work within the scope of this Agreement awarded during the term of this Agreement shall continue to be covered hereunder, until completion of the Project Work, notwithstanding the expiration date of this Agreement.

22.1.2 This Agreement may be extended by written mutual consent of the City, as directed by the City Council and the signatory Unions for such further periods as the Parties shall agree to.

Section 22.2 Turnover and Final Acceptance of Completed Work.

22.2.1 Construction of any phase, portion, section, or segment of Project Work shall be deemed complete when such phase, portion, section or segment has been turned over to the City by the Contractor and the City has accepted such phase, portion, section, or segment. As areas and systems of the Project are inspected and construction-tested and/or approved and accepted by the City or third parties with the approval of the City, the Agreement shall have no further force or effect on such items or areas, except when the Contractor is directed by the City to engage and repairs or modifications required by its contract(s) with the City.

22.2.2 Notice of each final acceptance received by the Contractor will be provided to the Trades Council with the description of what portion, segment, etc. has been accepted. Final acceptance may be subject to a "punch" list, and in such case, the Agreement will continue to apply to each such item on the list until it is completed to the satisfaction of the City and Notice of Completion is issued by the City or its representative to the Contractor. At the request of the Union, complete information describing any "punch" list work, as well as any additional work required of a Contractor at the direction of the City pursuant to Section 22.2.1 above, involving otherwise turned-over and completed facilities which have been accepted by the City, will be available from the CWA Administrator.

ARTICLE 23
MISCELLANEOUS PROVISONS

Section 23.1 Gender. The use of masculine or feminine gender or titles in this Agreement should be construed as including both genders and not as gender limitations unless the Agreement clearly requires a different construction.

Section 23.2 Headings and Subheadings. The use of Article titles and/or Section headings are for information only, and carry no legal significance.

Section 23.3 Binding Signatories Only. This Agreement shall only be binding on the signatory Parties hereto, and shall not apply to the parents, affiliates, subsidiaries, or other ventures of any such Party not performing Project Work.

Section 23.4 Separate Liability. It is understood that the liability of the Contractor(s) and the liability of the separate Unions under this Agreement shall be several and not joint. The Unions agree that this Agreement does not have the effect of creating any joint employment status between or among the City or CWA Administrator and/or any Contractor.

Section 23.5 Applicable Law; Venue. The internal laws of the State of California shall govern the interpretation and enforcement of this Agreement. In the event that either Party brings any action against the other under this Agreement, the Parties agree that trial of such action shall be vested exclusively in Orange County.

Section 23.6 Integration. This Agreement, including the attachments hereto and incorporated herein, represents the entire and integrated agreement between the Parties and supersedes all prior negotiations, representations, or agreements, either written or oral. The terms of this Agreement shall be construed in accordance with the meaning of the language used and shall not be construed for or against either Party by reason of the authorship of this Agreement or any other rule of construction which might otherwise apply.

Section 23.7 Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be an original and all of which together shall constitute one agreement.

Section 23.8 Execution of Contract. The persons executing this Agreement on behalf of each of the Parties hereto represent and warrant that (i) such Party is duly organized and existing, (ii) they are duly authorized to execute and deliver this Agreement on behalf of said Party, (iii) by so executing this Agreement, such Party is formally bound to the provisions of this Agreement, and (iv) that entering into this Agreement does not violate any provision of any other Agreement to which said Party is bound.

Section 23.9 No Third-Party Beneficiaries. Except where, if anywhere, this Agreement explicitly declares the existence of an express third party beneficiary, there are no intended third-party beneficiaries under this Agreement and no such other third parties shall have any rights or obligations hereunder, except employees working on the Project and Union benefit and trust funds are recognized third-party beneficiaries with rights under this Agreement.

Section 23.10 Nonliability of City Officers and Employees. No officer, official, employee, agent,

representative, or volunteer of City shall be personally liable to any Party, or any successor in interest, in the event of any default or breach by City, or for breach of any obligation of the terms of this Agreement.

IN WITNESS whereof the Parties have caused this Community Workforce Agreement to be executed as of the date and year above stated.

CITY OF IRVINE

Farrah Khan (Nov 1, 2023 19:00 PDT)

By: : _____
Mayor

ATTEST:

By: _____
Clerk of Council

APPROVED AS TO FORM:

Jeffrey Melching

By: Jeffrey Melching (Oct 18, 2023 09:12 PDT)
City Attorney

LOS ANGELES/ORANGE COUNTIES
BUILDING & CONSTRUCTION
TRADES COUNCIL

By: _____
Ernesto Medrano
Executive Secretary

DocuSign Envelope ID: 3A5B8C7E-F01A-45B2-93BE-620807AB0073

LOS ANGELES/ORANGE COUNTIES BUILDING AND CONSTRUCTION TRADES COUNCIL CRAFT UNIONS AND DISTRICT COUNCILS

Asbestos Heat & Frost Insulators (Local 5)

Boilermakers (Local 92)

Bricklayers & Allied Craftworkers (Local 4)

Cement Masons (Local 500)

District Council of Laborers

Electricians (Local 441)

Elevator Constructors (Local 18)

Gunite Workers (Local 345)

Iron Workers (Reinforced – Local 416)

Iron Workers (Structural – Local 433)

Laborers (Local 300) (remediation)

Laborers (Local 652)

Laborers (Local 1184)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Operating Engineers (Local 12)

Painters & Allied Trades DC 36

Pipe Trades (Steamfitters Local 250)

Pipe Trades (Local 345)

Pipe Trades (Plumbers/Fitters Local 582)

Pipe Trades (Sprinkler Fitters Local 709)

Plasterers (Local 200)

Plaster Tenders Local (1414)

Roofers & Waterproofers (Local 220)

Sheet Metal Workers (Local 105)

Teamsters (Local 986)

Southwest Mountain States Regional Council of Carpenters

ATTACHMENT A

LETTER OF ASSENT

To be signed by all contractors awarded work covered by the City of Irvine Community Workforce Agreement prior to commencing work.

[Contractor's Letterhead]
City of Irvine Public
Works Department
1234 address
City, state, zip code
Attn: _____

Re: Community Workforce Agreement - Letter of Assent

Dear Sir:

This is to confirm that [name of company] agrees to be party to and bound by the City of Irvine Community Workforce Agreement effective , 2023, as such Agreement may, from time to time, be amended by the negotiating parties or interpreted pursuant to its terms. Such obligation to be a party and bound by this Agreement shall extend to all work covered by the agreement undertaken by this Company on the project and this Company shall require all of its contractors and subcontractors of whatever tier to be similarly bound for all work within the scope of the Agreement by signing and furnishing to you an identical letter of assent prior to their commencement of work.

Sincerely.

[Name of Construction Company]

By: [_____] Name and Title of Authorized Executive

Contractor State License No.: _____

Project Name: _____

[Copies of this letter must be submitted to the CWA Administrator and to the Trades Council Consistent with Section 2.6 (b).]

ATTACHMENT B

FIRST TIER ZIP CODES

92602	92614	92620
92603	92616	92623
92604	92617	92650
92606	92618	92697
92612	92619	

ATTACHMENT C

CITY OF IRVINE
CRAFT REQUEST FORM

TO THE CONTRACTOR: Please complete and fax this form to the applicable union to request craft workers that fulfill the hiring requirements for this project. After faxing your request, please call the Local to verify receipt and substantiate their capacity to furnish workers as specified below. Please print your Fax Transmission Verification Reports and keep copies for your records.

The City of Irvine Community Workforce Agreement establishes a priority for the fulfillment of total work hours as follows: first, in those first tier zip codes which overlap all of the City of Irvine, as attached hereto, second (if there are not sufficient persons available from the first group), from Veterans residing in Orange County, third (if there are not sufficient persons available from the first and second groups) from graduates from the Building Trades Multi-Craft Core Curriculum ("MC3 Graduates") residing in Orange County, and fourth, from persons residing within Orange County. For Dispatch purposes, persons falling within these four categories, shall be referred to as Local Residents.

TO THE UNION: Please complete the "Union Use Only" section on the next page and fax this form back to the requesting Contractor. Be sure to retain a copy of this form for your records.

CONTRACTOR USE ONLY

To: Union Local #_____ **Fax#** (___) _____ **Date:** _____

Cc: CWA Administrator

From: **Company:** _____ Issued By: _____

Contact Phone :(___) _____ Contact Fax: (___) _____

PLEASE PROVIDE ME WITH THE FOLLOWING UNION CRAFT WORKERS.

Craft Classification (i.e., plumber, painter, etc.)	Journeyman or Apprentice	Local Resident or General Dispatch	Number of workers needed	Report Date	Report Time
TOTAL WORKERS REQUESTED = _____					

Please have worker(s) report to the following work address indicated below:

Report to: _____ On-site Tel: _____ On-site Fax: _____

Comment or Special Instructions: _____

UNION USE ONLY

Date dispatch request received:
Dispatch received by:
Classification of worker requested:
Classification of worker dispatched:

WORKER REFERRED

Name:
Date worker was dispatched:
Is the worker referred a: (check all that apply)

JOURNEYMAN	Yes _____	No _____
APPRENTICE	Yes _____	No _____
CITY RESIDENT	Yes _____	No _____
VETERAN RESIDING IN ORANGE COUNTY	Yes _____	No _____
MC3 RESIDENT RESIDING IN ORANGE COUNTY	Yes _____	No _____
OTHER ORANGE COUNTY RESIDENT	Yes _____	No _____
GENERAL DISPATCH FROM OUT OF WORK LIST	Yes _____	No _____

ATTACHMENT D

List of Neutral Arbitrators

Mark Burstein
Andrea Dooley
Fred Horowitz
Najeeb Khoury
Michael Prihar

ATTACHMENT E

LOS ANGELES/ORANGE COUNTIES BUILDING AND CONSTRUCTION TRADES COUNCIL
APPROVED
DRUG AND ALCOHOL TESTING POLICY

(rev. December 2019)

The Parties recognize the problems which drug and alcohol abuse have created in the construction industry and the need to develop drug and alcohol abuse prevention programs. Accordingly, the Parties agree that in order to enhance the safety of the workplace and to maintain a drug and alcohol-free work environment, individual Employers may require applicants or employees to undergo drug and alcohol testing.

1. It is understood that the use, possession, transfer or sale of illegal drugs, narcotics, or other unlawful substances, as well as being under the influence of alcohol and the possession or consuming alcohol is absolutely prohibited while employees are on the Employer's job premises or while working on any jobsite in connection with work performed under the Community Workforce Agreement ("CWA").

2. No Employer may implement a drug testing program which does not conform in all respects to the provisions of this Policy.

3. No Employer may implement drug testing at any jobsite unless written notice is given to the Union setting forth the location of the jobsite, a description of the project under construction, and the name and telephone number of the Project Supervisor. Said notice shall be addressed to the office of each Union signing the CWA. Said notice shall be sent by email or by registered mail before the implementation of drug testing. Failure to give such notice shall make any drug testing engaged in by the Employer a violation of the CWA, and the Employer may not implement any form of drug testing at such jobsite for the following six months.

4. An Employer who elects to implement drug testing pursuant to this Agreement shall require all employees on the Project to be tested. With respect to individuals who become employed on the Project subsequent to the proper implementation of a valid drug testing program, such test shall be administered upon the commencement of employment on the project, whether by referral from a Union Dispatch Office, transfer from another project, or another method. Individuals who were employed on the project prior to the proper implementation of a valid drug testing program may only be subjected to testing for the reasons set forth in paragraphs 5(g)(l) through 5(g)(3) and paragraphs 6(a) through 6(e) of this Policy. Refusal to undergo such testing shall be considered sufficient grounds to deny employment on the project.

5. The following procedure shall apply to all drug testing:

a. The Employer may request urine samples only. The applicant or employee shall not be observed when the urine specimen is given. An applicant or employee, at his or her sole option, shall, upon request, receive a blood test in lieu of a urine test. No employee of the Employer shall draw blood from a bargaining unit employee, touch or handle urine specimens,

or in any way become involved in the chain of custody of urine or blood specimens. A Union Business Representative, subject to the approval of the individual applicant or employee, shall be permitted to accompany the applicant or employee to the collection facility to observe the collection, bottling, and sealing of the specimen.

b. An employer may request an applicant to perform an alcohol breathalyzer test, at a certified laboratory only and cutoff levels shall be those mandated by applicable state or federal law.

c. The testing shall be done by a laboratory approved by the Substance Abuse & Mental Health Services Administration (SAMHSA), which is chosen by the Employer and the Union.

d. An initial test shall be performed using the Enzyme Multiplied Immunoassay Technique (EMIT). In the event a question or positive result arises from the initial test, a confirmation test must be utilized before action can be taken against the applicant or employee. The confirmation test will be by Gas Chromatography/Mass Spectrometry (GC/MS). Cutoff levels for both the initial test and confirmation test will be those established by SAMHSA. Should these SAMHSA levels be changed during the course of this Agreement or new testing procedures are approved, then these new regulations will be deemed as part of this existing Agreement. Confirmed positive samples will be retained by the testing laboratory in secured long-term frozen storage for a minimum of one year. Handling and transportation of each sample must be documented through strict chain of custody procedures.

e. In the event of a confirmed positive test result the applicant or employee may request, within forty-eight (48) hours, a sample of his/her specimen from the testing laboratory for purposes of a second test to be performed at a second laboratory, designated by the Union and approved by SAMHSA. The retest must be performed within ten (10) days of the request. Chain of custody for this sample shall be maintained by the Employer between the original testing laboratory and the Union's designated laboratory. Retesting shall be performed at the applicant's or employee's expense. In the event of conflicting test results the Employer may require a third test.

f. If, as a result of the above testing procedure, it is determined that an applicant or employee has tested positive, this shall be considered sufficient grounds to deny the applicant or employee his/her employment on the project.

g. No individual who tests negative for drugs pursuant to the above procedure and becomes employed on the project shall again be subjected to drug testing with the following exceptions:

1. Employees who are involved in industrial accidents resulting in damage to plant, property or equipment or injury to him/her or others may be tested for drug or alcohol pursuant to the procedures stated hereinabove.

2. The Employer may test employees following thirty (30) days advance written notice to the employee(s) to be tested and to the applicable Union. Notice to the applicable Union shall be as set forth in paragraph 3 above and such testing shall be pursuant to the procedures stated hereinabove.

3. The Employer may test an employee where the Employer has reasonable cause to believe that the employee is impaired from performing his/her job. Reasonable cause shall be defined as being aberrant or unusual behavior, the type of which is a recognized and accepted symptom of impairment (i.e., slurred speech, unusual lack of muscular coordination, etc.). Such behavior must be actually observed by at least two persons, one of whom shall be a supervisor who has been trained to recognize the symptoms of drug abuse or impairment and the other of whom shall be the Job Steward. If the Job Steward is unavailable or there is no Job Steward on the project the other person shall be a member of the applicable Union's bargaining unit. Testing shall be pursuant to the procedures stated hereinabove. Employees who are tested pursuant to the exceptions set forth in this paragraph and who test positive will be removed from the Employer's payroll.

h. Applicants or employees who do not test positive shall be paid for all time lost while undergoing drug testing. Payment shall be at the applicable wage and benefit rates set forth in the applicable Union's Master Labor Agreement. Applicants who have been dispatched from the Union and who are not put to work pending the results of a test will be paid waiting time until such time as they are put to work. It is understood that an applicant must pass the test as a condition of employment. Applicants who are put to work pending the results of a test will be considered probationary employees.

6. The Employers will be allowed to conduct periodic jobsite drug testing on the Project under the following conditions:

a. The entire jobsite must be tested, including any employee or subcontractor's employee who worked on that project three (3) working days before or after the date of the test;

b. Jobsite testing cannot commence sooner than fifteen (15) days after start of the work on the project;

c. Prior to start of periodic testing, a Business Representative will be allowed to conduct an educational period on company time to explain periodic jobsite testing program to affected employees;

d. Testing shall be conducted by a SAMHSA certified laboratory, pursuant to the provisions set forth in paragraph 5 hereinabove.

e. Only two (2) periodic tests may be performed in a twelve (12) month period.

7. It is understood that the unsafe use of prescribed medication, or where the use of prescribed medication impairs the employee's ability to perform work, is a basis for the Employer to remove the employee from the jobsite.

8. Any grievance or dispute which may arise out of the application of this Agreement shall be subject to the grievance and arbitration procedures set forth in the CWA.

9. The establishment or operation of this Policy shall not curtail any right of any employee found in any law, rule or regulation. Should any part of this Agreement be found unlawful by a court of competent jurisdiction or a public agency having jurisdiction over the parties, the remaining portions of the Agreement shall be unaffected, and the parties shall enter negotiations to replace the affected provision.

10. Present employees, if tested positive, shall have the prerogative for rehabilitation program at the employee's expense. When such program has been successfully completed the Employer shall not discriminate in any way against the employee. If work for which the employee is qualified exists, he/she shall be reinstated.

11. The Employer agrees that results of urine and blood tests performed hereunder will be considered medical records held confidential to the extent permitted or required by law. Such records shall not be released to any persons or entities other than designated Employer representatives and the applicable Union. Such release to the applicable Union shall only be allowed upon the signing of a written release and the information contained therein shall not be used to discourage the employment of the individual applicant or employee on any subsequent occasion.

12. The Employer shall indemnify and hold the Union harmless against any and all claims, demands, suits, or liabilities that may arise out of the application of this Agreement and/or any program permitted hereunder.

13. Employees who seek voluntary assistance for substance abuse may not be disciplined for seeking such assistance. Requests from employees for such assistance shall remain confidential and shall not be revealed to other employees or management personnel without the employee's consent. Employees enrolled in substance abuse programs will be subject to all Employer rules, regulations and job performance standards with the understanding that an employee enrolled in such a program is receiving treatment for an illness.

14. The parties agree to develop and implement a drug abuse prevention and testing program for all apprentices entering the industry.

15. This Memorandum of Understanding shall constitute the only Agreement in effect between the parties concerning drug and alcohol abuse, prevention and testing. Any modifications thereto must be accomplished pursuant to collective bargaining negotiations between the parties.

APPENDIX A: SPECIMEN REPORTING CRITERIA

Initial Test Analyte	Initial Test Cutoff [1]	Confirmatory Test Analyte	Confirmatory Test Cutoff Concentration
Marijuana metabolites (THCA)[2]	50 ng/ml [3]	THCA	15 ng/ml
Cocaine metabolite (Benzoylecgonine)	150ng/ml[3]	Benzoylecgonine	100 ng/ml
Codeine/ Morphine	2000 ng/ml	Codeine Morphine	2000 ng/ml 2000 ng/ml
Hydrocodone/ Hydromorphone	300 ng/ml	Hydrocodone Hydromorphone	100ng/ml 100ng/ml
Alcohol	0.02%	Ethanol	0.02%
Oxycodone/ Oxymorphone	100 ng/ml	Oxycodone Oxymorphone	100ng/ml 100ng/ml
6-Acetylmorphine	10 ng/ml	6-Acetylmorphine	10 ng/ml
Phencyclidine	25 ng/ml	Phencyclidine	25 ng/ml
Amphetamine/ Methamphetamine	500 ng/ml	Amphetamine Methamphetamine	250ng/ml 250 ng/ml
MDMA[4]/MDA[5]	500 ng/ml	MDMA MDA	250ng/ml 250 ng/ml

[1] For grouped analytes (i.e., two or more analytes that are in the same drug class and have the same initial test cutoff):

Immunoassay: The test must be calibrated with one analyte from the group identified as the target analyte. The cross-reactivity of the immunoassay to the other analyte(s) within the group must be 80 percent or greater; if not, separate immunoassays must be used for the analytes within the group.

Alternate technology: Either one analyte or all analytes from the group must be used for calibration, depending on the technology. At least one analyte within the group must have a concentration equal to or greater than the initial test cutoff or, alternatively, the sum of the analytes present (i.e., equal to or greater than the laboratory's validated limit of quantification) must be equal to or greater than the initial test cutoff.

[2] An immunoassay must be calibrated with the target analyte, 9-tetrahydrocannabinoJ-9- carboxylic acid (THCA).

[3] **Alternate technology (THCA and benzoylecgonine):** The confirmatory test cutoff must be used for an alternate technology initial test that is specific for the target analyte (i.e., 15 ng/ml for THCA, 100 ng/ ml for benzoylecgonine).

[4] Methylenedioxymethamphetamine (MDMA)

[5] Methylenedioxyamphetamine (MDA)

Initial Test Analyte	Initial Test Cutoff	Confirmatory Test Analyte	Confirmatory Test Cutoff Concentration
Barbiturates	300 ng/ml	Barbiturates	200 ng/ml
Benzodiazepines	300 ng/ml	Benzodiazepines	300 ng/ml
Methadone	300 ng/ml	Methadone	100 ng/ml
Methaqualone	300 ng/ml	Methaqualone	300 ng/ml
Propoxyphene	300 ng/ml	Propoxyphene	100 ng/ml

SIDE LETTER OF AGREEMENT
TESTING POLICY FOR DRUG ABUSE

It is hereby agreed between the parties hereto that an Employer who has otherwise properly implemented drug testing, as set forth in the Testing Policy for Drug Abuse, shall have the right to offer an applicant or employee a "quick" drug screening test. This "quick" screen test shall consist either of the "ICUP" urine screen or similar test or an oral screen test. The applicant or employee shall have the absolute right to select either of the two "quick" screen tests, or to reject both and request a full drug test.

An applicant or employee who selects one of the "quick" screen tests, and who passes the test, shall be put to work immediately. An applicant or employee who fails the "quick" screen test, or who rejects the "quick" screen tests, shall be tested pursuant to the procedures set forth in the Testing Policy for Drug Abuse. The sample used for the "quick" screen test shall be discarded immediately upon conclusion of the test. An applicant or employee shall not be deprived of any rights granted to them by the Testing Policy for Drug Abuse as a result of any occurrence related to the "quick" screen test.

CORE EMPLOYEES LIST

TO BE COMPLETED BY ALL PRIME CONTRACTORS/CONSULTANTS, SUBCONTRACTORS/SUBCONSULTANTS

FIRM NAME: _____

PROJECT: _____ **CONTRACT NO.:** _____

CONTRACTOR: _____ **TELEPHONE NO.:** _____

The following is a list of "Core Employees" which in accordance with the Community Workforce Agreement (§3.8.2), have been on the active payroll for at least **sixty (60) out of the last one-hundred (100) days** prior to the award, **have worked at least two-thousand (2,000) hours in the craft in which they are employed**, are able to safely perform and have any licenses required for the work they are performing. Pursuant to the requirements of SB 1362 and California Labor Code §3099.2, all employees performing **electrical work** for a subcontractor holding a C-10 license **must be certified**. If employees working on project are found to be not certified, they shall be immediately removed. Failure to provide proof of this documentation on all employees will be considered a violation and subject the subcontractor to corrective action up to and including being removed from the project.

The prime contractor/consultant and any subcontractor/subconsultant, at any tier, must submit this form no later than ten (10) days prior to commencing work on the project.

☐ Check if company is directly signatory to all unions it will be assigning work to. List unions here:

_____

Name	SSN	Trade	ZIP Code of residence	Certificate # (Electricians only)	MC3 Graduate? Y/N	Veteran? Y/N

Certification:

I certify that the information contained hereon is true and correct. If it is determined that the information reported hereon is not true and correct, I will not be allowed to do work (begin, finish, complete) for the City of Irvine.

Signature: _____ **Date:** _____

Name/Title: _____

PRE-JOB CONFERENCE FORM
CWA Pre-Job Conference Form

Project Information	
Project Name:	
Specification Number:	Contract Number:
Contract Award Amount:	Pre-Job Conference:
Estimated Start Date:	Conference Location:
Estimated End Date:	

General Contractor Information	
Prime Contractor:	
Address:	
Phone:	
Email:	Fax:
Prime Contractor's License Number:	

Project Description

Heavy Equipment to Be Utilized on Job

Jobsite Information	
Project Address:	
Site Phone:	Email:
Fax:	Jobsite Labor Rep:
Project Manager:	Jobsite Safety Rep:
Job Superintendent:	Manpower Ordered By:

Jobsite Scheduling Information	
Number of Shifts:	Start / Stop Times:
Pay Day:	Ending Day of Pay Period:

Jobsite Facilities
Location(s) of First Aid Facilities:
Location(s) of Sanitary Facilities:
Location(s) of Drinking Water Facilities:
Description of Jobsite Parking:
Name of Selected Hospital:
Hospital Address:
Hospital Phone Number

Contractor Jurisdictional Work Assignments	
As required by CWA Article 8, the assignment of work will be solely the responsibility of the contractor performing the work involved; and such work assignments will be in accordance with the Plan for the Settlement of Jurisdictional Disputes in the Construction Industry (the "Plan") or any successor plan. All jurisdictional disputes on this project shall be settled in accordance with CWA Article 8.	
Jurisdictional Work Assignments	
Contractor Name and Type of Work	*Union Work Assignment (Identify Local CWA-Signatory Union)*
Example: Contractor XYZ – Installation of sprockets	Example: Sprocket Installers Local 123

Subcontractor Information – Complete or Attach Subcontractor Listing	
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	Start Date:
Contact Person:	Contact Person:
Email:	Email:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:

Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:
Subcontractor Name:	
Type/Scope of Work:	
Address:	
Start Date:	End Date:
Contact Person:	Phone:
Email:	Contractor License Number:

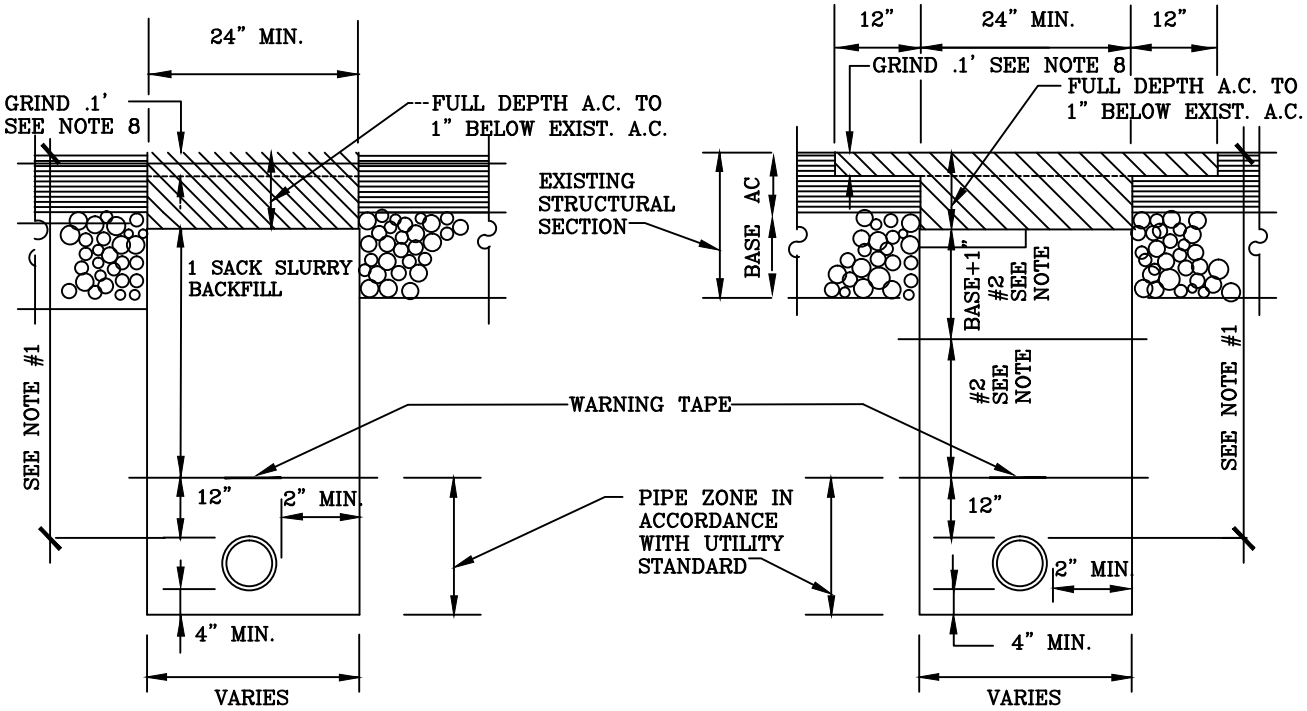
APPENDIX B

STANDARD PLANS

Copies of the following agency standard plans and/or details referenced by the plans and Specifications are attached hereto and are made a part of these Special Provisions.

AGENCY:	STD. PLAN NO.:	DESCRIPTION:
City of Irvine	223	Utility Trench Repair
City of Irvine	318	Storm Drain Bedding Detail
City of Irvine	601	Shrub Planting
City of Irvine	602	Shrub Planting on Slope
City of Irvine	606	Double Stake Tree
City of Irvine	608	Root Barrier
City of Irvine	609	Ground Cover Planting
City of Irvine Park Standard Manual	8.2.6	Picnic Table
City of Irvine Park Standard Manual	8.2.7	Recycling Receptacle
City of Irvine Park Standard Manual	8.2.8	Trash Receptacle

CITY OF IRVINE
PUBLIC WORKS



NOTES:

1. DEPTH OF UTILITIES ON ARTERIAL STREETS SHALL BE 42 INCHES MINIMUM COVERAGE, OR AS APPROVED BY THE CITY ENGINEER. DEPTH OF UTILITIES ON NON-ARTERIAL STREETS SHALL BE 30 INCHES MINIMUM COVERAGE, OR AS APPROVED BY THE CITY ENGINEER.
2. BACK FILL ABOVE PIPE ZONE SHALL BE COMPACTED TO 90% MAXIMUM DENSITY WHEN SLURRY BACK FILL IS NOT USED (WITH THE EXCEPTION OF THE TWO FEET IMMEDIATELY UNDER THE ASPHALT WHICH SHALL BE UNTREATED BASE COMPACTED TO 95% MAXIMUM DENSITY). COMPACTION TESTS SHALL BE TAKEN BY CONTRACTOR AT RANDOM LOCATIONS FOR EVERY 8 INCHES OF LIFT. FLOODING OR JETTING SHALL NOT BE ALLOWED.
3. ALL UTILITIES TO BE INSTALLED BENEATH PUBLIC STREETS, INTERSECTIONS, AND STREET CROSSINGS (LOCAL STREETS EXCEPTED) SHALL BE BORED UNLESS OTHERWISE APPROVED BY THE INSPECTION SUPERINTENDENT. IF OPEN CUTTING OF A STREET IS ALLOWED, REPAIR OF THE STREET SHALL BE IN ACCORDANCE WITH THIS STANDARD PLAN.
4. THE EDGE OF THE TRENCH SHALL BE A NEAT CUT AS APPROVED BY THE CITY INSPECTOR. THE TRENCH SHALL BE CAPPED WITH AC EVEN WITH THE FINISHED GRADE TO THE SATISFACTION OF THE CITY INSPECTOR.
5. ALTERNATE A SHALL BE USED ON ARTERIAL STREETS, AT INTERSECTIONS, AND FOR STREET CROSSINGS, UNLESS CITY ENGINEER APPROVES THE USE OF ALTERNATE B. ALTERNATE B MAY BE USED FOR PARALLEL CUTS TO A STREET IF APPROVED BY THE CITY INSPECTOR.
6. TRENCHING WITH ROCK WHEELS SHALL NOT BE ALLOWED.
7. TRENCH WIDTH BELOW STRUCTURAL SECTION CAN BE LESS THAN 24 INCHES IF APPROVED BY THE CITY INSPECTOR.
8. UPON COMPLETION OF BACKFILLING THE TRENCH, ASPHALT CONCRETE SHALL BE INSTALLED FLUSH WITH THE EXISTING PAVEMENT. SEVEN CALENDAR DAYS AFTER COMPLETION OF AFOREMENTIONED ASPHALT CONCRETE IT SHALL BE GROUND TO 0.1 FOOT DEPTH FOR THE ENTIRE LENGTH OF THE TRENCH UNLESS OTHERWISE APPROVED BY THE CITY INSPECTOR. NEW ASPHALT CONCRETE SHALL BE INSTALLED EVEN WITH THE FINISH GRADE.
9. ALL TRENCHES SHALL BE COMPACTED BY SELF-PROPELLED ROLLERS. NO WHEEL ROLLING IS ALLOWED.

UTILITY TRENCH REPAIR

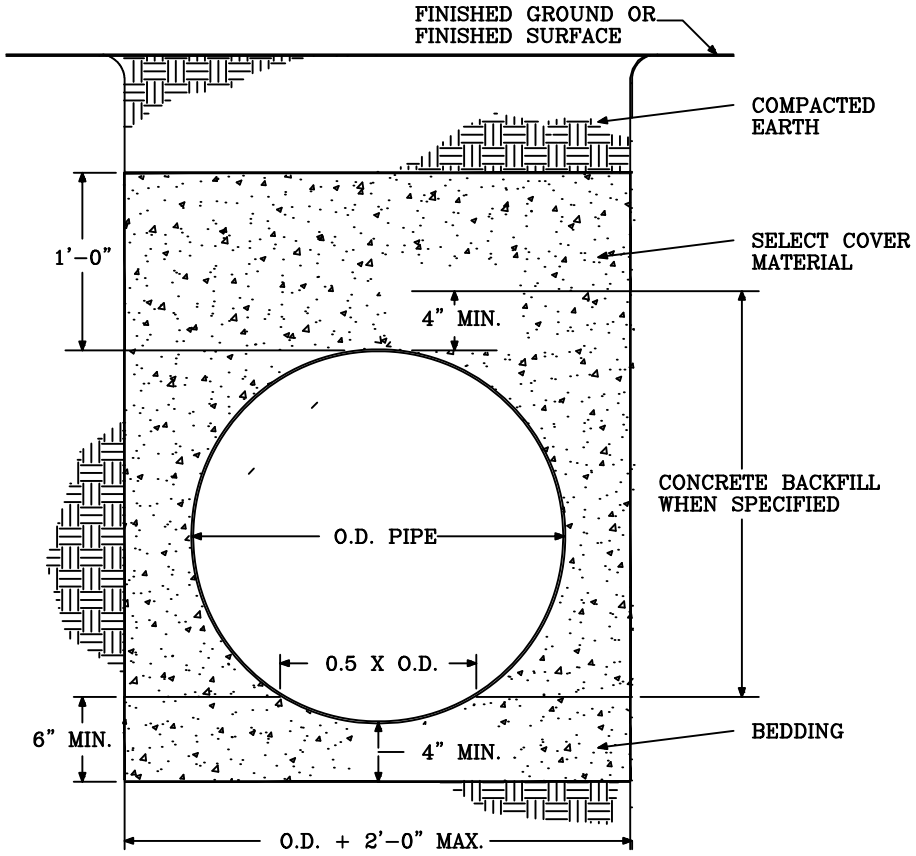
MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

STD. PLAN 223

SHEET 1 OF 1

CITY OF IRVINE
PUBLIC WORKS



NOTES :

1. ALL MATERIAL MUST MEET THE APPROVAL OF THE FIELD INSPECTOR.
2. SELECT COVER MATERIAL SHALL BE SAND OR OTHER GRANULAR MATERIAL WITH A MIN. SAND EQUIVALENT OF 25.
3. BEDDING SHALL CONSIST OF SAND OR OTHER GRANULAR MATERIAL WITH A MIN. SAND EQUIVALENT OF 25 UNLESS GROUND WATER IS PRESENT, IN WHICH CASE BEDDING MATERIAL OF #3 ROCK IS REQUIRED.
4. BEDDING AND BACKFILL SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90%, EXCEPT FINAL 2 FEET WHICH WILL BE NOT LESS THAN 95%.

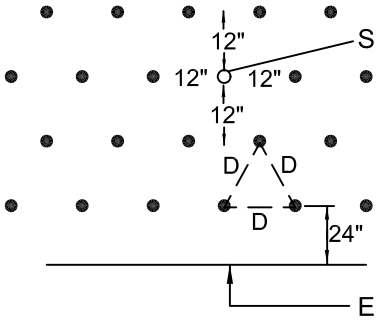
STORM DRAIN BEDDING DETAIL

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

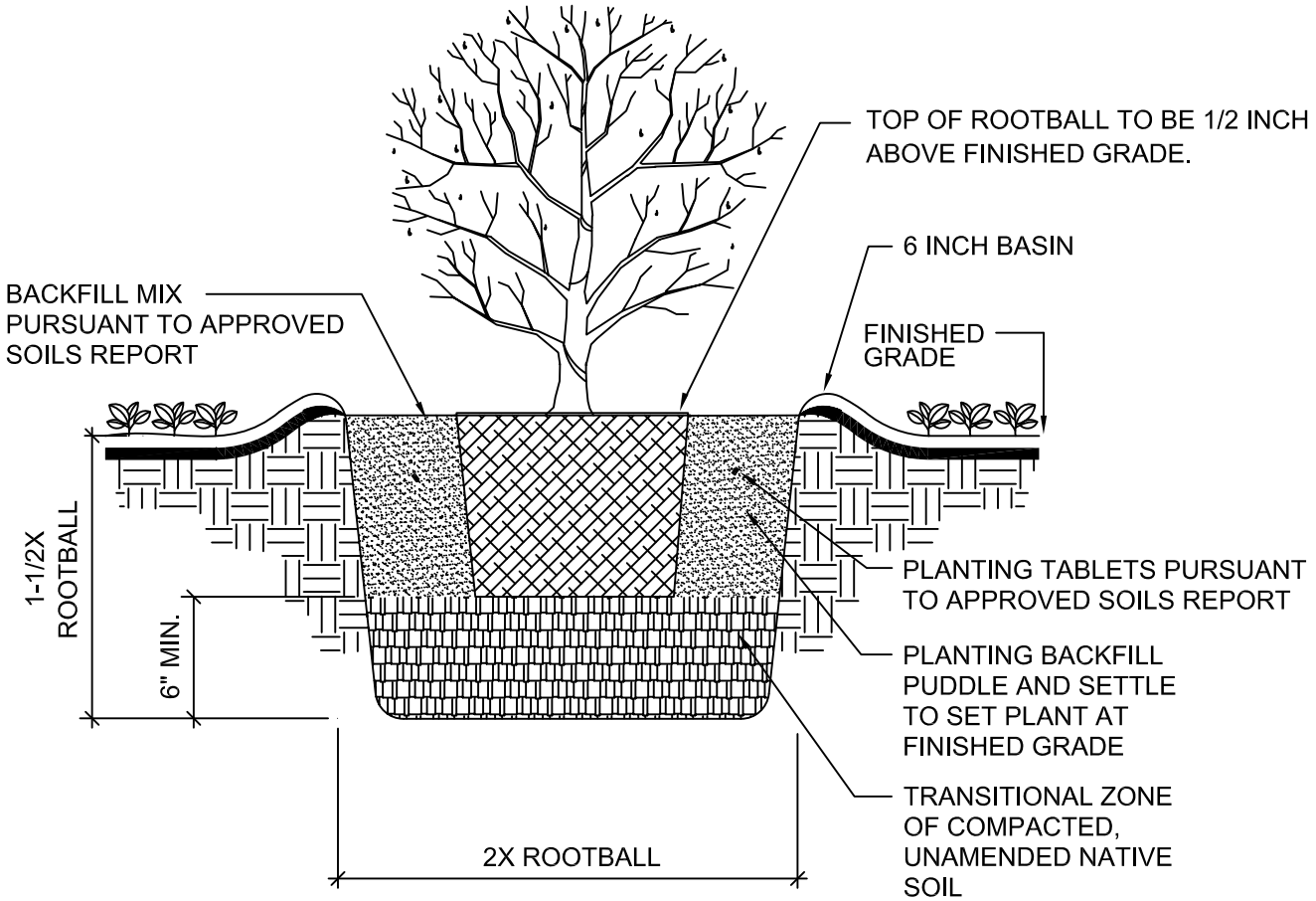
AUGUST 2013
DATE

STD. PLAN 318

SHEET 1 OF 1



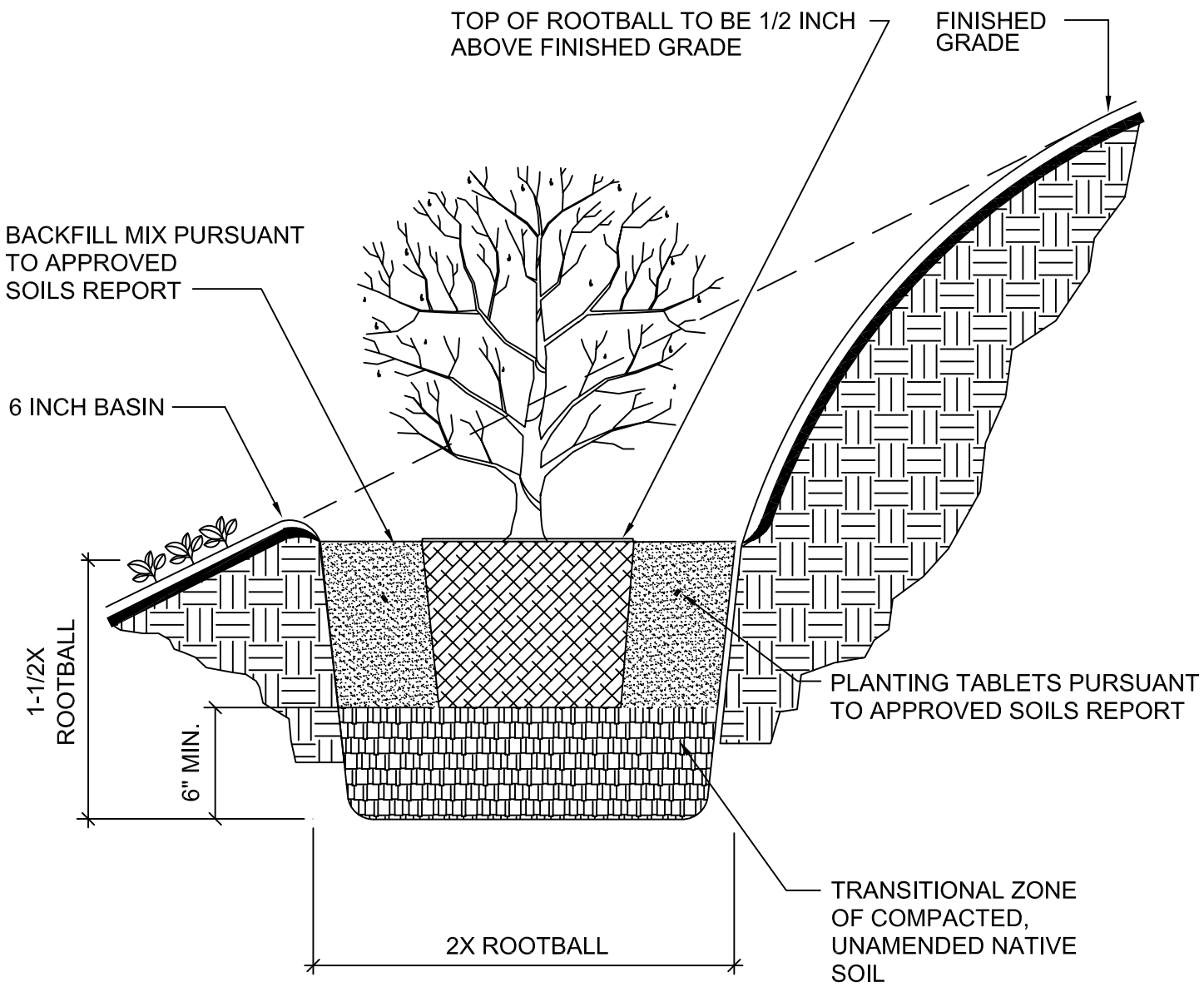
NOTE: LOCATE PLANTS SPACED EQUAL DISTANT (D) FROM EACH OTHER AS SHOWN ON PLANTING PLAN AND MINIMUM OF 12" FROM SPRINKLER HEAD.



NOTE: ALL PLANT BASINS SHALL RECEIVE A 2 INCH LAYER OF APPROVED MULCH. MULCH TO BE 6 INCHES AWAY FROM THE SHRUB STEM.

©Copyright 2000 Global Digi-tech, LLC – The pictorial and graphic expressions displayed with this work are copyrighted under the laws of the United States and shall be used only on projects under the jurisdiction of the agency listed below.

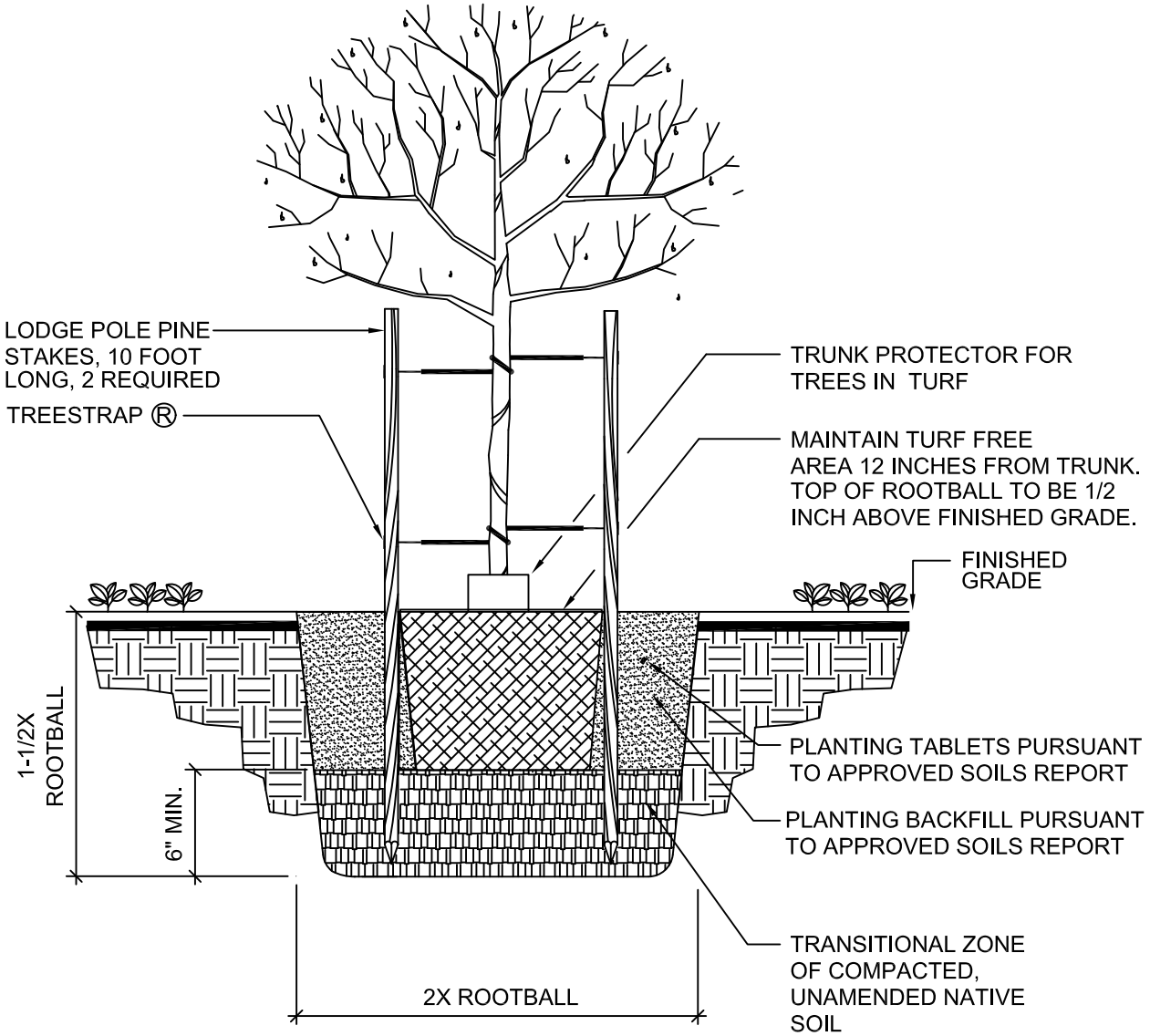
REVISIONS	CITY OF IRVINE	STANDARD PLAN NO.
	SHRUB PLANTING	601
	Approved by: Mark L. Carroll R.C.E. 31515 City Engineer Date: 6-22-09	Sheet 1 of 1



NOTE: ALL PLANT BASINS SHALL RECEIVE A 2 INCH LAYER OF APPROVED MULCH. MULCH TO BE 6 INCHES AWAY FROM THE SHRUB STEM.

©Copyright 2000 Global Digi-tech, LLC – The pictorial and graphic expressions displayed with this work are copyrighted under the laws of the United States and shall be used only on projects under the jurisdiction of the agency listed below.

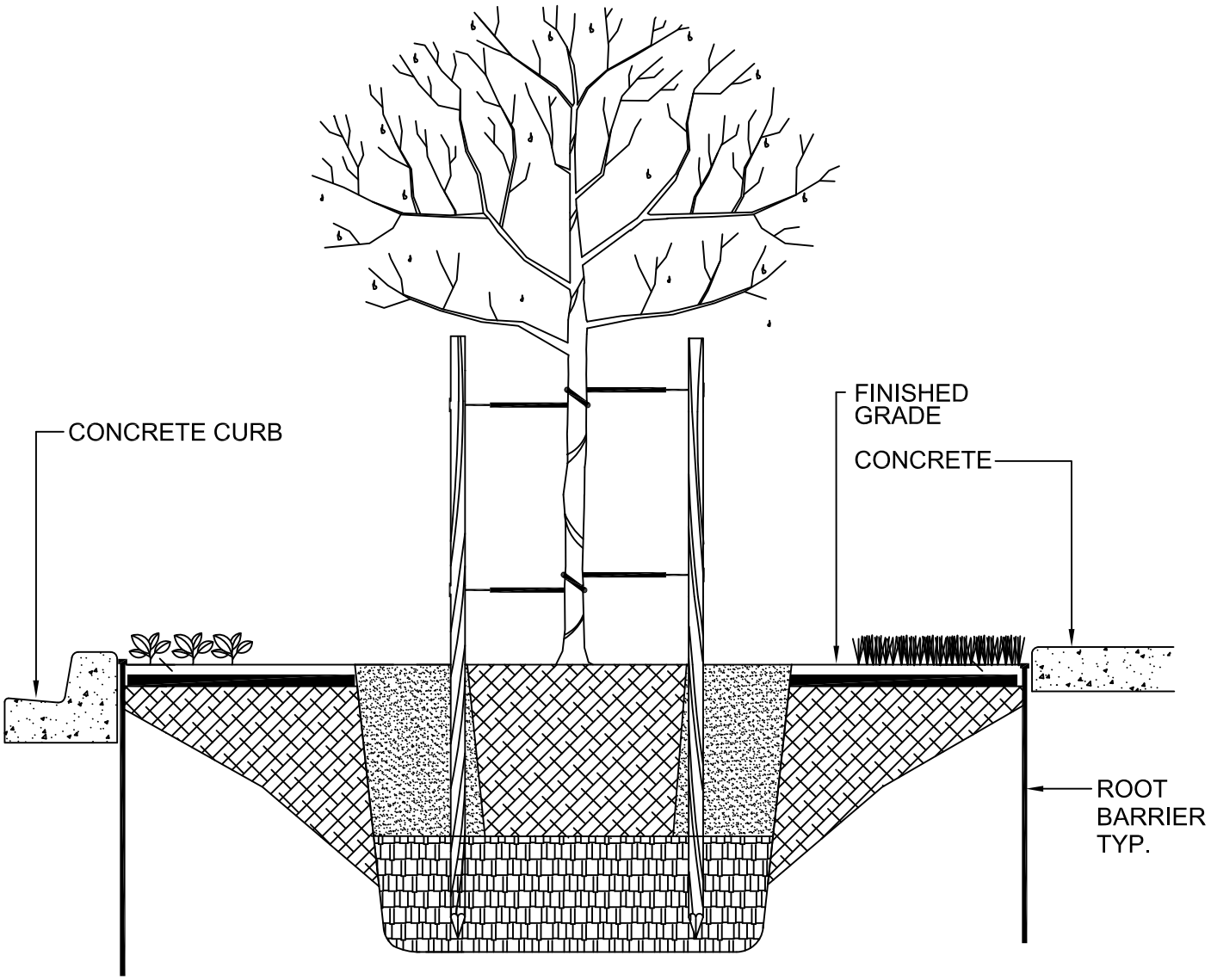
REVISIONS	CITY OF IRVINE	STANDARD PLAN NO.
	SHRUB PLANTING ON SLOPE	**602**
	Approved by: Mark L. Carroll R.C.E. 31515 City Engineer — Date: 6-22-09	Sheet 1 of 1



NOTE: ALL PLANT BASINS SHALL RECEIVE A 2 INCH LAYER OF APPROVED MULCH. MULCH TO BE 6 INCHES AWAY FROM THE TREE TRUNK.

©Copyright 2000 Global Digi-tech, LLC – The pictorial and graphic expressions displayed with this work are copyrighted under the laws of the United States and shall be used only on projects under the jurisdiction of the agency listed below.

REVISIONS	CITY OF IRVINE	STANDARD PLAN NO.
	DOUBLE STAKE TREE, 15 GAL. & 24 INCH BOX	**606**
	Approved by: Mark L. Carroll R.C.E. 31515 City Engineer — Date: 6-22-09	Sheet 1 of 1

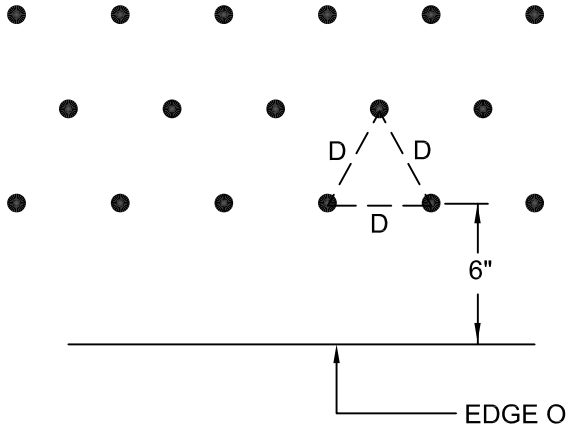


NOTE:

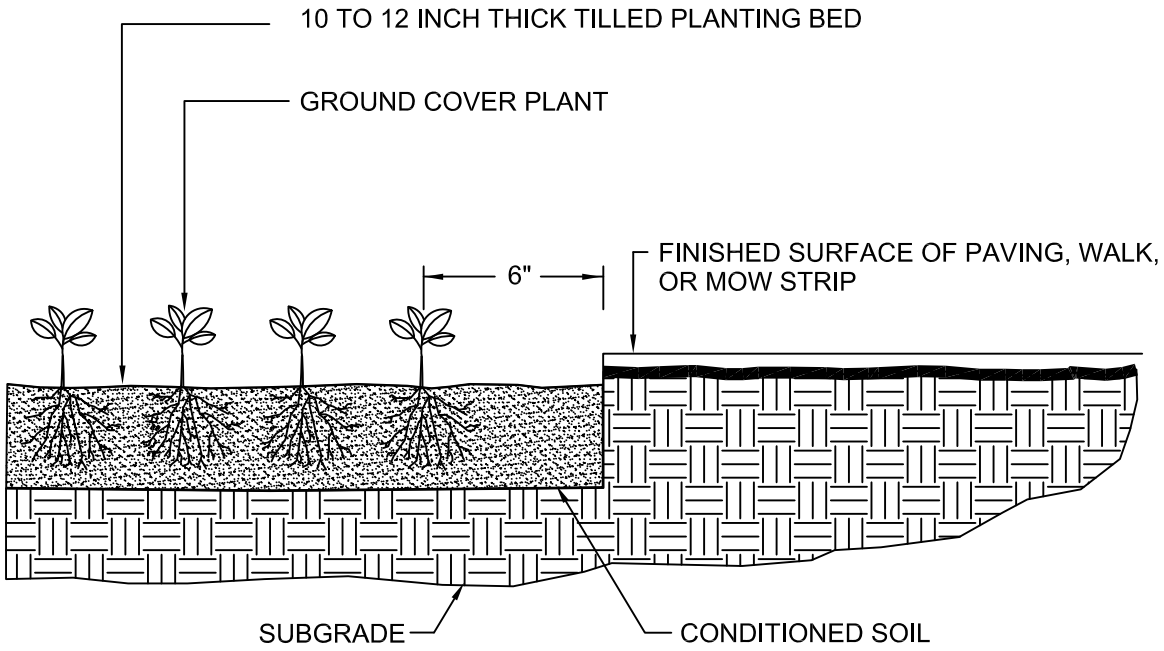
1. TOP OF ROOT CONTROL BARRIER MUST BE AT GRADE.
2. POSITION ROOT CONTROL BARRIER ADJACENT TO STRUCTURE.
3. RAISED ROOT DEFLECTORS MUST BE FACING PLANTED AREA.
4. PROVIDE A MIN. OF 12 FEET OF ROOT BARRIER EACH SIDE OF TREE TRUNK.
5. ROOT BARRIER SHALL EXTEND A MIN. OF 18 INCHES BELOW GRADE ON WALK SIDE.
6. ROOT BARRIER SHALL EXTEND A MIN. OF 24 INCHES BELOW GRADE ON CURB SIDE.
7. TREE PLANTING AND STAKING SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD PLAN NOS. 604 THROUGH 607.

©Copyright 2000 Global Digi-tech, LLC – The pictorial and graphic expressions displayed with this work are copyrighted under the laws of the United States and shall be used only on projects under the jurisdiction of the agency listed below.

REVISIONS	CITY OF IRVINE	STANDARD PLAN NO.
	ROOT BARRIER	608
	Approved by: Mark L. Carroll R.C.E. 31515, City Engineer — Date 6-22-09	Sheet 1 of 1



NOTE: LOCATE PLANTS SPACED EQUAL DISTANT (D)
FROM EACH OTHER AS SHOWN ON PLANTING PLAN.



©Copyright 2000 Global Digi-tech, LLC – The pictorial and graphic expressions displayed with this work are copyrighted under the laws of the United States and shall be used only on projects under the jurisdiction of the agency listed below.

REVISIONS	CITY OF IRVINE	STANDARD PLAN NO.
	GROUND COVER PLANTING	609
	Approved by: Mark L. Carroll R.C.E. 31515, City Engineer — Date: 6-22-09	Sheet 1 of 1

8.2.2. PARK BENCH

Quantity and Location

Benches are required:

- Within 15 feet from any parking spaces accessible to persons with disabilities, per Section VI.C.
- At tennis courts, per Section VII.A.12.
- At tot lots per, Section VII.B.3.5.

Accessibility

See Section VI-G, including requirements that all benches are:

- Accessible to persons with disabilities.
- Have backs and armrests.
- Have an adjacent companion seating space, outside of the path of travel.

Features

All benches shall be 6 feet long, with backs and armrests. Benches may include a center rail.

Materials and Finish:

- Steel: Galvanized. Metal finishing shall be of high-quality, permanently affixed powder coating, applied through a heat-finished process. Metal products shall have smooth welds, joints and corners. Joint fasteners shall be imbedded or sealed. Benches shall contain a minimum of 70 percent post-consumer steel.
- Aluminum: Seats, backs and end caps shall be anodized aluminum with hot dip galvanized frame where holes are drilled prior to galvanizing.
- Recycled Products: Seats and backs shall be wood-look, 100 percent recycled lumber product or 100 percent recycled plastic, where only one type of recycled product is used consistently. Seats and backs shall be ultra-violet (UV) stabilized. Frame shall be aluminum or galvanized steel.
- Concrete and wood are not acceptable materials. Recycled plastic products that look like wood should be used in place of wood.

Warranty: A 10-year minimum warranty is required.

Life Cycle Expectations: Benches are anticipated to require replacement after 20 years of normal and ordinary use.

Installation Notes

1. Pads and Positioning: All park benches shall be placed on a reinforced concrete pad, 4 feet wide, 6½ feet long, and 4 inches thick. All benches shall be centered on the pad with length of the bench parallel to length of the pad. If there is a non-flush obstruction at the front of the bench, bench shall either be placed flush to that obstruction or shall overhang it, so as not to present a safety hazard.

2. Frames: All frames shall be $2^{3}/_{8}$ inches OD galvanized surface mounted type. Comparables may be substituted only with prior approval from the Community Development Director.

3. Mounting: All benches shall be surface mounted, using stainless steel anchor bolts.

4. Labels: All packing labels shall be removed prior to installation in a manner that does not damage the surfaces.

5. Fasteners: All fasteners shall be stainless steel.
   - All bench slats shall be fastened to the frame with stainless steel $^{3}/_{8}$-inch by 4-inch carriage bolt, $^{3}/_{8}$-inch flat washer and $^{3}/_{8}$-inch hex bolt.
   - All frames shall be fastened to concrete slabs by an ITT Red Head SRM-38 stainless steel drop-in anchor, a $^{3}/_{8}$-inch by 1-inch stainless steel hex head bolt, $^{3}/_{8}$-inch flat washer and $^{3}/_{8}$-inch lock washer, both stainless steel.

Preferred Models

Dumor: Any steel, aluminum or recycled plastic with steel frame model if surface mounted.

Images and Diagrams



Dumor #58

8.2.6. PICNIC TABLE

Quantity and Location

See Section I.

Accessibility

See Section VI.G.

Features

Dimensions:

- All tables and seats not accessible to persons with disabilities shall be 8 feet long.
- All tables accessible to persons with disabilities shall have a 2-foot overhang, be minimum 8 feet long including the overhang, and have seats minimum 6 feet long.

Materials and Finish:

- Steel: Acceptable if surface-mounted.
- Aluminum: Tops, seats and end-caps shall be anodized aluminum with hot dipped galvanized frames, holes to be drilled prior to galvanizing.
- Recycled Products: Tables shall be made of wood-look, 100 percent recycled lumber product or 100 percent recycled plastic, where only one type of recycled product is used consistently. Top and seat shall be UV stabilized. Tables shall have minimum 4-inch thick slab and metal frame. Lighter colors should be used for the slab, such as cedar with green or maroon frame or gray with maroon frame.
- Concrete and wood are not acceptable materials. Recycled plastic products that look like wood should be used in place of wood.
- All frames shall be $2^{3}/_{8}$-inch OD galvanized steel, with holes drilled prior to galvanizing.

Warranty: A 10-year minimum warranty is required.

Life Cycle Expectations: Picnic tables are anticipated to require replacement after 15 years of normal and ordinary use.

Installation Notes

1. Shade: At least 50 percent of all picnic tables shall be located in shaded areas where possible.

2. Pads & Positioning: Each table shall be placed in the center of a reinforced concrete pad, 12 feet long, 9 feet wide and 4 inches thick, with the length of the table parallel to the length of the pad.

3. Positioning of frame to aluminum top and seats shall be per manufacturer's specifications.

4. Mounting: All tables and seats shall be surface mounted, using stainless steel anchor bolts. All frames shall be fastened to concrete slabs with an ITT Red Head SRM 38 stainless steel drop-

in anchor, a $^3/_8$-inch by 3-inch stainless steel hex head bolt and a $^3/_8$-inch flat stainless steel washer. Frame-to-frame connections shall be made with the appropriate size bolt made of stainless steel. No lag bolts will be accepted.

5. Labels: All packing labels shall be removed prior to installation in a manner that does not damage the surfaces.

Preferred Models

Any steel or recycled plastic table manufactured by DuMor , with four holes drilled for mounting prior to galvanizing or coating.

Gametime model #P796.

Images and Diagrams



Aluminum Table
Gametime #P796



Recycled Plastic Table
DuMor

8.2.7. RECYCLING RECEPTACLE

Quantity and Location

Within the park grounds, developers of all public and private parks shall install, or cause to be installed, recycling receptacles for the separate collection of common recyclable materials, including, but not limited to, bottles and cans.

At a minimum, such receptacles shall be in sufficient numbers to serve the users of the park, located within convenient proximity to all picnic areas, playgrounds, and athletic fields and courts. Proposed quantities, locations and designs will be subject to review and approval by the Director of Community Development or designee during Public Facility Review or PARK review process.

At least one recycling receptacle shall be located within convenient proximity of each:

- Park building including community center and/or restroom.
- Picnic area.
- Tot lot.
- Athletic field and court; and
- Entry into the park from the parking area.

Accessibility

All recycling receptacles shall be accessible to persons with disabilities and located immediately adjacent to a path of travel accessible to persons with disabilities.

Features

Each receptacle shall be equipped with locking covers to help prevent pilfering and to minimize contamination of collected recyclables.

Lids shall have labels for beverage container entry holes (one labeled “bottles only” and the other labeled “cans only”), labels for any other specific recyclable materials accepted in the receptacle, and a label stating “no trash.”

Containers shall have a label on the front stating, “Recycling Only.”

Warranty: A minimum two-year limited warranty is required.

Life Cycle Expectations: Recycling receptacles are anticipated to require replacement after 20 years of normal and ordinary use.

Installation Notes

None.

Preferred Models

Doty and Sons, model RR2C1813 or approved equal.

Big Belly Solar Compactor and Compacting Recycler (solar trash compactor and a recycle compactor) or approved comparable containers equipped with solar-powered compaction mechanisms and sensory capabilities that gauge real-time remaining capacity in each container to prevent overflow and promote efficiency.

Images and Diagrams



Recycling Receptacle
Doty & Sons



Recycling Receptacle
Big Belly

8.2.8. TRASH RECEPTACLE

Quantity and Location

Trash receptacles shall be installed in all private and public parks for collection of trash. Sufficient numbers of receptacles shall be provided to serve the users of the park, but no less than one for each park.

At least one trash receptacle shall be located within convenient proximity of each:

- Park building including community center and/or restroom.
- Picnic area.
- Tot lot.
- Athletic fields and courts.
- Entry into the park from the parking area.

Features

All trash receptacles shall be accessible to persons with disabilities and located immediately adjacent to a path of travel accessible to persons with disabilities.

Warranty: At minimum, a two-year limited warranty is required.

Life Cycle Expectations: Trash receptacles are anticipated to require replacement after 20 years of normal and ordinary use.

Following or substantially similar specifications:

- Size: 26” Dia. X 36” H
- Weight: 610 lbs.
- Capacity: 41-gallon liner
- Material: Reinforced concrete
- Finish: A-1 exposed aggregate, tan with grey matrix
- Reinforcing: ¼-inch diameter steel rebar
- Parts: one model TF 1515 aluminum lid (dark brown), one 41-gallon polyethylene liner, one security cable assembly
- Logo options: inkjet or cast

Installation Notes

1. Receptacles shall be affixed to hard surfaces consistent with manufacturer recommendations.
2. A hard surface of 3 feet 4 inches by 3 feet 4 inches minimum accessible area shall be provided adjacent to accessible paths.

3. Receptacles shall be no taller, or mounted higher, than 4 feet above adjacent grade at the tallest point of the unit.

4. Placement of the receptacles shall not inhibit the monitoring or emptying of the contents.

Preferred Models

Wasau, model TF 1151 or approved equal meeting specified features.

Images and Diagrams



Wasau model TF 1151

APPENDIX C

GEOTECHINCAL REPORTS

NMG Geotechnical, Inc.

January 29, 2016

Project No. 99070-35

To: Irvine Company Community Development
550 Newport Center Drive
Newport Beach, California 92660

CITY OF IRVINE
APPROVED
BY
DATE 2/29/16

Attention: Mr. Jamie Yoshida

Subject: Geotechnical Review of Updated 40-Scale Preliminary Grading Plan, Portion of Tentative Tract Map 16814 and 17769, Neighborhood 4B of Planning Area 6, City of Irvine, California

INTRODUCTION

At your request, NMG Geotechnical, Inc. (NMG) has reviewed the updated preliminary grading plan for portions of Tentative Tract Map 16814 and 17769, Neighborhood 4B, Planning Area 6, Portola Springs Development, city of Irvine, California. The updated plan reviewed for this study was the 40-scale preliminary grading plan (Sheets 1 through 21 of 21 sheets) prepared by Stantec and received on January 19, 2016. The purpose of this study was to evaluate the updated grading plan in light of the geotechnical conditions at the site in order to provide updated recommendations for design and grading of the future residential, park and school developments.

NMG prepared a prior rough grading plan review report for the subject Neighborhood 4B. The prior NMG (2014) report should be used for a more detailed discussion of findings, and the geotechnical data pertinent to the site. Please note that the prior report was for TTM 16814 that included all four pads. Since this time, the park pad has been separated out as TT 17769.

This report includes the complete geotechnical remedial recommendations and the updated Geotechnical and Remedial Measures Maps (Plates 1 through 8) to be used during rough grading. The geologic conditions and remedial measures are also illustrated on the geotechnical cross-sections (Plates 9 through 11). In addition, a separate exhibit has been prepared detailing the remedial measures for the proposed grading within the archaeological sites (Plate 12). This report also includes a summary of the changes to the grading plan since our last report and presents the updated groundwater monitoring results through January 2016 (Table 1).

7-9 W149 RS85900

ATTACHMENTS

Figure 1 – Site Location Map – Rear of Text
Figure 2 – Retaining Wall Drainage Detail – Rear of Text
Figure 3 – Typical Geogrid Reinforcement Installation Details – Rear of Text
Table 1 – Groundwater Monitoring Data – Rear of Text
Appendix A – References
Appendix B – General Earthwork and Grading Specifications
Plates 1 through 8 – Geotechnical and Remedial Measures Map – In Pocket
Plates 9 through 11 – Geotechnical Cross-Sections 1-1', 2-2', 2A-2A', 3-3' through 8-8', 8A-8A', and 9-9' through 13-13' – In Pocket
Plate 12 – Fill Placement over Archaeological Sites Exhibit – In Pocket

SCOPE OF SERVICES

The scope of services for this updated grading plan review report included the following tasks:

- **Site Reconnaissance:** A site visit was made prior to the completion of this report to document the existing site conditions and changes since the issuance of the prior review report. During the site visit, the existing groundwater observations wells were read and the updated data is presented in Table 1.
- **Review and Compilation:** The geotechnical data from the prior reports were compiled onto the updated rough grading plan sheets.
- **Geotechnical Review and Analysis:** Geotechnical review and analysis was performed based on the updated 40-scale rough grading plan. The grading requirements for the capping of the archaeological sites was coordinated with the civil engineer and the archaeologist, and the geotechnical recommendations were determined. The geotechnical analysis included evaluation and review of the plan and updating of remedial measures. The Geotechnical and Remedial Measures Map, Plates 1 through 8, provides the updated remedial grading measures. The geologic conditions and remedial measures are also illustrated on the cross-sections, Plates 9 through 11. An additional exhibit was also prepared detailing the remedial grading recommendations for the archaeological cap sites (Plate 12).
- **Report Preparation:** This geotechnical report was prepared with accompanying figures, tables, appendices and illustrations to present the data pertinent to rough grading. This report is intended for submittal to the governing agency with the rough grading plan. This report supplements the prior NMG report (NMG, 2014) and includes the complete recommendations updated as necessary for the proposed grading.

PROPOSED ROUGH GRADING

The rough grading plan prepared by Stantec consists of Sheets 1 through 21 of 21 sheets. A description of the plan set on a sheet by sheet basis is as follows:

- Sheet 1 is the title sheet with a location map, vicinity map, plan index, earthwork quantities, and grading and paving notes.
- Sheet 2 includes the index map, construction notes and quantities, special notes, and sediment notes.
- Sheets 3 and 4 presents the sections and details.
- Sheets 5 through 12 are the 40-scale rough grading plan sheets for portions of Tentative Tract 16814 and 17769, Planning Area 6, Neighborhood 4B.
- Sheets 13 through 16 are the 80-scale erosion control plan.
- Sheet 17 contains selected geotechnical boring and trench logs.
- Sheets 18 through 21 are the 80-scale demolition plan.

The proposed development consists of four large superpads for mixed uses. The westerly and northerly pads are for planned residential uses. The southerly pad adjacent to Portola Parkway is planned for a future school site. These three pads are still part of Tentative Tract 16814 (TT 16814). The easterly pad will be used for a community park and day care center and is now Tentative Tract 17769 (TT 17769). Access for the development will be from a proposed new road, Pearblossom, from Portola Parkway, and from the extension of Tomato Springs Road.

The proposed preliminary grading will involve cuts up to approximately 75 feet deep and fills typically on the order of 10 to 30 feet thick and locally up to 50+ feet thick. Design cut and fill slopes are shown along the perimeter of the site and within the interior of the development that are designed at slope ratios of 2H:1V or flatter, except locally for the non-structural archaeological capping where a slope is designed at a 1.5H:1V.

A portion of the extension of Tomato Springs Road, from the existing terminus in the adjacent Planning Area 4A, will extend across the Metropolitan Water District (MWD) easement and extend easterly across Round Canyon to the park pad. A storm drain system is planned within the easement area, which is deeper than the existing MWD pipelines. A jack and bore excavation is proposed to facilitate installation of the storm drain system beneath the water lines. A new storm drain culvert is also planned where Tomato Springs Road will cross Round Canyon, with up to 30 feet of fill planned for the roadway crossing above the storm drain.

The natural hillsides within the central portion of the site lie within mapped archaeological sites. In order to protect the artifacts in place, portions of these sites that are flatter than 3H:1V will be capped with a minimum two-foot-thick zone of soil. These areas are discussed further in Section 4 of the Conclusions and Recommendations.

ROUGH GRADING PLAN REVISIONS

The changes to the grading plan reviewed in the prior NMG report (2014) included the following:

- The park (Lots 1 through 3 of TT 17769) grading has been modified to add pads for a day care facility and community center in the northwest and west portions of the site. The grades in the park have also been lowered 1 to 10 feet in the western portion of the site (Sheets 7, 8, and 11).

- The grading for the archaeological sites has been modified to provide a fill slope over the steeper hillside areas that need the cap (Sheets 5, 6, 10 and 12). A portion of the southerly site has been designed at a 1.5H:1V fill slope so the toe of slope does not impact a blue line stream (Sheet 12).
- Temporary debris basins were added to Lots 1 and 2 (TT 17769; Sheets 7 and 8) and Lot 12 (TT 16814, Sheet 11) to collect storm water runoff. Overall drainage for Lots 1 through 3 (TT 17769) was modified.
- Revisions were made to the access road, pad, storm drain and surface drainage along the northwest and west sides of Lot 11 (Sheet 6).
- The perimeter slope descending down from Lot 1 (TT 17769, Sheet 11) to the intersection of Pearblossom and Portola Parkway was modified, and a prior lettered lot "P" was removed.
- The access road and perimeter slope along the north side of Lots 1 and 2 (TT 17769, Sheet 8) were modified.
- Revisions were made to the access road, pad, storm drain and surface drainage to the east side of the TT 17769 (Sheet 8).
- The cell site pad east of the park site (Lot 1, TT 17769, Sheet 8) was removed from the geotechnical map since it is not known whether the grading for the cell site will be done prior to or after the Neighborhood 4B grading.
- Minor revisions were made to the access road descending down to Round Canyon, northwest of Lot 3 (TT 17769, Sheet 7).
- Additional details were added to Sheets 3 and 4.
- Locations of jack and bore pits were added to the grading plan near the MWD/IRWD crossing (Sheet 9).

UPDATED GROUNDWATER MONITORING

The groundwater levels in the five wells at the subject site were read periodically since our prior report (NMG, 2014). The monitoring data is included in Table 1 at the rear of text. Recent readings on January 12, 2016 show that the groundwater has dropped approximately 2 feet below the original levels in October 2013, except in Well W-1, where the groundwater levels have dropped almost 4 feet from the original levels.

CONCLUSION AND RECOMMENDATIONS

1. General Conclusion and Recommendation

Based on our findings, the site is considered geotechnically feasible for the proposed mixed use development, provided the recommendations of this report are implemented during grading and future design and construction. The remedial recommendations in this report supersede the conclusions and recommendations from the prior reports. The preceding report (NMG, 2014) includes a more complete summary of the overall project findings, geotechnical data and the background information.

The recommended remedial grading measures are depicted on the Geotechnical and Remedial Measures Map (Plates 1 through 8) and Cross-Sections (Plates 9 through 11), and supersede the prior reports. Our recommendations are considered minimum and may be superseded by more stringent requirements of others. The grading and construction should be performed in accordance with the City of Irvine Grading Code and the General Earthwork and Grading Specifications provided in Appendix B, except as recommended below. Geotechnical observation/testing and mapping during grading is essential to verify and evaluate the recommended remedial design measures.

2. Remedial Removals

General Removals: The unsuitable earth materials should be removed prior to placement of proposed fill. Unsuitable materials at the site include undocumented fills, topsoil, colluvium, weathered compressible slopewash/alluvium, and weathered bedrock. Estimated removal depths vary across the site. Typical removal depths are on the order of 5 to 10 feet, with local removals estimated up to 25 feet.

There was a quarry area within Round Canyon and along the west side of the proposed school site that was present between the 1960 through the 1970s, with a haul road extending across the northwest side of the park site up to a second quarry area in the vicinity of SR-241. Based on our prior investigation, there are significant amounts of undocumented fills throughout these areas. The removals in these areas are anticipated to be on the order of 10 to 25 feet deep. Our borings and trenches did not encounter trash or deleterious materials, however, there might be some encountered that will need to be disposed of offsite.

The estimated removal depths are shown on the Geotechnical and Remedial Measures Map (Plates 1 through 8). The removal bottom should expose competent alluvium/slopewash materials, saturated alluvium, or bedrock material and should be evaluated, mapped and accepted by the geotechnical consultant prior to scarification/recompaction and placement of compacted fill.

The removals at the eastern end of the park, near the planned cell site, should extend far enough outside the project limits, so that grading for the cell site in the future would not adversely impact the Neighborhood 4B access road and pad for the storm drain.

Wet Removals: Areas of wet and saturated materials are anticipated to be encountered during grading in the school and park sites during remedial removals of uncertified fills, unsuitable native alluvium or weathered bedrock. We anticipate that groundwater will be encountered during removals where Tomato Springs Road crosses Round Canyon and also during the removals in areas adjacent to Round Canyon. These areas may require removal of wet, locally organic, undocumented fill in order to expose saturated competent alluvium or bedrock.

Within the western residential pad, mass excavation, as well as remedial overexcavation and slope stabilization, is expected to encounter potentially heavy groundwater seepage in the bedrock. In addition, the slope stabilization excavation near Tomato Springs and the southern school site are expected to encounter groundwater in the bedrock during removal of the hydro-auger system, which was installed during construction of Portola Parkway.

Shallow groundwater is also anticipated in the area of the jack and bore for the sewer and storm drain which is planned to cross under the existing MWD and IRWD water pipelines, at the western crossing of Tomato Springs Road and during the remedial operations for construction of the Round Canyon crossing and storm drain construction.

Construction dewatering may be necessary in these areas, and is anticipated to be needed for the jack and bore operations. Where removal/overexcavation/ keyway bottoms expose saturated alluvium, bridging with gravel or other granular material may be necessary for workability. The wet material may require drying back prior to use as fill material. Highly organic materials (if encountered) will need to be removed and disposed of offsite.

3. General Earthwork and Grading

Prior to commencement of grading operations, deleterious material (including highly organic material, vegetation, trash, unsuitable debris) should be cleared from the site and disposed of offsite. We encountered numerous irrigation lines that cross the site. These lines should be removed and the areas should be properly backfilled. It should be noted that asbestos cement pipes have been used in the past on the Irvine Ranch and may be encountered during grading.

Sheets 18 through 21 are demolition plans for the project grading. There are numerous concrete structures, pipelines, trees to be removed, and some asphalt pavement that will need to be disposed of offsite. Concrete without rebar may be broken and placed in the compacted fills below 10 feet or 2 feet below planned utilities. Please note that the Irvine Company does not allow asphalt concrete to be placed in the fill.

Grading and excavations should be performed in accordance with the City of Irvine Grading Code and the General Earthwork and Grading Specifications in Appendix B. Prior to placement of fill, removal bottoms should be scarified a minimum of 6 inches, moisture-conditioned as needed, and compacted to a minimum 90 percent relative compaction. Relative compaction should be based upon ASTM Test Method D1557. Moisture content of fill soil should be over optimum moisture content. Consideration should be given to placing fill at higher moisture contents to facilitate the subgrade presoaking process under slabs-on-grade.

Native materials that are relatively free of deleterious material should be suitable for use as compacted fill. Saturated materials generated during earthwork operations will likely need to be dried out prior to use as compacted fill. If additional import soils are required in order to achieve design grades, they should be evaluated by the geotechnical consultant prior to and during transport to the site to verify its suitability.

Fill material should be placed in loose lifts of approximately 8 inches in thickness and compacted prior to placement of the next lift. Ground sloping greater than 5H:1V should be prepared by benching into firm, competent material as fill is placed.

4. Protection of Archaeological Sites and Environmentally Sensitive (Jurisdictional) Areas

Archaeological Sites: There are two main archaeological sites that are to remain in place (ORA-244 Locus A and B; Plates 2 and 6). The grading plan shows that some of these areas are to be capped with fill as determined in the environmental documents. Remedial removals, scarification and benching cannot be made in these areas. We understand that fill is to be added by pushing the fill over the site and only after 2 feet of fill is placed on the ground surface can heavy machinery be used on the archaeological sites. Heavy equipment including paddle-wheel scrapers, water trucks and support equipment will be allowed upon completion of the initial 2-foot of cap material, and the native material is suitably "bridged". As a result, we understand that this method of capping with soils will be performed on slopes with less than 3H:1V slope ratio.

In two areas, where the archaeological sites are located on steep hillsides, the design includes a fill slope to be placed in front of the steep hillside. The toe and lower portion of the fill slope extends approximately 40 feet horizontally downslope of the archaeological site. A fill key (20 feet wide by 2 feet into competent) shall be constructed at the toe of slope and the lower portion of the fill shall be benched into competent native materials as the fill is placed. See Plate 12 for the exhibit showing "Fill Placement over Archaeological Sites." Once the slope reaches the elevation of the archaeological cap, there shall be no benching into the native soils or the non-structural cap fill. The outer portions of the fill should be moisture-conditioned and compacted. The fill being placed against the archaeological site on the steep hillside shall be pushed over or against the ground surface, so as not to disturb the ground surface. No track mounted equipment should be used against the steep natural hillside within the archaeological site. The fill soils within the fill key and lower portion of the fill slope, as discussed above, should be placed in thin lifts, moisture-conditioned, and compacted to a minimum of 90 percent relative compaction.

Subdrains (backdrains) should be placed as shown on the detail of "Fill Placement over Archaeological Sites Exhibit" (Plate 12). These drains should consist of a minimum of 3 cubic feet of ¾ inch gravel per linear foot, Schedule 40, perforated pipe wrapped in geotextile fabric (Mirafi 140N or equivalent).

In addition, a portion of the fill slope on the southerly capping area is designed at a 1.5H:1V fill slope to keep the toe of slope outside of a mapped blue line stream. Geogrid (Mirafi 2XT or equivalent) should be incorporated into the fill at 4 foot vertical intervals for the 1.5H:1V slope, with a minimum embedment of 6 horizontal feet from the design slope face. Plate 12 highlights the zone of required geogrid reinforcement and the attached detail, Figure 3, provides the

installation and design layout recommendations for the geogrid-reinforced slope. The recommended Mirafi 2XT used in design have long-term design strength (LTDS) values of 1,096 lb/ft. Alternative recommended geogrid materials should meet the minimum LTDS design values. Alternative geogrid materials will need to be reviewed and approved by the geotechnical consultant prior to use by the contractor.

Upon placement and compaction of the non-structural archaeology cap, the areas should be planted as soon as practical.

Blue Line and Habitat Areas: In Round Canyon, there are environmentally sensitive areas and a blue line stream that are to be protected (Plates 3 and 7). The grading adjacent to these areas should be started at the Limit of Remedial Grading line which is setback from these environmentally sensitive areas.

5. Slope Stabilization

The recommended slope stabilization measures are shown on the accompanying Geotechnical and Remedial Measures Map (Plates 1 through 8) and Cross-Sections (Plates 9 through 11). During grading, keyway excavations should be mapped and evaluated by the geotechnical consultant to verify the anticipated conditions. If the conditions are different than anticipated, the slope stability analysis should be checked and the remedial grading measures modified as necessary. The keys and excavations should be evaluated and accepted by the geotechnical consultant prior to placement of the subdrain and/or backfill. The recommended keyway excavations should be constructed and provided with proper subdrainage in accordance with Appendix B.

5.1 Natural Slopes

The natural hillsides along the western and northwestern portions of the site are anticipated to be left in their natural condition next to the proposed development. These slopes generally have favorable bedding conditions (bedding dipping steeply, oblique, or into slope). These natural hillsides are considered grossly stable, however, have a potential for surficial instability. There is a potential for erosion and small surficial slump-type failures locally and as a result, catchment areas were planned around the western residential pad. An enlarged concrete lined channel (5 feet below pad grade) was designed around the western and northwestern sides of the western residential pad (Cross-Sections 10-10' and 11-11'). Debris catchment basins were also added near the top of the cut slopes in the northeastern area (Cross-Sections 1-1' and 2A-2A'). Routine maintenance and removal of any accumulated debris or soil should be performed within these debris catchment areas.

There are natural slopes below the southwest side of the school pad that extends down to the water line easement near Portola Parkway and west of the park site on Lot 2 of TT 17769. These hillsides vary between 2H:1V and flatter and the Oso Sandstone bedding is generally neutral to favorable to slope. In order to provide a stable pad near the edge of the school and park pads, side hill keys are recommended that are 20 feet wide and 10 to 15 feet deep below pad grade. If weathered and/or fractured bedrock are

exposed at the bottom of the key, the depth of the key should be increased until competent bedrock is exposed.

5.2 Cut Slopes

Proposed cut slopes within the development have been assessed to determine their stability. Based on our evaluation and analysis, the proposed cut slopes are grossly stable as designed. Stabilization fill keys have been designed for all cut slopes to facilitate future landscaping and/or to mitigate the potential for local surficial erosion and wedge-type failures and/or potential high groundwater conditions. The stabilization keyways are generally on the order of 5 to 10 feet deep and 15 to 25 feet wide.

The stabilization fill key locations and dimensions are depicted on the Geotechnical and Remedial Measures Map (Plates 1 through 8) and on the geologic cross-sections (Plates 9 through 11). The recommended keyway excavations should be constructed and provided with proper subdrainage in accordance with Appendix B.

The stabilization fill key along the northeast side of the western pad (Cross-Sections 1-1', 2-2' and 3-3') is recommended to be 15 feet deep in order to add a canyon type subdrain in the key bottom to help draw down the groundwater in the vicinity of this pad. The backcut on this stabilization fill key should also stay within the Limit of Remedial Grading Line which is delineated approximately 30 feet from the existing archaeological site. A portion of this backcut will need to be excavated at a 1.25H:1V slope ratio (Cross-Section 1-1').

The stabilization fill key along the south side of the school pad along Portola Parkway varies from 20 to 80 feet wide. It was widened locally to remove the existing hydro-augers. There will be seepage encountered in this keyway and backcut and therefore, a canyon type subdrain is recommended at the heel of the key.

5.3 Fill Slopes

The reworked onsite soils are anticipated to provide adequate strength for the gross and surficial stability of the proposed fill slopes at 2H:1V inclinations. A base fill key should be provided for the majority of these slopes. The depth of the key should be a minimum of 2 feet into competent earth material, at least 15 feet wide, and have a 2 percent tilt back into the slope. The fill slopes are anticipated to be stable as designed provided they are constructed in accordance with the details in our General Grading and Earthwork Specifications (Appendix B).

As discussed above in Section 4, a portion of the archaeological fill cap is designed at a 1.5H:1V slope ratio and as a result, geogrid reinforcement is recommended for surficial stability.

5.4 Temporary Slopes

Temporary slopes will be created as a result of the backcuts for the recommended stabilization fill keys as well as for remedial removals adjacent to natural slopes, adjacent property, or improvements. In general, we anticipate that the temporary excavations at the site will have a minimum factor of safety of 1.2, except for the backcut for the slope represented on Cross-Section 1-1' that has a factor of safety of 1.03 (NMG, 2014). The lower factor of safety is associated with the steeper backcut for the proposed stabilization fill key (1.25H:1V) that resulted from the close proximity of the slope to the property line. Thus, in order to reduce the potential for backcut failures in this area, we recommend that the key for the stabilization fill be excavated in a maximum of 100-foot sections. The excavations should be backfilled to the proposed toe of slope prior to excavation of the next section.

In addition, other excavations that expose adverse bedding planes will be prone to failures during grading operations. The actual stability of the backcuts will depend on many factors including the amount of joints and water present within a specific area and the amount of time the excavation remains exposed.

Proper remedial measures should be provided to protect the water lines and adjacent properties in-place. Measures to mitigate potential backcut failure may include the following:

- The key bottoms should not be left open for long periods of time; the lower portions of the keys should be backfilled as soon as practical (i.e., backfilled prior to the weekend if possible).
- The backcut and frontcut should be carefully excavated at the recommended slope angles and "on grade" to reduce oversteepened areas. Cutting areas at steeper angles may result in slope failure.
- The backcut and frontcut should be "slope-boarded" on a routine basis so that the geotechnical consultant can map the slope carefully during excavation and help to notify the project team of critically unstable areas. This will also allow those working in the key to observe any potential failures.
- If necessary, the slope stabilization keyways and remedial grading operations may need to be constructed in sections (on the order of 100 to 200 feet long); smaller sections may be necessary if backcut failures occur.

6. Groundwater and Dewatering

The groundwater table varies from approximately 10 to 80+ feet below ground in the alluvial canyons and within the bedrock at the site. Groundwater is typically moderately deep below the site, except along the southwestern perimeter of the site within the vicinity of "Tomato Springs", adjacent to Round Canyon, and locally within structural elements, such as faults and folds, that act as groundwater traps.

Design grading will involve excavations up to 110 feet below existing grades. It is anticipated that during grading, both design cut excavations and remedial excavations will extend into the groundwater table, exposing saturated alluvium and/or bedrock in the removal bottoms. Groundwater is anticipated to be encountered in the western residential pad, the school site, grading adjacent to Round Canyon and in the northwestern park area. The constant irrigation of the orchards results in water percolating into the ground through fractures, faults and sandy soils. Thus, other areas may also encounter groundwater seepage and wet soils/bedrock, especially in the orchard areas and also depending upon the time of year.

Temporary dewatering and/or top-loading may be necessary locally during grading to achieve the recommended grades and remedial measures. Recommendations for canyon-type subdrains are included in Section 12, and the locations are depicted on the Geotechnical and Remedial Maps (Plates 1 through 8).

Based on the current design grades, the depth of remedial removals and the installation of an extensive subdrain and drainage system, it is anticipated that groundwater will remain a minimum of 5 to 10 feet below the planned school site and northern pads, and considerably deeper below the park area. In addition, with the removal of the avocado trees and irrigation, the groundwater would be anticipated to continue to become lower with time.

Where storm drains and sewer lines are planned deeper than 10 feet in the western pad and school site and near Round Canyon, groundwater may be encountered in the utility trenches. There is a planned storm drain under the MWD/IRWD water line easement in Tomato Springs roadway that will extend below the existing water lines. During the jack and bore operation for storm drain under the water lines, it is anticipated that dewatering will be necessary. Excavations for removals and keyways below the groundwater table may also require dewatering during excavations.

7. Seismic Design Guidelines

The seismic design parameters per 2013 CBC and ASCE 7-10, considering risk-targeted approach with one percent probability of collapse in a 50 year period. These parameters were calculated using the United States Geologic Survey (USGS) website: http://geohazards.usgs.gov/designmaps/us/application.php. The output data is attached. (rear of text).

Selected Seismic Design Parameters from 2013 CBC/ASCE 7-10	*Seismic Design Values*	*Reference*
Latitude	33.6977 North	
Longitude	117.7043 West	
Nearest Seismic Source	San Joaquin Hills Blind Thrust Fault	USGS, 2013
Distance to Nearest Seismic Source	4.2 mi (6.7 km)	USGS, 2013
Site Class per Table 20.3-1 of ASCE 7-10	D	USGS, 2014
Spectral Acceleration for Short Periods (Ss)	1.487 g	USGS, 2014
Spectral Accelerations for 1-Second Periods (S1)	0.548 g	USGS, 2014
Site Coefficient F_a, Table 11.4-1 of ASCE 7-10	1.0	USGS, 2014
Site Coefficient F_v, Table 11.4-2 of ASCE 7-10	1.5	USGS, 2014
Design Spectral Response Acceleration at Short Periods (S_{DS}) from Equation 11.4-3 of ASCE 7-10	0.991 g	USGS, 2014
Design Spectral Response Acceleration at 1-Second Period (S_{D1}) from Equation 11.4-4 of ASCE 7-10	0.548 g	USGS, 2014
MCE Peak Ground Acceleration Corrected for Site Class Effects from Equation 11.8-1 of ASCE 7-10	0.538 g	USGS, 2014
Seismic Design Category, Section 11.6 of ASCE 7-10	D	USGS, 2014

8. Liquefaction Potential

As previously noted, the potential for liquefaction is considered slight to nil due to the recommended remedial removals, the alluvial soil composition, and recorded blow counts.

9. Settlement Potential

Our comments regarding settlement potential assume that the structures will be of low-rise construction (i.e., relatively light foundation loads) and the design fill is generally on the order of 30 feet. Heavy structures or deeper fills may need special site-specific consideration, and possibly additional mitigation for settlement.

The source and amount of potential settlement varies over the site due to variations in subsurface conditions and depths of planned cuts and fills. The potential settlements anticipated to be of major concern within portions of the subject site can be separated into two types:

(1) Hydroconsolidation (settlement upon wetting) of alluvium left in place above the water table, and

(2) Time-dependent consolidation settlement of compressible alluvium locally left in place below the water table.

Our recommended remedial removals (Section 3.2) are intended to remove the potentially collapsible and/or very compressible near-surface material. Settlement should not be of particular

concern within the majority of the subject site where remedial removals extend down to bedrock or very dense alluvium. Most of the alluvium at the site is considered medium dense to dense. The amount of settlement will depend on the thickness of design fills and loading. Based on our preliminary analysis, where alluvium is left-in-place, and after grading operations are complete, we anticipate total consolidation to be on the order of 1 to 2 inches and differential settlement to be on the order of less than 1 inch over a 40-foot span.

10. Rippability and Placement of Oversize Material

The bedrock at the site includes dense sandstone and siltstone beds that is slightly cemented and may be locally difficult to rip. We anticipate that the rock will be rippable with moderate difficulty (using D-10 bulldozers) in the planned excavations (design cuts up to 75+ feet deep).

Locally, the planned cuts may produce oversize rock (greater than 12 inches in size) that will require special placement in the fill. The oversize rock will need to be placed in fills deeper than 10 feet below design lot/pad grade and deeper than any planned utilities within streets. The Grading and Earthwork Specifications in Appendix B include details of the placement of oversize rock.

11. Lot Capping/Overexcavation

The proposed grading is anticipated to expose cut and fill transitions at finish grade within many of the lots. The cut portions of lots/pads exposing bedrock for the two residential pads and the school site should be overexcavated to a minimum depth of 10 feet and replaced with compacted fill to provide a uniform fill cap over each lot. The northeast portion of the western residential pad should be overexcavated 15 feet where groundwater is encountered. The cut portions of the "Tomato Springs" area as well as the cut portions in the synclinal fold area should be overexcavated a minimum of 10 feet to mitigate shallow groundwater conditions.

If hard rock is exposed at overexcavation grade in the streets that cannot be excavated with normal trenching equipment or backhoes, overexcavation should be implemented to a minimum depth of 2 feet below the deepest utility line in the gut section to facilitate future construction and utility installation.

Lot overexcavation/capping (up to 10 feet) may also be recommended during grading in areas were earth materials are very different within an individual lot, such as in areas where highly expansive claystone beds are encountered adjacent to sandstone. Deeper lot capping may also be recommended in areas of faulting, due to rock fractures that may have a potential for groundwater seepage.

12. Subdrainage

Canyon-type Subdrains: These subdrains should consist of a minimum of 9 cubic feet of gravel per linear foot, Schedule 40, perforated pipe wrapped in geotextile filter fabric (Mirafi 140N or equivalent) should be placed on the removal bottom of the canyons, in the heels of the stabilization fill/buttress keys, and locally through overexcavation areas prior to placement of fill and provided with outlets into the future slope face/v-ditch or storm drain systems.

In general, the canyon-type subdrains may be placed as follows:

1. 6-inch pipe shall be used in the last 1,000 feet (upper most portion) of the subdrain.
2. 8-inch pipe shall be used in portions of the subdrain over 1,000 feet long to the outlet location.

Additional canyon type subdrains were added on the western and eastern residential pads and the school pad in areas where groundwater is anticipated to be found near finish grade. These subdrains are designed to cross the pads that are being overexcavated and recompacted to a depth of 10 to 15 feet. The subdrains should be placed in trenches between 2 and 10 feet below the overexcavation grade. Canyon type subdrains are also recommended for the key ways that are anticipated to encounter groundwater. The approximate locations and elevations of the recommended canyon-type subdrains are shown on the Geotechnical and Remedial Measures Maps (Plates 1 through 8); however, the actual locations should be based on field conditions and determined by the geotechnical consultant during grading.

Backdrains: These should consist of a minimum of 3 cubic feet of gravel per linear foot, with 4-inch, Schedule 40, perforated pipe wrapped in geotextile filter fabric (Mirafi 140N or equivalent) Backdrains should be provided for the recommended stabilization fills at 30-foot vertical intervals with outlets every 100 feet through the slope face. The locations of backdrains in keys on backcuts are not shown on Plates 1 through 8. These backdrain locations should be determined in the field during grading by the contractor and the geotechnical consultant.

During grading, additional subdrains may be necessary for areas where seepage is encountered (i.e., along highly fractured bedrock zones) and if shallow groundwater conditions are found to exist near the finish grade of future building pads. Canyon-type subdrains and backdrain details are included in the General Earthwork and Grading Specifications (Appendix B).

Protection of Subdrain Outlets: Once the outlets are videoed and found to be acceptable, the outlet pipe should be protected by installation of devices per exhibit labeled "Subdrain Outlet Marker Detail" in the Grading and Earthwork Specifications (Appendix B). This will allow the pipe outlets to be protected in the future during landscaping and make them easier to find in the future, if necessary.

13. Expansion Potential and Sulfate Exposure

The expansion potential of the onsite soils is generally anticipated to range from low to medium as classified by ASTM D4829. Although some relatively thin clayey siltstone and claystone beds will probably be of high expansion potential and some sandstone beds are likely to be of very low expansion potential, grading and lot capping are likely to blend the near-surface soils so that at the completion of grading most of the residential lots should fall within the medium range. At the completion of grading operations, soil samples should be collected at finish grade and tested for expansion potentials to confirm anticipated conditions.

The soluble sulfate content for the onsite alluvial soils is generally anticipated to be within the range of negligible sulfate exposure for concrete as classified in the ACI 318-08, Table 4.2.1.

Soil samples should be collected at finish grade and tested for soluble sulfate content at the completion of rough grading.

14. Lateral Earth Pressures and Retaining Walls

Based on laboratory test results and our previous experience on similar projects, we recommend the following lateral earth pressures for native soils in drained (Figure 2 provides details for retaining wall drainage) conditions.

	Equivalent Fluid Pressure (psf/ft.)	
Conditions	Level	2:1 Slope
Active	40	65
At-Rest	60	85
Passive	360	180 (sloping down)

In addition to the above lateral forces due to retained earth, the influence of surcharge due to other loads such as adjacent footings, or lateral load acting on screen walls above the retaining wall, if any, should be considered during design of retaining walls.

To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, such as a basement wall, or at restrained wall corners, the at-rest pressure should be used. Passive pressure is used to compute lateral soil resistance developed against lateral structural movement. Further, for sliding resistance, the friction coefficient of 0.38 may be used at the concrete and soil interface. In addition, the passive resistance is taken into account only if it is ensured that the soil against embedded structures will remain intact with time.

15. Asphalt Pavement and Subgrade

This initial investigation suggests that the R-values for street subgrades are likely to be on the order of 20, unless selective grading or imported material is used. Based on recent studies by Pirzadeh and Associates, Inc., the traffic indices for Pearblossom is 6.9 and for Tomato Springs Road is 6.3. The preliminary pavement sections for these two roads are as follows:

- Pearblossom should have a minimum of 4.2 inches of asphalt concrete over 12 inches of aggregate base.
- Tomato Springs Road should have a minimum of 4.2 inches of asphalt concrete over 10 inches of aggregate base.

The pavement section for the temporary access roads and permanent maintenance/access road for the Bee Canyon channel improvement and MWD may consist of 4 inches of asphalt concrete over 6 inches of aggregate base.

The pavement sections should be based on actual R-values of the street subgrade soils after completion of grading.

16. Surface Drainage

Surface drainage should be carefully taken into consideration during all grading, landscaping, and building construction. Positive surface drainage should be provided to direct surface water away from structures and slopes and toward the street or suitable drainage devices. Ponding of water adjacent to the structures should not be allowed. Paved areas should be provided with adequate drainage devices, gradients, and curbing to reduce run-off flowing from paved areas onto adjacent unpaved areas.

17. Maintenance of Graded Slopes

To reduce the erosion and slumping potential of the graded slopes, all permanent manufactured slopes should be protected from erosion by planting with appropriate vegetation or suitable erosion protection should be applied as soon as is practical. Proper drainage should be designed and maintained to collect surface waters and direct them away from slopes. A rodent-control program should be established and maintained as well, to reduce the potential for damage related to burrowing. In addition, the design and construction of improvements and landscaping should also provide appropriate drainage measures.

18. Protection of Existing Utilities

Existing utilities should be located and marked during grading operations. Grading and construction activities near pipelines should be performed with care and under the direction of the utility company. Stockpiling of soils over these lines should not be allowed without prior acceptance by the utility company. Operation of heavy equipment and crossings over waterlines with heavy equipment should be in conformance with IRWD and MWD guidelines (e.g., ramps, plating). Excavations adjacent to the waterline easement should be performed with care, so as not to undermine or destabilize the adjacent ground.

19. Well Abandonment

There are at least 5 groundwater observation wells onsite that were installed by NMG during prior geotechnical investigations. Additional wells may be encountered during grading. Wells located in an area of design fill or where design cuts will not completely remove the well will need to be abandoned. The Orange County Health Care Agency (OCHA) has specifications for abandonment of water wells. Groundwater wells should be abandoned so that the top of the abandoned portion is at least 10 feet below finish grade and/or as directed by the agency.

If an oil well is encountered within the limits of grading during grading operations, it should be located and re-abandoned under the supervision of and to applicable standards of the California Division of Oil, Gas and Geothermal Resources (DOGGR).

20. Geotechnical Review of Future Plans

Future grading plans and any revisions/changes in the current plan for the site should be reviewed and accepted by the geotechnical consultant prior to grading. A geotechnical report with recommendations specific to the grading plan and construction should be issued.

The geotechnical consultant for the future builders should also review future precise grading and foundation plans. A geotechnical report with recommendations for design and construction will be necessary.

21. Geotechnical Observation and Testing during Grading

The findings, conclusions and recommendations in this report are based upon interpretation of data and data points having limited spatial extent. Verification and refinement of actual geotechnical conditions during grading is essential, especially where slope stabilization is involved. At minimum, geotechnical observation and testing should be conducted during grading operations at the following stages:

- During and following clearing and grubbing, prior to site processing;
- During and following remedial removals to evaluate and accept the removal bottom;
- During and following cutting of slopes and excavation of slope stabilization measures;
- During installation of subdrains;
- During placement of compacted fill;
- During abandonment of groundwater and/or oil wells;
- During construction of utility lines (if applicable);
- During and upon completion of excavations for storm drain structures and during trench backfill;
- During pavement subgrade and aggregate base preparation for street pavements; and
- When any unusual or unexpected geotechnical conditions are encountered during grading and construction.

If you have any questions regarding this report, please contact the office. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.

Shahrooz "Bob" Karimi, RCE 54250
Principal Engineer

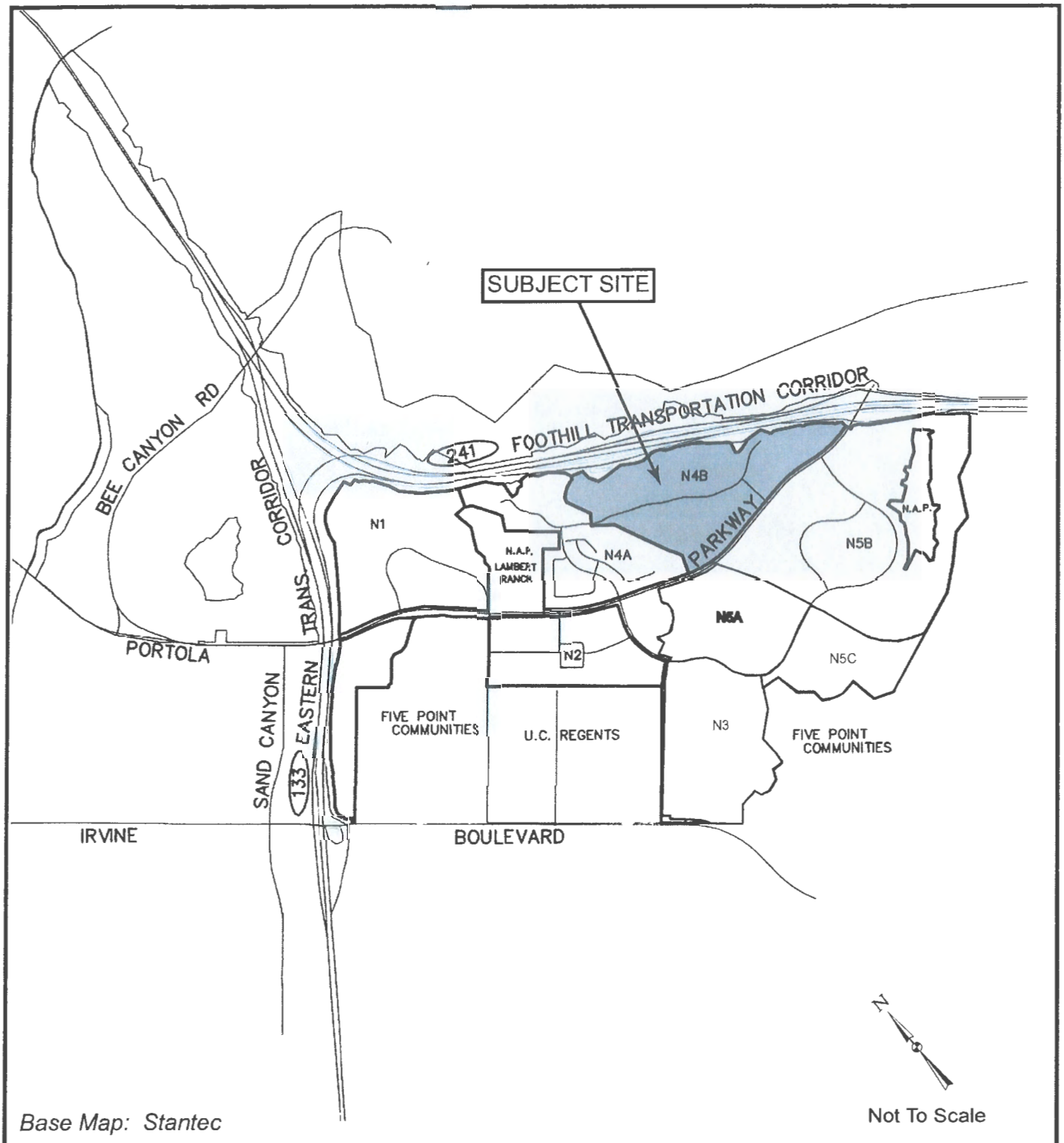
Terri Wright, CEG 1342
Principal Geologist

AZ/TW/SBK/grd

Distribution: (1) Addressee (electronic copy only)
(3) Mr. Doug Johnson, Stantec Consulting, Inc. (includes two copies for agency submittal and one electronic copy only)





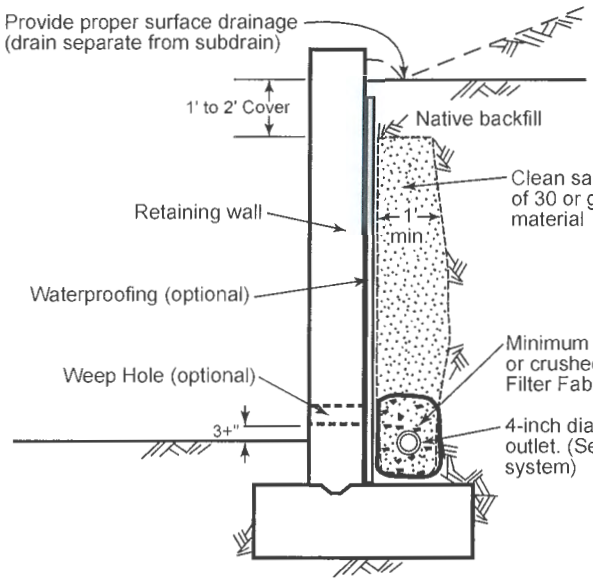


SITE LOCATION MAP

PORTOLA SPRINGS PLANNNING AREA 6, NEIGHBORHOOD 4B TENTATIVE TRACTS 16814 & 17769 CITY OF IRVINE, CALIFORNIA	Project Number: 99070-35 Project Name: ICDC/PA6 N4B Date: 1-29-16 Figure No. 1	NMG Geotechnical, Inc.

OPTION 1:

AGGREGATE SYSTEM DRAIN



Clean sand vertical drain having sand equivalent of 30 or greater or other free-draining granular material

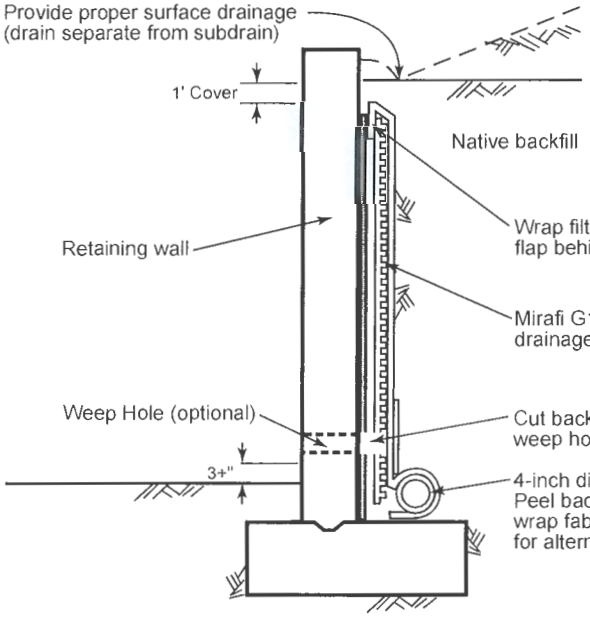
Minimum 1 ft.^{3}/ft. of 1/4 to 1 1/2" size gravel or crushed rock encased in approved Filter Fabric

4-inch diameter perforated pipe with proper outlet. (See Notes below for alternate discharge system)

Alternative: Class 2 permeable filter material (Per Caltrans specifications) may be used for vertical drain and around perforated pipe (without filter fabric)

OPTION 2:

COMPOSITE DRAINAGE SYSTEM



Wrap filter fabric flap behind core

Mirafi G100N, Contech C-Drain 15K, or equivalent drainage composite.

Cut back of core to match size of weep hole. Do not cut fabric.

4-inch diameter perforated pipe with proper outlet. Peel back the bottom fabric flap,place pipe next to core, wrap fabric around pipe and tuck behind core. (See Notes for alternate weep hole discharge system)

NOTES:

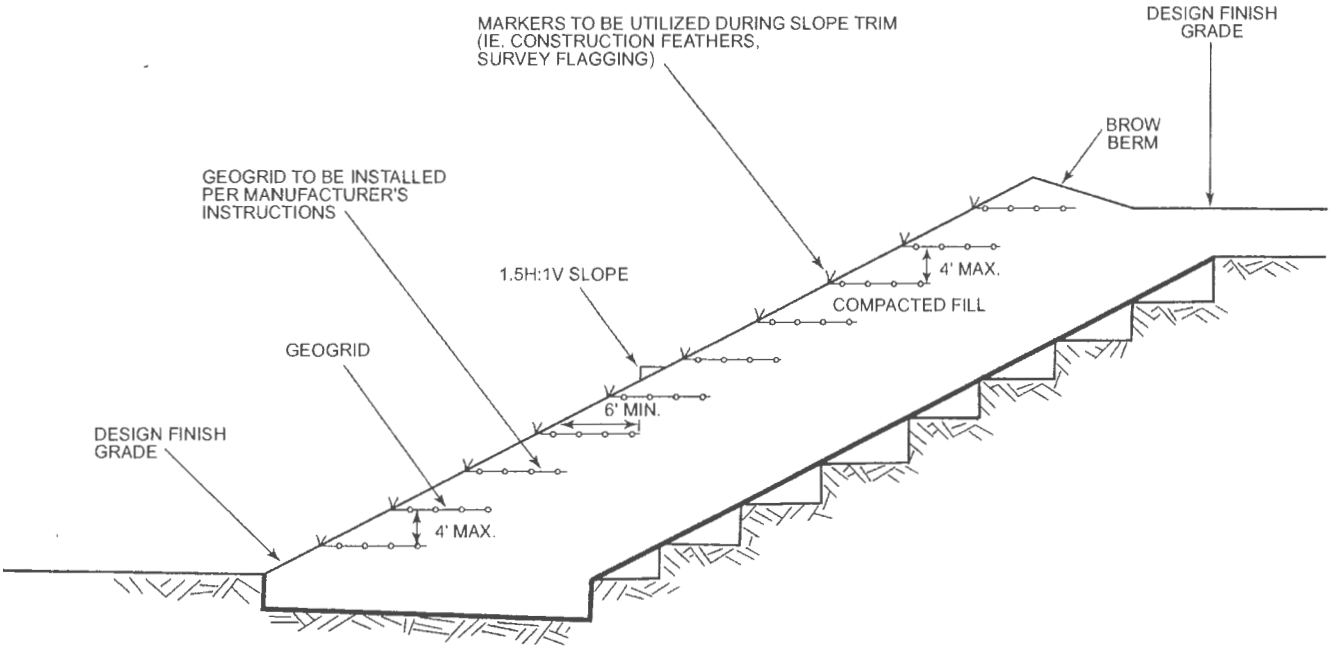
1. PIPE TYPE SHOULD BE PVC OR ABS, SCHEDULE 40 OR SDR35 SATISFYING THE REQUIREMENTS OF ASTM TEST STANDARD D1527, D1785, D2751 , OR D3034.
2. FILTER FABRIC SHALL BE APPROVED PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL.
3. DRAIN PIPE SHOULD HAVE A GRADIENT OF 1 PERCENT MINIMUM.
4. WATERPROOFING MEMBRANE MAY BE REQUIRED FOR A SPECIFIC RETAINING WALL (SUCH AS A STUCCO OR BASEMENT WALL).
5. WEEP HOLES MAY BE PROVIDED FOR LOW RETAINING WALLS (LESS THAN 3 FEET IN HEIGHT) IN LIEU OF A VERTICAL DRAIN AND PIPE AND WHERE POTENTIAL WATER FROM BEHIND THE RETAINING WALL WILL NOT CREATE A NUISANCE WATER CONDITION. IF EXPOSURE IS NOT PERMITTED, A PROPER SUBDRAIN OUTLET SYSTEM SHOULD BE PROVIDED.
6. IF EXPOSURE IS PERMITTED, WEEP HOLES SHOULD BE 2-INCH MINIMUM DIAMETER AND PROVIDED AT 25-FOOT MAXIMUM SPACING ALONG WALL. WEEP HOLES SHOULD BE LOCATED 3+ INCHES ABOVE FINISHED GRADE.
7. SCREENING SUCH AS WITH A FILTER FABRIC SHOULD BE PROVIDED FOR WEEP HOLES/OPEN JOINTS TO PREVENT EARTH MATERIALS FROM ENTERING THE HOLES/JOINTS.
8. OPEN VERTICAL MASONRY JOINTS (I.E., OMIT MORTAR FROM JOINTS OF FIRST COURSE ABOVE FINISHED GRADE) AT 32-INCH MAXIMUM INTERVALS MAY BE SUBSTITUTED FOR WEEP HOLES.
9. THE GEOTECHNICAL CONSULTANT MAY PROVIDE ADDITIONAL RECOMMENDATIONS FOR RETAINING WALLS DESIGNED FOR SELECT SAND BACKFILL.

RETAINING WALL DRAINAGE DETAIL

NMG Geotechnical, Inc.

FIGURE 2

3/05 RETAINING WALL DRAINAGE.ai



NOTES:

1) GEOGRID LENGTH AND TYPE IS SPECIFIED WITHIN REPORT.

2) GEOGRID SHOULD BE INSTALLED TO APPROXIMATELY 1 TO 2 FEET FROM THE FINISH GRADE SURFACE OR BROW BERM.

3) GEOGRID DELIVERY, STORAGE, HANDLING AND PLACEMENT SHOULD BE CONDUCTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

4) GEOGRID REINFORCEMENT SHOULD BE PLACED TO LAY FLAT AND PULLED TIGHT PRIOR TO FILL PLACEMENT. GEOGRID SHOULD BE HELD TIGHT (THROUGH USE OF PINS OR PILES OF SOIL) UNTIL A SUBSEQUENT LAYER OF MATERIAL CAN BE PLACED.

5) TRACK-TYPE EQUIPMENT SHALL NOT BE PERMITTED ON GEOGRID REINFORCEMENT BEFORE A MINIMUM OF SIX INCHES OF SOIL COVER IS PLACED. RUBBER-TIRED EQUIPMENT IS PERMITTED DIRECTLY ON GEOSYNTHETIC MATERIAL AT SLOW SPEEDS (LESS THAN 10 MPH). SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

6) CORRECT ORIENTATION OF GEOGRID REINFORCEMENT SHALL BE VERIFIED BY CONTRACTOR.

FIGURE 3

TYPICAL GEOGRID REINFORCEMENT INSTALLATION DETAILS

NMG Geotechnical, Inc.

Fig 2(12-22-05).ai

99070-35
January 29, 2016

Table 1
Groundwater Monitoring Data

Well No.	Surface Elev. (ft msl)	Depth of Well (ft)	Date and Depth to Groundwater (BGS)									Approximate Groundwater Elevation (feet msl) From Latest Reading
			10/3/13	10/11/13	10/21/13	11/11/13	12/23/13	3/5/14	1/6/15	12/3/15	1/12/16	
W-1	595	71	24.8	24.7	24.4	24.0	24.3	24.1	23.4	26.25	28.8	566.2
W-2	542	51	34.2	34.3	34.2	34.2	34.0	33.2	33.2	34.1	36.17	505.8
W-3	575	81	65.6	63.7	63.7	63.7	63.9	64.0	64.3	64.6	67.4	507.6
W-4	589.5	46	25.2	24.2	25.2	25.4	25.7	25.8	25.3	26.2	27.9	561.6
W-5	575	40	27.4	27.4	28.1	26.8	27.0	26.7	26.3	29.3	29.9	545.1

APPENDIX A

APPENDIX A

REFERENCES

NMG Geotechnical, Inc., 2001, Revised Preliminary Geotechnical Investigation and Planning Study for Conceptual Design, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 99070-01, dated August 17, 2001.

NMG Geotechnical, Inc., 2003. Preliminary Geotechnical Review of Tentative Tract 15652, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 99070-01, dated December 29, 2003.

NMG Geotechnical, Inc., 2004, Preliminary Geotechnical Investigation for Zone 4 Domestic and Zone C Reclaimed Water Tanks Site, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 03087-01, dated April 15, 2004.

NMG Geotechnical, Inc., 2005a, Preliminary Geotechnical Investigation and Review of Tentative Tract 16814 Map, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated January 10, 2005.

NMG Geotechnical, Inc., 2005b, Geotechnical Investigation and Review of 40-Scale Preliminary Grading Plan, Neighborhood 4, a Portion of Tentative Tract Map 16814, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated October 24, 2005.

NMG Geotechnical, Inc., 2006, Geotechnical Investigation and Review of 40-Scale Preliminary Grading Plan, Neighborhood 4B, a Portion of Tentative Tract Map 16814, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated November 27, 2006.

NMG Geotechnical, Inc., 2007, Geotechnical Report of Observation and Testing During Construction of Planning Area 6 Zone 4 and C Reservoirs and Zone 4 to 6 and C to D (Tomato Springs) Booster Pump Stations, IRWD Project Nos. 10551, 30179, 13002 and 30182, City of Irvine, California, Project No. 05014-01, dated April 2, 2007.

NMG Geotechnical, Inc., 2014, Supplemental Geotechnical Investigation and Review of Updated 40-Scale Preliminary Grading Plan, Neighborhood 4B, Tentative Tract Map 16814, Planning Area 6, City of Irvine, California, Project No. 99070-35, dated March 21, 2014.

Pirzadeh & Associates, Inc., 2016, Planning Area 6 Neighborhood 4B Traffic Indices, dated January 19, 2016.

U.S. Geological Survey, 2013, 2008 Interactive Deaggregations Program; web site address: https://geohazards.usgs.gov/deaggint/2008/.

U.S. Geological Survey, 2014, U.S. Seismic Design Maps, web site address: http://geohazards.usgs.gov/designmaps/us/application.php.

APPENDIX B

APPENDIX B

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 Geotechnical Consultant: Prior to commencement of work, the owner shall employ a geotechnical consultant. The geotechnical consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.

4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing: Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

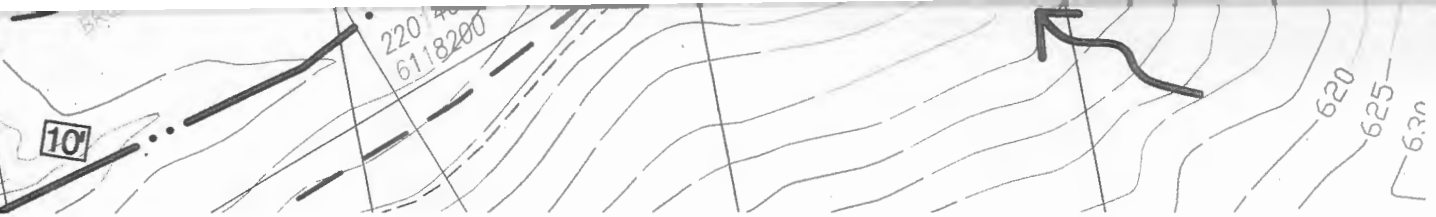
7.2 Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum 90 percent of maximum from 1 foot above the top of the conduit to the surface, except in traveled ways (see Section 7.6 below).

7.3 Jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

7.4 Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

7.6 Trench backfill in the upper foot measured from finish grade within existing or future traveled way, shoulder, and other paved areas (or areas to receive pavement) should be placed to a minimum 95 percent relative compaction.



UNITY
OPMENT

PA6 - N4B
ROUGH GRADING

Date: 3/21/14
10/28/2013

SHEET 5
OF 12

JOB NO.
2042492000

DRAWING: p:\1999\99070-35\drafting_wip\geo&rem pa-6 n



SYMBOLS

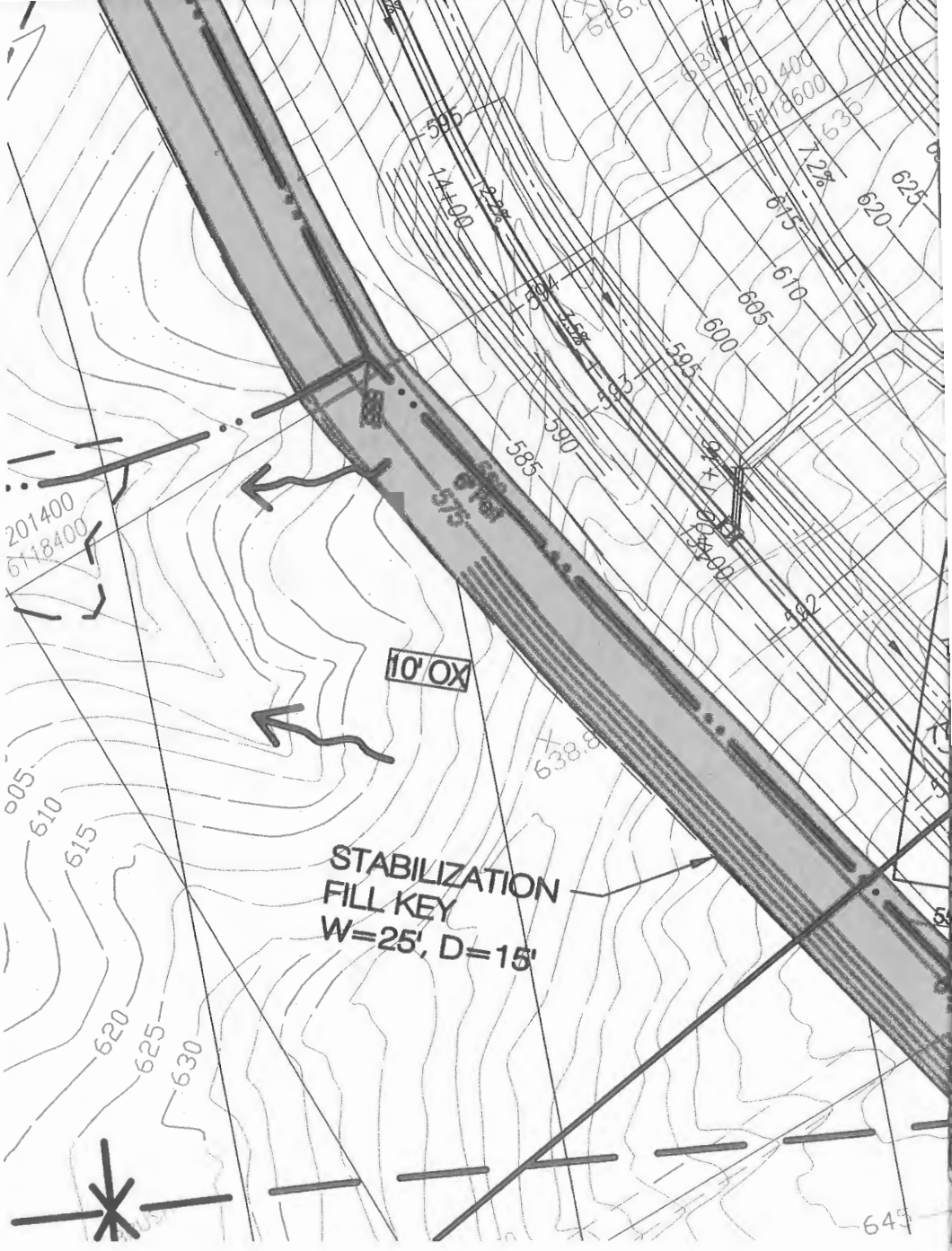


PLATE 2

Project No.: 99070-35	By: SBK/TW	NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 N4B		
Date: 1/29/16	SCALE: 1" = 40'	

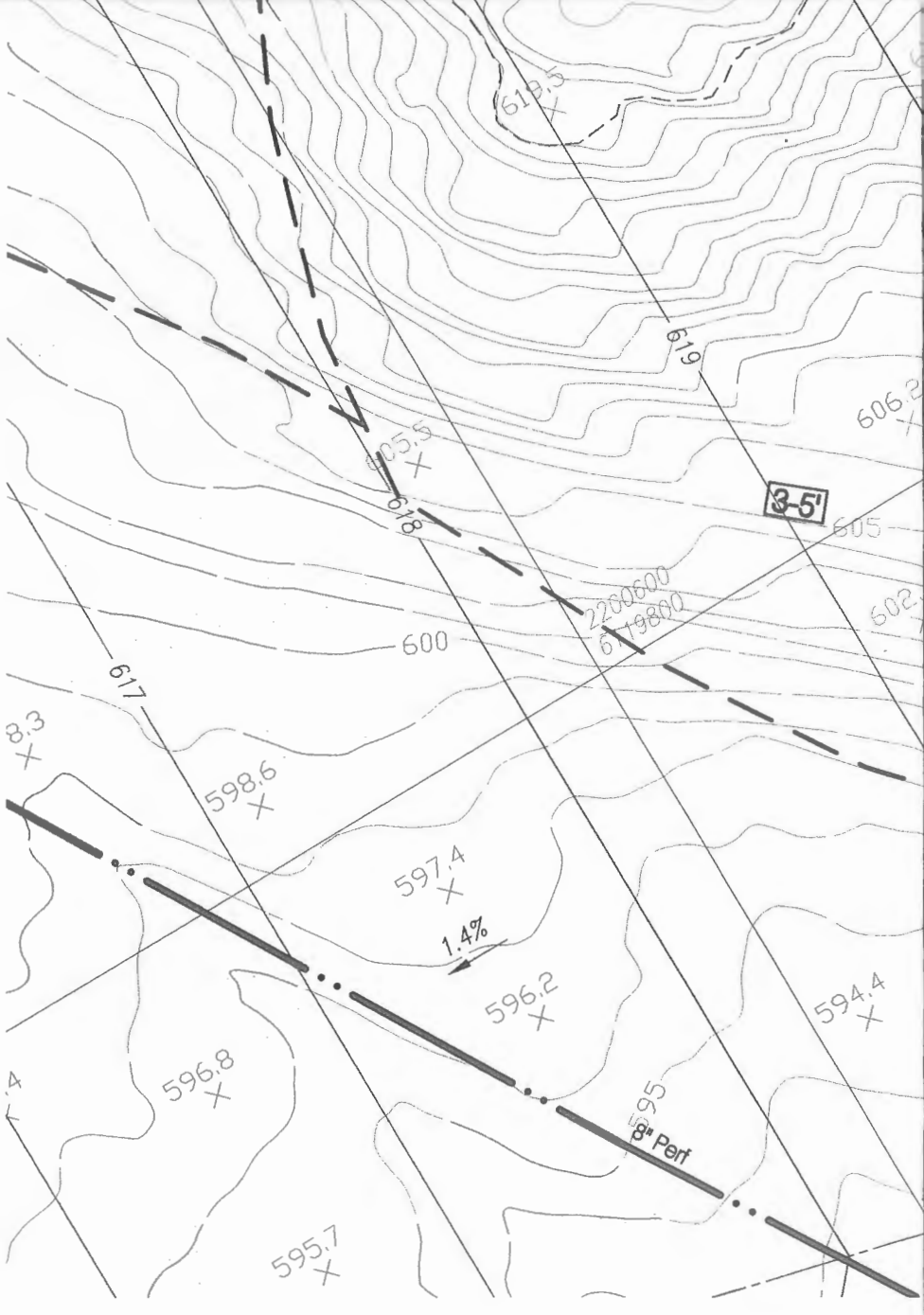


PLATE 3

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 4NB			
Date: 1/29/16	SCALE: 1" = 40'		

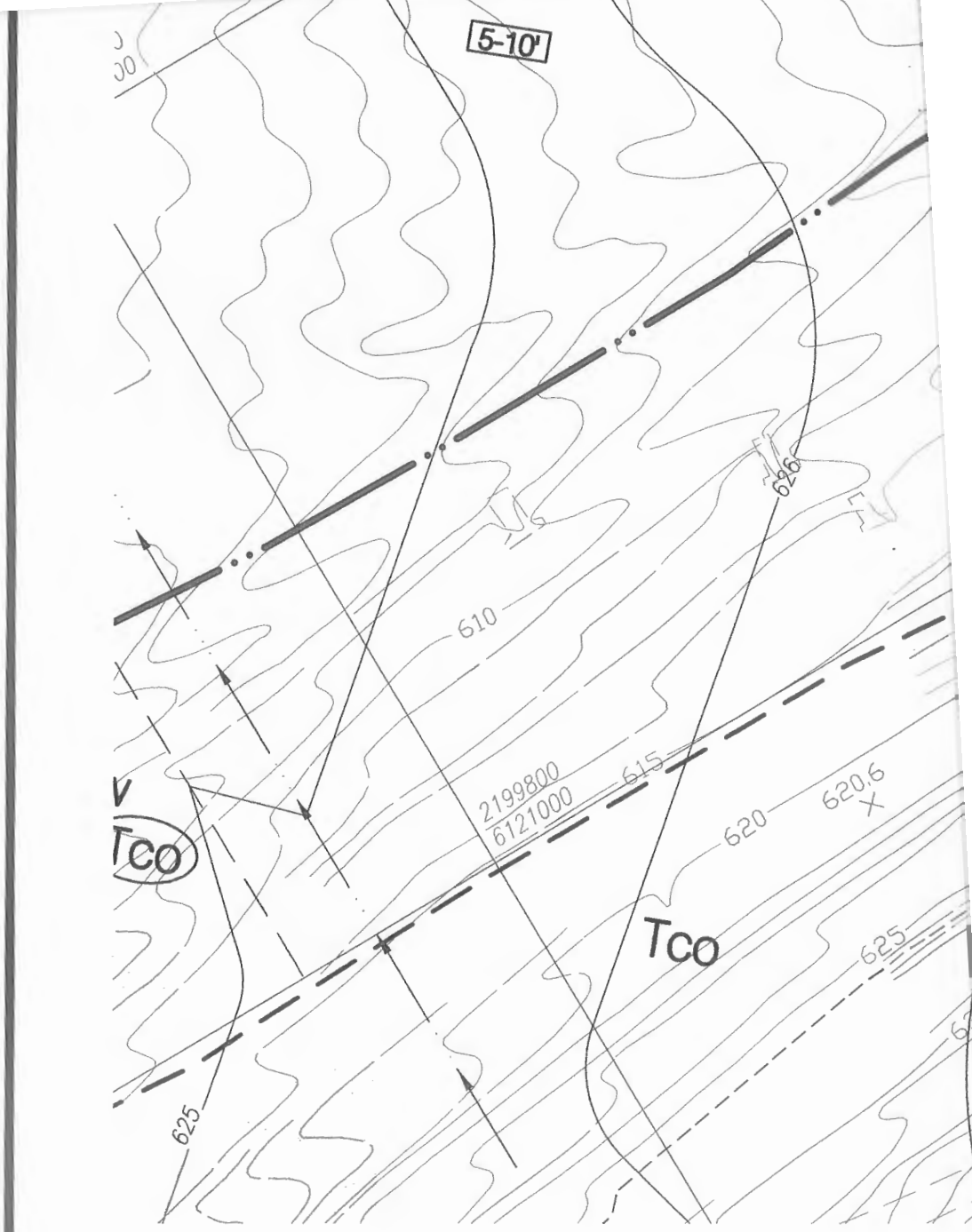
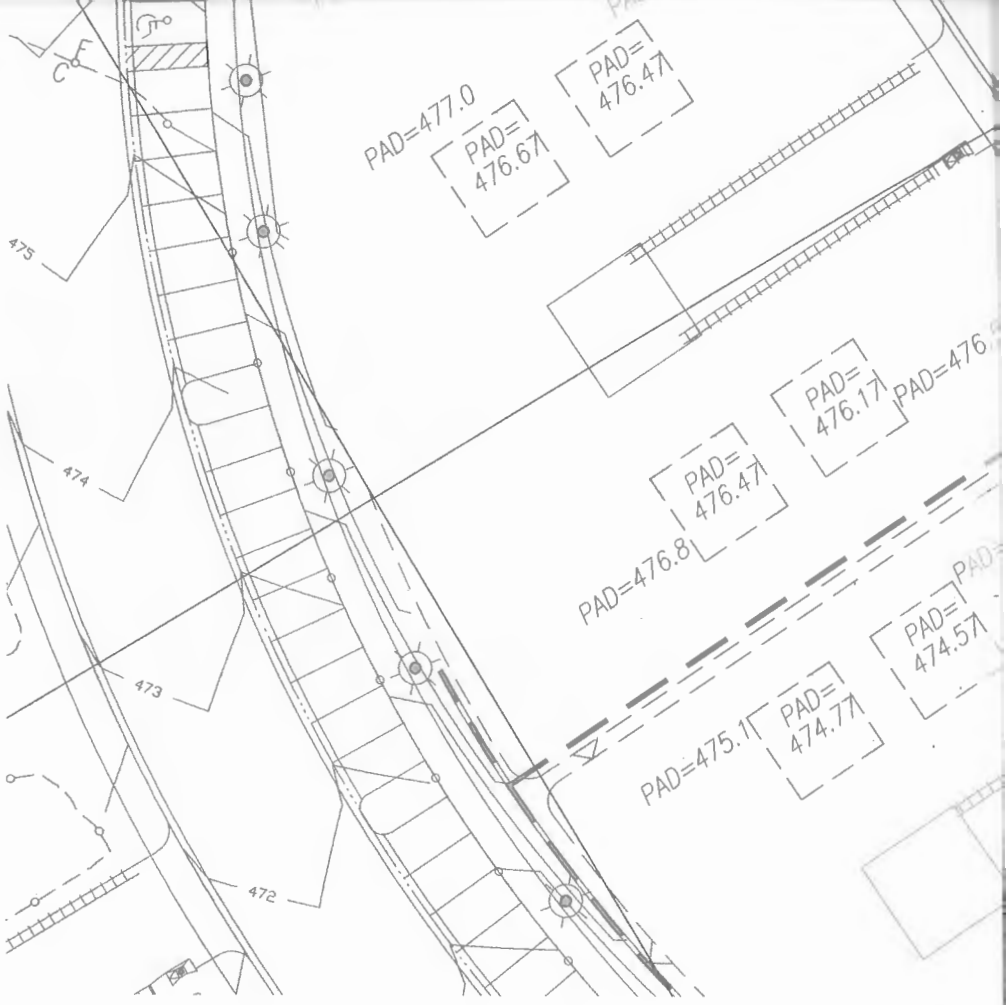


PLATE 4

Project No.: 99070-35	By: SBK/TW	NMG
Project Name: ICDC/PA-6 N4B		Geotechnical, Inc
Date: 1/29/16	SCALE: 1" = 40'	



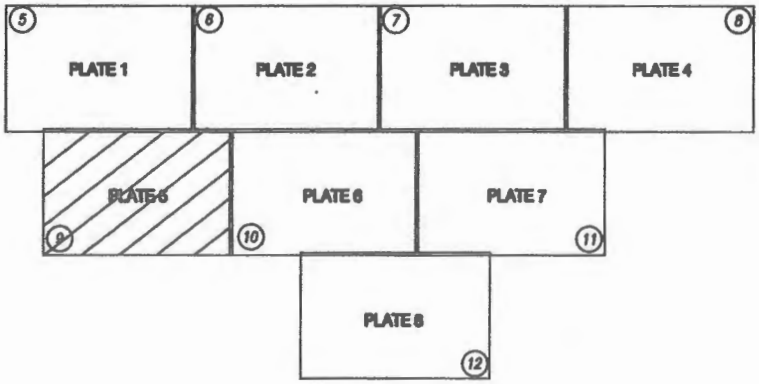


PLATE 5

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 N4B			
Date: 1/29/16	SCALE: 1" = 40'		

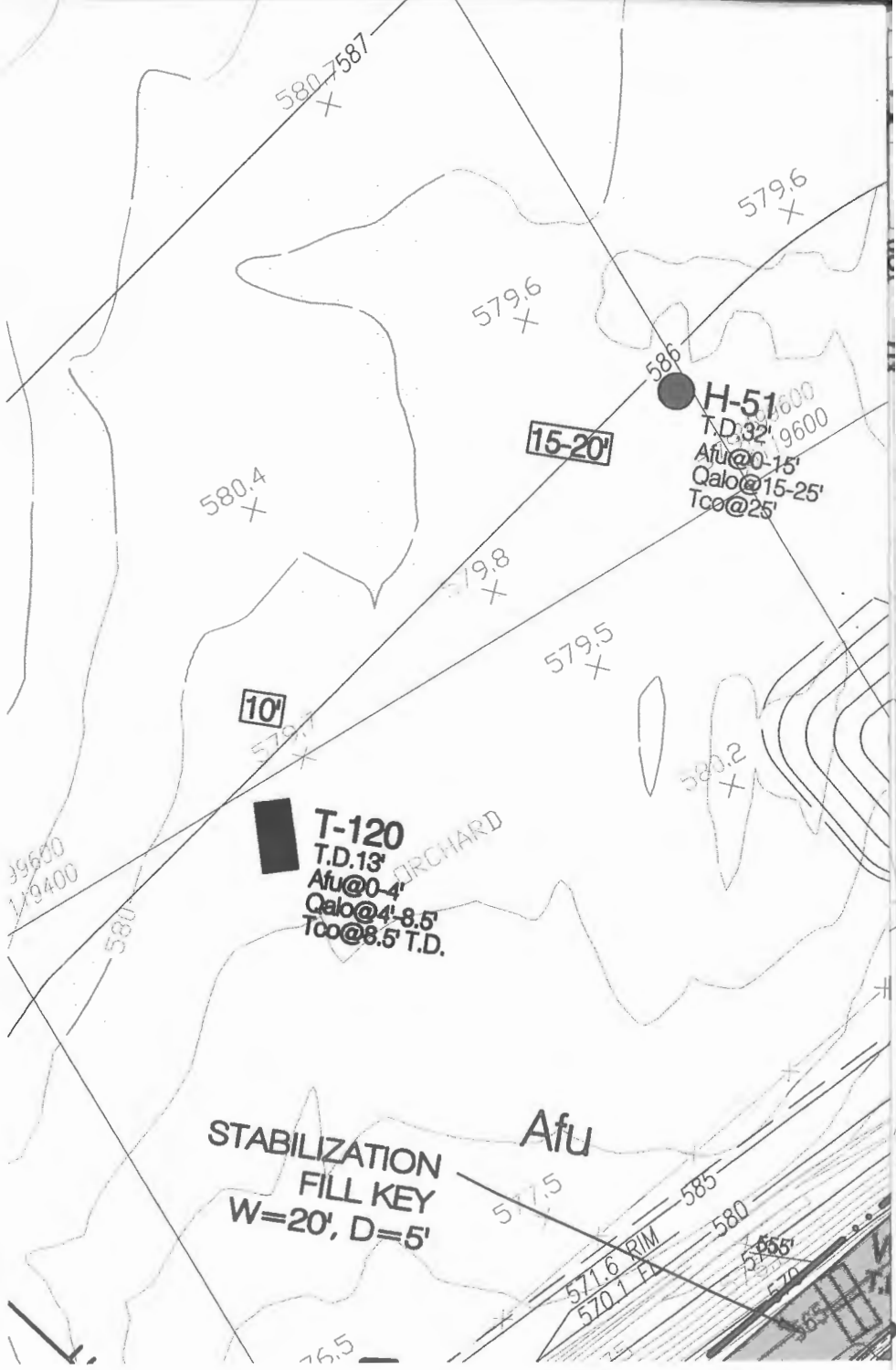
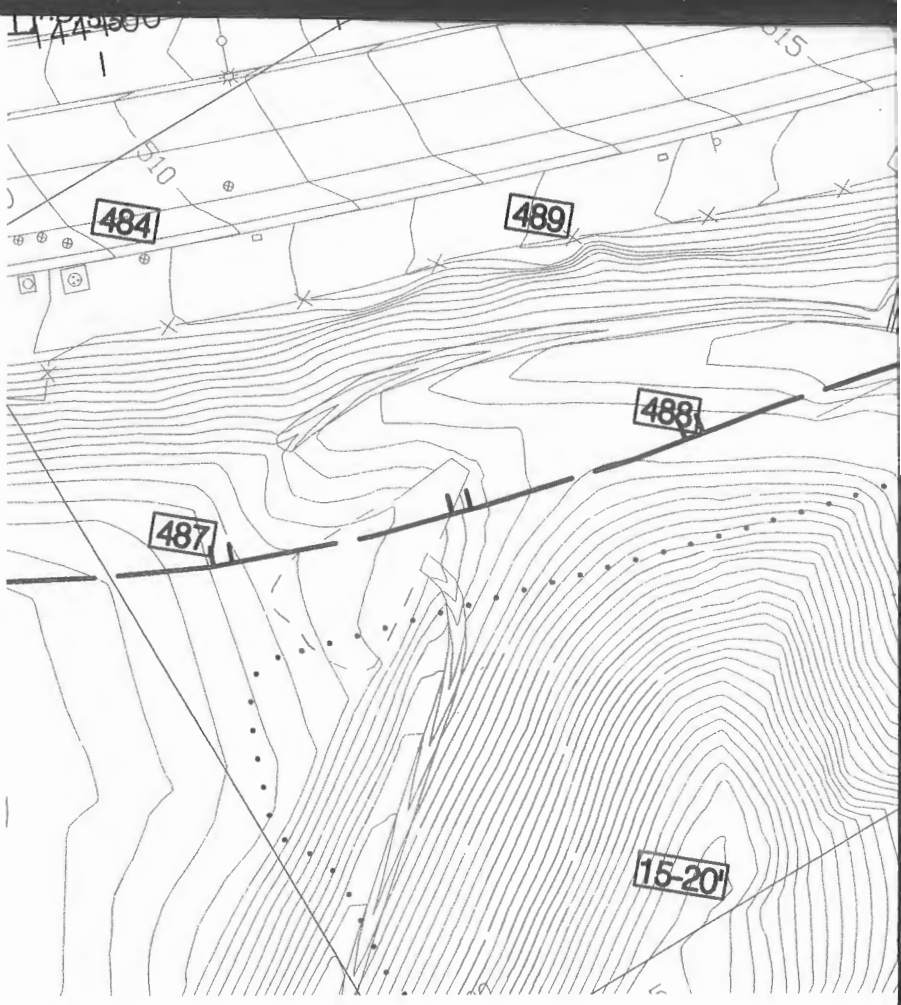


PLATE 7

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 N4B			
Date: 1/29/16	SCALE: 1" = 40'		



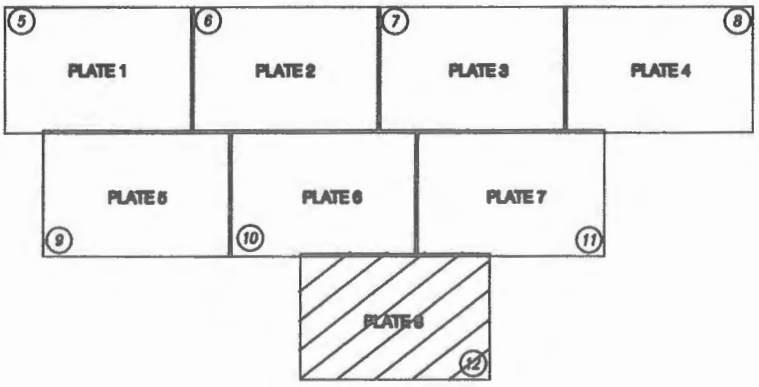
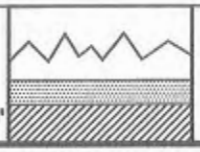


PLATE 8

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 N4B			
Date: 1/29/16	SCALE: 1" = 40'		

PLATE 9

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/ PA-6 N4B			
Date: 1/29/2016	SCALE: 1" = 40'		



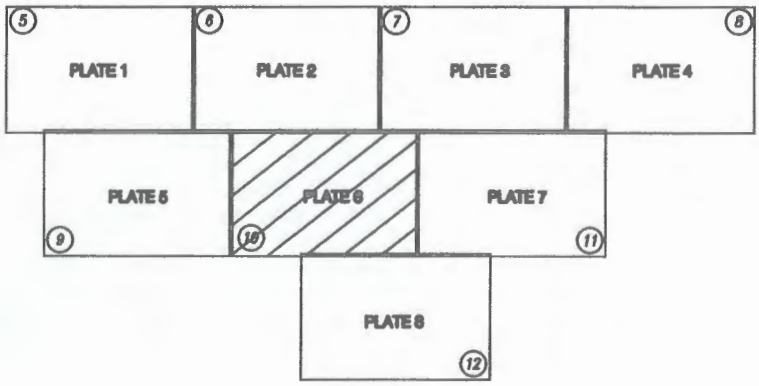


PLATE 6

Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/PA-6 N4B			
Date: 3/21/14	SCALE: 1" = 40'		

PLATE 10

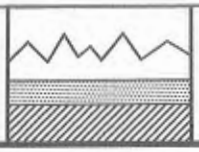
Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/ PA-6 N4B			
Date: 1/29/16	SCALE: 1" = 40'		

PLATE 11

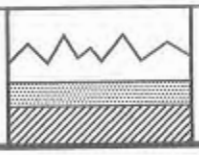
Project No.: 99070-35	By: SBK/TW		NMG Geotechnical, Inc.
Project Name: ICDC/ PA-6 N4B			
Date: 1/29/16	SCALE: 1" = 40'		

PLATE 12

FILL PLACEMENT OVER ARCHAEOLOGICAL SITE EXHIBIT

PLANNING AREA 6, NEIGHBORHOOD 4B
TENTATIVE TRACT 16562
CITY OF IRVINE, CALIFORNIA

Project No.: 99070-35
Project Name: ICDC/PA-6 N4B
Date: 1/29/2016

By: SBK/TW

Scale: 1"=40'

NMG Geotechnical, Inc.

Drawing: P:\1999\99070-35\Drafting_WIP\Archeo Exhibit.dwg
Layout: PLATE-1
Last Saved: Mon Jan 25

80 ft. 40

650
645
640
638
10+00

NMG Geotechnical, Inc.

July 6, 2016

Project No. 99070-35

To: Irvine Company Community Development
550 Newport Center Drive
Newport Beach, California 92660

CITY OF IRVINE
APPROVED
BY
DATE 4/27/17

Attention: Mr. Jamie Yoshida

Subject: Geotechnical Review of Precise Grading Plan for Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B, City of Irvine, California

INTRODUCTION

In accordance with your request, NMG Geotechnical, Inc. (NMG) has performed a geotechnical review of the precise grading plan for Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B (N4B), City of Irvine, California. We reviewed Sheets 1 through 20 of 20 sheets of the Precise Grading Plan, PA6 N4B, Portola Springs Community Park, Tract 17769, Lot 1. The plan was prepared by Stantec and was received by NMG on June 16, 2016.

The purpose of our review was to evaluate the proposed precise grading and construction in light of the geotechnical conditions at the site, in order to provide recommendations for design, precise grading, and construction of the proposed park improvements. The site is currently being graded by The Irvine Company, under the geotechnical observation and testing of NMG. Approximately two-thirds of the park site is graded at this time. The recommendations in this report are based on our review of the referenced reports and subject plan, our observation and testing during the ongoing preliminary grading, laboratory testing, and geotechnical analysis.

ATTACHMENTS

City of Irvine Geotechnical Checklist – Rear of Text
Figure 1 – Site Location Map – Rear of Text
Figure 2 – Retaining Wall Drainage Detail – Rear of Text
Figure 3 – Pool and Spa Detail – Rear of Text
Figure 4 – Pool Deck Detail – Rear of Text
Appendix A – References
Appendix B – Boring Logs
Appendix C – Laboratory Test Results
Appendix D – Seismicity Data
Appendix E – General Earthwork and Grading Specifications
Plate 1 – Geotechnical Map – In Pocket

00675198-GRR G2

SITE LOCATION AND ONGOING GRADING

Planning Area 6, Neighborhood 4B (N4B) is located north of Portola Parkway and south of the SR 241 in northeast Irvine, County of Orange, California. The proposed community park is a triangular-shaped parcel located in the eastern most portion of N4B, and will be bounded on the west by Pearblossom, on the southeast by Portola Parkway, and on the northeast by the SR 241 (Figure 1).

The site is currently being graded to the Delta 1 preliminary grading plan, which is the simple precise grading plan for the park finish grades. The grading is being performed by Stice Construction under the geotechnical observation and testing of NMG. The perimeter slopes along the south and east sides are essentially constructed, along with the majority of the remedial removals and overexcavation along the south and east sides of the park. The northwest portion of the park and the perimeter slopes to the northwest are currently being graded. Since the preliminary rough grading is not complete, soil sampling was not conducted at this time and will need to be completed in the future when the pads are completed to finish grades.

In general, the park site will be rough graded to a stepped pad condition that will sheet flow to the southwest. Following completion of the rough grading operations for the park, the pad area will be covered with approximately 5 to 50 feet of compacted fill overlying competent alluvium and bedrock materials. Ascending slopes varying in height up to 45 feet will border the park to the north, east, and southeast, with descending slopes up to 40 feet bordering the western portion of the site.

PROPOSED PRECISE GRADING AND IMPROVEMENTS

Based on our review of the community park precise grading plan, elevations across the subject site will range from 616 to 646 feet above mean sea level (msl). The proposed precise grading should consist of relatively minor cuts and fills, generally less than 2 feet thick. However, in some of the landscape berm areas fills will be up to 5 feet above simple precise grades and in the northeast corner of the proposed pickle ball courts there will be cuts up to 5-feet-deep. There are also design cuts of up to 3 feet deep in the southerly softball field.

The precise grading plan reviewed for this report consists of Sheets 1 through 20 of 20 sheets. Sheet 1 is the title sheet and contains vicinity and location maps, grading notes and paving notes. Sheet 2 contains the index maps, legend, and construction notes and quantities. Sheets 3 through 7 are the 20-scale precise grading plans and Sheet 8 is a 10-scale grading plan for the building area. Sheets 9 through 14 are the storm drain plans, showing area drains also. Sheets 15 and 16 are the horizontal control plans. Sheet 17 includes the signing and striping plan, Sheet 18 is the erosion control plan, Sheet 19 are construction details and Sheet 20 will have the landscape details.

The planned improvements at the park site include the following:

- A community center building with court yards and a terrace area;
- Two lighted softball fields with restroom and concession stand buildings;
- A group picnic area and a tot lot play area;

- A sand volleyball court;
- Two lighted soccer fields and one unlighted practice field;
- Three lighted tennis courts;
- Six lighted pickleball courts;
- Asphalt covered parking lot, and access road to a maintenance shed;
- Concrete walkways and landscape berms; and
- Area drains, storm drain, water and sewer lines.

GEOTECHNICAL CONDITIONS

The subject park site is currently being graded with the overall N4B preliminary grading. The Geotechnical Map (Plate 1) includes the as-graded geotechnical conditions over the southern and eastern portions of the park, including the perimeter slope keyway location, as-built subdrains, the remedial removal bottom elevations, and the exposed geologic conditions during grading as mapped by NMG. The fill is not up to finish grade throughout much of the park and the remedial grading has not yet been completed in the northwest portion of the park. Also included on Plate 1 are the boring locations from the borings that were drilled during prior geotechnical investigations at the site. The boring logs are included in Appendix B of this report.

The subject park site pad is underlain by compacted fill overlying alluvium and bedrock. The compacted fill at the completion of preliminary grading will vary from 5 feet thick in the northwest corner and east end of the park, up to 50 feet thick in the southwest corner beneath the proposed building. The fill is being compacted to a minimum of 90 percent relative compaction, is derived from onsite sources, and consists generally of silty sand and sandy silt, with some clayey sand and gravelly sandy clay. The alluvium left in-place consists of brown, sandy silt and silty sand, that is generally moist to saturated and medium dense. The bedrock units consist of the Capistrano Formation, Oso Member (sandstone) underlying the southern portion of the park and conformably overlies the Puente Formation, Soquel Member (sandstone and siltstone) that underlies the northern and western portions of the park. The Oso Member is typically a whitish to light gray, fine- to medium-grained sandstone that is poorly bedded to massive and dense. The Soquel Member typically consists of interbedded sandstone and siltstone with several clay beds throughout the exposed bedrock.

The geologic structure throughout the site consists primarily of a homoclinal structure, with bedding striking northwest and dipping southwest. There were numerous northeast striking high angle faults also encountered in the eastern portion of the site. These faults are seismically inactive and no evidence of recent activity was noted during our mapping.

During grading for the slope stabilization keys along the northeastern portion of the site, there was a small backcut failure below the adjacent SR-241 off-ramp. A kicker fill was place over the lower portion of the failure to reduce the movement. A detailed investigation was performed during grading and separate report was prepared that was reviewed by both the city of Irvine and Caltrans (NMG, 2016b). The failed material and kicker fill were left in place and compacted fill was placed over the area to reduce the potential impact to Caltrans right-of-way. This area is depicted on Plate 1 as a non-structural fill area (only landscape improvements are planned in this

area). The finish slope over this area is designed at a 3H:1V to 4H:1V and slope stability analysis was performed to verify a stable condition in this area.

During grading in the southern and eastern portions of the park, groundwater was found to be generally shallower than anticipated. The backcuts for the slopes and the removal/overexcavation bottom adjacent to Portola Parkway were found to expose alluvium and faulted sandstone of the Oso Member. Groundwater was found within the sandstone bedrock and alluvial removal bottoms and was seeping out of the backcut in the sandstone. Within the bedrock areas, the groundwater seepage was found to be heavier along the faults, which appeared to be conduits for the groundwater flow. Due to the presence of groundwater throughout the area, canyon type subdrains were extended up canyon farther than originally designed and were extended along the overexcavation bottom to the heel of the stabilization fill key on the south side of the park adjacent to Portola Parkway and the northeast portion of the site adjacent to the SR-241 (Plate 1). The groundwater was encountered at higher elevations in the southern portion of the site and lower elevations in the north; therefore, groundwater flow in this area is generally to the north. Groundwater is deeper than the removal bottom in the western portion of the site and should be deeper than 50 feet below the proposed community building.

CONCLUSION AND RECOMMENDATIONS

Based on our review of the subject plan and referenced reports, the proposed park development, as described herein, is considered geotechnically feasible. The following recommendations should be implemented during structural design, grading and construction. Our recommendations are considered minimum and may be superseded by more stringent requirements of others (i.e., governing agency, architect and/or structural engineer). Additional laboratory testing will need to be performed at the completion of precise grading in order to confirm/update the geotechnical recommendations presented in this report. The geotechnical recommendations provided herein should be reviewed and revised as needed.

1. Site Preparation/Remedial Removals/Overexcavation

If construction of the park begins in the near future, and considering that the site is currently being graded, we do not anticipate the need for additional removal and recompaction. However, at minimum, we recommend that the upper 6 inches across the site be scarified, moisture-conditioned, and compacted to a minimum of 90 percent relative compaction with adequate moisture prior to placement of additional fill. The geotechnical consultant should review the conditions of the site prior to construction and provide recommendations accordingly.

2. General Earthwork and Grading

Grading and excavations should be performed in accordance with the City of Irvine Grading Code and the General Earthwork and Grading Specifications, which is included in Appendix E of this report. Miscellaneous trash, debris, vegetation, and stockpiled fill should be removed prior to remedial grading operations. Prior to placement of additional fill, the bottom should be scarified, moisture-conditioned and recompacted.

Fill materials should be compacted to at least 90 percent of maximum dry density, as determined by ASTM Test Method D1557. Fill materials should be placed in loose lifts, no thicker than 8 inches. Materials should be moisture-conditioned and processed as necessary to achieve uniform moisture content that is within moisture limits required to assure adequate bonding and compaction. We recommend that moisture contents of the fill be placed at above optimum moisture content as a result of the expansive nature of the materials and in order to facilitate the time required for presaturation of subgrades for foundation and concrete improvements.

3. Groundwater and Subdrains

The groundwater table is generally deeper than 50 feet below the design grades in the western portion of the site. It is anticipated that groundwater will remain deep below the footings of the building structure. There are several canyon-type subdrains that were placed on the removal bottom underlying the building area which outlets into the storm drain system in Pearblossom Street. No additional subdrainage measures are necessary at the site during precise grading.

Based on our observations during grading, shallow perched groundwater was encountered in the eastern portion of the site and subdrains were extended up canyon. These subdrains are relatively shallow (7 to 10 feet below preliminary grades) in the eastern portion of the site and if improvements or trenches encounter the subdrains, they will need to be repaired.

4. Settlement

Based on our assessment of the site grading and soil conditions and given the light loading of the proposed structures and fill, we anticipate that the total and differential settlement will be on the order of 1 inch and ½ inch over a span of 30 feet, respectively. The non-structural fill area within the slope in the eastern portion of the site may be subject to more settlement.

5. Seismic Design Parameters

The following table summarizes the seismic design criteria for the subject site. The seismic design parameters are developed in accordance with ASCE 7-10 and 2013 CBC.

Selected Seismic Design Parameters from 2013 CBC/ASCE 7-10	*Seismic Design Values*	*Reference*
Latitude	33.6977 North	
Longitude	117.7043 West	
Nearest Seismic Source	San Joaquin Hills Blind Thrust Fault	USGS 2013
Distance to Nearest Seismic Source	4.2 Miles (6.7 km)	USGS 2013
Site Class per Table 20.3-1 of ASCE 7-10	D	USGS, 2014
Spectral Acceleration for Short Periods (Ss)	1.49 g	USGS, 2014
Spectral Accelerations for 1-Second Periods (S1)	0.55 g	USGS, 2014
Site Coefficient F_a, Table 11.4-1 of ASCE 7-10	1.0	USGS, 2014
Site Coefficient F_v, Table 11.4-2 of ASCE 7-10	1.5	USGS, 2014
Design Spectral Response Acceleration at Short Periods (S_{DS}) from Equation 11.4-3 of ASCE 7-10	0.99 g	USGS, 2014
Design Spectral Response Acceleration at 1-Second Period (S_{D1}) from Equation 11.4-4 of ASCE 7-10	0.55 g	USGS, 2014
Peak Ground Acceleration (MCE_R) Corrected for Site Class Effects from Equation 11.8-1 of ASCE 7-10	0.54 g	USGS, 2014
Seismic Design Category, Section 11.6 of ASCE 7-10	D	USGS, 2014

6. Foundation and Slab Design

For preliminary design, a net allowable bearing capacity of 1,800 psf may be assumed for a 12-inch-wide footing embedded 12 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by 300 psf (400 psf for pad footings) for every additional foot of width and/or embedment depth up to a maximum of 3,000 psf (4,000 psf for pad footings). The allowable bearing pressure may be increased by one-third for wind and seismic loading. We recommend that strip and isolated footings have a minimum embedment depth of 18 inches. The allowable bearing pressure may also be applied to post-tensioned slabs if needed for design. For lateral resistance against sliding, a friction coefficient of 0.38 may be used at the soil-foundation interface. Also, a soil unit weight of 120 pcf may be assumed for onsite soils.
The footings of free-standing structures (including walls and pilasters) should have a minimum embedment depth of 24 inches into approved soils.

The following table provides our general guidelines and recommendations for design of post-tensioned foundations and slabs on expansive soil in accordance with the 2013 California Building Code (CBC) and Post-Tension Institute (PTI) 3rd Edition provisions.

GEOTECHNICAL GUIDELINES FOR DESIGN OF POST-TENSIONED SLABS*

Parameter	*Recommendation*
Center Lift	
* Edge Moisture Variation Distance, e_m	9.00 feet
* Center Lift, y_m	0.60 inches
Edge Lift	
* Edge Moisture Variation Distance, e_m	4.80 feet
* Edge Lift, y_m	0.70 inch
Subgrade Modulus, k	100 pci
Modulus of Elasticity of Soils, Es	2,000 psi
Presaturation, as needed, to obtain the minimum moisture down to the minimum depth	1.2 x optimum down to 12 inches

****Based on method in CBC 2013***

In addition, as indicated in the 3rd Edition of PTI, shape factor calculations should be performed by the project structural engineer in order to determine if strengthening/modification of foundations are necessary. Per PTI guidelines, the modifications to the foundations design should be considered if the shape factor (ratio of square of foundation perimeter over foundation area) exceeds 24.

For uniform thickness, post-tensioned slabs, we recommend that the slabs have a thickened edge such that the slab is embedded a minimum of 12 inches below the lowest adjacent grade. The thickened edge should be tapered and have a minimum width of 12 inches. If non-uniform thickness (ribbed) post-tensioned slabs are used, we recommend minimum embedment of 18 inches below adjacent grades for the perimeter footings.

If non-post-tension slabs-on-grade and foundations are considered at the site in accordance with Wire Reinforcement Institute (WRI) method (per the 2013 California Building Code), an effective Plasticity Index of 20 is considered appropriate for the upper 15 feet of soil materials. For non-post-tension slabs, we recommend a minimum embedment of 18 inches below the lowest adjacent grade for the perimeter footings.

Based on our understanding of the future site grading and soil conditions and given the light loading of the proposed residential buildings, we anticipate that the total and differential settlement will be on the order of 1 inch and ½ inch over a span of 30 feet, respectively.

7. Slab Design Related to Moisture Mitigation

In addition to geotechnical and structural considerations, the project owner should also consider moisture mitigation when designing and constructing slabs-on-grade. Ever present moisture emissions from the concrete itself, as well as subgrade moisture potentially passing through the slab, can affect flooring and items in contact with the floor.

The intended use of the interior space, type of flooring, and the type of goods in contact with the floor may dictate the need for and design of measures to mitigate potential effects of concrete moisture emission from and/or moisture vapor transmission through the slab. Typically for habitable structures, a vapor retarder or barrier has been recommended under the slab to help mitigate moisture transmission through slabs. The most recent guidelines by the American Concrete Institute (ACI 302.1R-96) recommend that the vapor retarder be placed directly under the slab (no sand layer). However, the location of the vapor retarder may also be subject to the builder's past successful practice. Placement of 1 or 2 inches of sand over the moisture retarder has been common practice in southern California. Specifying the strength of the retarder to resist puncture and its permeance rating is very important. These qualities are not necessarily a function of the retarder thickness. A minimum of 10-mil is typical but some materials, such as 10-mil polyethylene ("Visqueen") may not meet the desired standards for toughness and permeance.

The vapor retarder, when used, should be installed in accordance with standards such as ASTM E 1643-98 and/or those specified by the manufacturer.

Concrete mix design and curing are also significant factors in mitigating slab moisture problems. Concrete with lower water/cement ratios results in denser, less permeable slabs. They also "dry" faster with regard to when flooring can be installed (reduced moisture emissions quantities and rates). Rewetting of the slab following curing should be avoided since this can result in additional drying time required prior to flooring installation. Proper concrete slab testing prior to flooring installation is also important.

8. Lateral Earth Pressures

Lateral earth pressures for retaining walls and structures with approved onsite drained soils are as follows:

Lateral Earth Pressures		
Equivalent Fluid Pressure (psf/ft.)		
Conditions	*Level*	*2:1 Slope*
Active	40	65
At Rest	60	85
Passive	360	180 (if sloping in front of wall)

Where practical, onsite soils with high expansion potential should not be used for backfill materials. The above parameters may not apply for backfill that is highly expansive.

To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, such as a vault or at restrained wall corners, the at-rest pressure should be used. Passive pressure is used to compute lateral soils resistance developed against lateral structural movement. Future landscaping/planting and improvements adjacent to the retaining walls should also be taken into account in the design of the retaining walls. Excessive soil disturbance, trenches (excavation and backfill), future landscaping adjacent to footings and over-saturation can adversely impact retaining structures and result in reduced lateral resistance. For walls with narrow trench footings (10 inches or less) that are located in areas likely to be landscaped, we recommend neglecting the passive resistance in the upper 2 feet.

For sliding resistance, the friction coefficient of 0.38 may be used at the concrete and soil interface. This value may be increased to 0.55 if there is a keyway below the wall base. The passive resistance is taken into account only if it is ensured that the soil against embedded structure will remain intact with time. The retaining walls may also need to be designed for additional lateral loads if other structures or walls are planned within a 1H:1V projection.

The seismic lateral earth pressure for level backfill for walls retaining greater than 6 feet of soils may be estimated to be an additional 15 pcf for active and at-rest conditions. The earthquake soil pressure has a triangular distribution and is added to the static pressures. For the active and at-rest conditions, the additional earthquake loading is zero at the top and maximum at the base. Per the requirements of the 2013 CBC (Section 1803.5.12), seismic earth pressures do not apply to walls retaining less than 6 feet of soils.

Drainage behind retaining walls should also be provided in accordance with the attached Figure 2. Specific drainage connections, outlets and avoiding open joints should be considered for the retaining wall design.

9. Light Pole Foundations

For light pole foundations, an allowable side skin friction of 250 psf may be used. For lateral resistance, a passive pressure of 360 psf/ft for level conditions and 180 psf/ft for 2H:1V sloping ground conditions (sloping down in front of the caissons) may be used. The passive earth pressure may be increased by a factor of 2.4 if caissons are three or more diameters apart. For caissons that are fewer than three diameters apart, the factor may be linearly interpolated from 1.9 at three-diameter spacing to one at zero spacing. The end bearing should be neglected.

10. Swimming Pool and Spa

Although the proposed park site does not include pool or spa improvements, typical design parameters and recommendations for construction of pools, spas, and pool decks are provided on Figures 3 and 4 at the rear of text. For design, the subgrade soils for the pool and spa decks should be considered as having "Medium" expansion potential. The depth of the cutoff wall adjacent to the pool deck should be a minimum of 18 inches below the top of the pool deck. If the thickness of the sand layer is increased, the depth of the cut-off wall should also be increased to bottom of the sand layer. An additional subdrain system for the cutoff walls adjacent to landscaped areas should also be provided. Presaturation of the pool and spa deck subgrade soils should be performed.

11. Sport Courts

We anticipate that a post-tensioned slab will be utilized for the sport courts in order to reduce the potential for cracking. Design of the sports court is the purview of the structural engineer/court designer. The Post-Tensioning Institute's recommendations for design and construction of post-tensioned sport courts may be utilized. We also recommend that the upper 6 inches of subgrade soil for the courts be presaturated to 110 percent of optimum moisture content.

Installation of a subdrain system around the outside perimeter of the court slabs is recommended if the adjacent area will be irrigated and/or landscaped. The subdrain should consist of a 4-inch-diameter perforated pipe inserted into a minimum of one cubic foot per lineal foot of crushed rock wrapped in filter fabric and outlet to an appropriate drainage device (i.e., area drain or storm drain system).

12. Play Area

In general, the play surface area should be designed and constructed in accordance with the manufacturers specifications.

If a sandbox is planned for the play areas, we recommend that a layer of geofabric (Mirafi 140N or equivalent) be provided at the bottom and along the edges to provide a barrier between the native soils and sand. The sandbox and the concrete sub-slab for play area should be provided with appropriate drainage. The subgrade soils should have a minimum of 90 percent relative compaction, be properly moisture-conditioned and approved by the geotechnical consultant prior to placement of aggregate base (if any).

Positive drainage should be provided to direct water away from the playground area, and ponding of water should not be allowed. Installation of additional drainage devices should be considered in order to minimize the adverse impact of water on aggregate base (if any) and subgrade soils.

13. Foundation Setbacks

The footings of structures located above descending slopes should be set back from the slope face in accordance with the minimum requirements of the City of Irvine and CBC criteria, whichever is greater. The setback distance is measured from the outside edge of the footing bottom along a horizontal line to the face of the slope.

The tables below summarize the minimum setback criteria for structures above descending slopes:

Structural Setback Requirements

Case A – Building and Retaining Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
20 to 30	10
More than 30	⅓ * H (maximum of 40')
Case B – Freestanding Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
More than 20	Maximum of 10

For freestanding walls and other structures that are sensitive to lateral movement (e.g. smooth stucco finish, glass screens, etc.), NMG recommends that the structural setback requirements in accordance with Case A above be followed or that additional design measures be used to help control the potential for cracking and displacements. Otherwise, typical freestanding walls may have a setback in accordance with Case B.

14. Cement Type

We anticipate negligible levels of soluble sulfates in the onsite soils. Structural concrete elements in contact with soil include footings and building slabs-on-grade. Concrete mix for these elements may be based on the "negligible" soluble sulfate category of Tables 4.2.1 and 4.3.1 in ACI-318. Other ACI guidelines for structural concrete are recommended.

15. Exterior Non-structural Concrete

Based on laboratory testing on the near-surface soil samples taken at the subject site, the expansion potential of onsite soils is anticipated to vary between "very low" and "low". Exterior concrete elements such as curb and gutter, driveways, sidewalks and patios are susceptible to lifting and cracking when constructed over expansive soils. With expansive soils, the impacts to flatwork/hardscape can be significant, generally requiring removal and replacement of the affected improvements. Please also note that reducing concrete problems is often a function of proper slab design; concrete mix design, placement, and curing/finishing practices. Adherence to guidelines of the American Concrete Institute (ACI) is recommended. Also, the amount of post-construction watering, or lack thereof, can have a very significant impact on the adjacent concrete flatwork.

For reducing the potential effects of expansive soils, we recommend a combination of presaturation of subgrade soils, reinforcement, moisture barriers/drains, and a sub layer of

granular material. Though these types of measures may not completely eliminate adverse impacts, application of these measures can significantly reduce the impacts from post-construction expansion of soil. The degrees and combinations of these measures will depend upon:

- The expansion potential of the subgrade soils;
- The potential for moisture migration to the subgrade;
- The feasibility of the measures (especially presaturation); and
- The economics of these measures versus the benefits.

These factors should be weighed by the project owner determining the measures to be applied on a project-by-project basis, subject to the requirements of the local building/grading department.

The following table provides our recommendations for varying expansion characteristics of subgrade soils. Additional considerations are also provided after the table. We recommend that the "**Medium**" category be used during the preliminary design of the project site. Additional laboratory testing following completion of grading operations should be performed to verify our preliminary recommendations.

TYPICAL RECOMMENDATIONS FOR CONCRETE FLATWORK/HARDSCAPE

Recommendations	Expansion Potential (Index)				
	Very Low (< 20)	*Low (20 – 50)*	***Medium (51 – 90)***	*High (91 – 130)*	*Very High (> 130)*
Slab Thickness (Min.): Nominal thickness except where noted.	4"	4"	**4"**	4"	4" Full
Subbase: Thickness of sand or gravel layer below concrete	N/A	N/A	**Optional**	2" – 4"	2" – 4"
Presaturation: Degree of optimum moisture content (opt.) and depth of saturation	Pre-wet Only	1.1 x opt. to 6"	**1.2 x opt. to 12"**	1.3 x opt. to 18"	1.4 x opt. to 24"
Joints: Maximum spacing of control joints. Joint should be ¼ of total thickness	10'	10'	**8'**	6'	6'
Reinforcement: Rebar or equivalent welded wire mesh placed near mid-height of slab	N/A	N/A	**Optional (WWF 6 x 6 – W1.4xW1.4)**	No. 3 rebar, 24" O.C. both ways or equivalent wire mesh	No. 3 rebar, 24" O.C. both ways
Restraint: Slip dowels across cold joints; between sidewalk and curb	N/A	N/A	**Optional**	Across cold joints	Across cold joints (and into curb)

The more expansive soils, because they are clayey, can take significantly longer to achieve recommended presaturation levels. Therefore, the procedure and timing should be carefully

planned in advance of construction. For exterior slabs, the use of a granular sublayer is primarily intended to facilitate presaturation and subsequent construction by providing a better working surface over the saturated soil. It also helps retain the added moisture in the native soil in the event that the slab is not placed immediately. Where these factors are not significant, the layer may be omitted.

On projects with highly expansive soils, additional measures such as thickened concrete edges/footings, subdrains and/or moisture barriers should be considered where planter or natural areas with irrigation are located adjacent to the concrete improvements. Design and maintenance of proper surface drainage is also very important. If the concrete will be subject to heavy loading from cars/trucks or other heavy objects, thicker slabs should be used.

The above recommendations typically are not applied to curb and gutter, but should be considered in areas with highly expansive soils.

16. Interlocking Concrete Paver Section

It is our understanding that interlocking pavers may be used for the pedestrian walkways. Our recommendation for the concrete paver section is a minimum of 60-millimeter-thick concrete paver over approximately 1 inch of sand over 6 inches of aggregate base, over compacted subgrade.

A concrete band along the perimeter of the pavers should be provided for lateral restraint. The concrete band should, at minimum, be 12 inches deep and deepened to below the depth of disturbed soil if adjacent to landscape/planter areas. The geotechnical consultant should confirm the concrete band is excavated into firm and competent soil.

Prior to construction of the paver sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned as needed, and recompacted in place to a minimum of 90 percent relative compaction per ASTM Test Method D1557.

17. Pavement Design

The following pavement structural sections have been designed in accordance with the Orange County Highway Design Manual. Based on prior laboratory testing, the near-surface subgrade soils for the park site will likely have an R-Value of 20. We are providing the following pavement sections based on traffic indices (TI) provided by Pirzadeh and Associates for Pear Blossom (TI = 6.9) and Tomato Springs Road (TI = 6.3).

Location	*Traffic Index*	*Pavement Section*
Pearblossom	TI – 6.9	0.35' AC over 1.0' AB
Tomato Springs Road	TI – 6.3	0.35' AC over 0.83' AB

The pavement section for temporary access roads and permanent maintenance/access roads may consist of 4 inches of asphalt concrete over 6 inches of aggregate base.

The pavement sections should be based on actual R-values of the street subgrade soils after completion of grading.
If a two-stage paving is planned, we recommend that the initial AC lift be a minimum of 0.25 foot thick and the final cap be a minimum of 0.10 foot thick.

Street pavement should be placed in accordance with the requirements of Section 301 and 302 of the Standard Specifications of Public Works Construction (the Greenbook). Prior to construction of pavement sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned to slightly over optimum moisture content, and recompacted in place to a minimum of 90 percent relative compaction per ASTM D1557.

AB materials should be crushed aggregate base in accordance with the Greenbook. The materials should be free of any deleterious materials. AB materials should be placed in 6- to 8-inch loose lifts, moisture-conditioned as necessary and compacted to a minimum of 95 percent relative compaction per ASTM D1557.

18. Surface Drainage

Inadequate control of surface runoff or heavy irrigation after development of the site may result in nuisance seepage conditions and/or erosion. Maintaining adequate surface drainage, proper disposal of runoff water and control of irrigation will help reduce the potential for future moisture-related problems.

Surface drainage should be carefully taken into consideration during grading, landscaping and building construction. Positive surface drainage should be provided to direct runoff away from hardscape, walls and slopes and collected in suitable drainage devices.

It is also important to maintain a consistent level of soil moisture, not allowing the subgrade soils to become overly dry or overly wet. Properly designed landscaping and irrigation systems can help in that regard.

19. Slope Maintenance, Surface Drainage and Erosion Control

To reduce the erosion and slumping potential of graded slopes (if any), permanent manufactured slopes within the development should be protected or planted with groundcover vegetation (e.g., grasses) and deep-rooted vegetation (e.g., trees and shrubs) as soon as practical. Oversteepening of slopes should be avoided during final grading and landscaping improvements.

Maintenance of proper pad drainage, the design and construction of property improvements in accordance with sound engineering practices and proper maintenance of landscaping, including regular pad and slope irrigation, should be performed. Irrigation should not be excessive or sporadic; maintaining a relatively constant level of soil moisture around structures and improvements is important. Planters and landscape areas immediately adjacent to structures and walls should be avoided or provided with measures to mitigate the potential for water adversely

impacting the foundations and slabs. Water should not be allowed to pond and drainage should be maintained away from structures, walls and tops of slopes. Considering the climatic conditions in southern California and the expansive soil mitigation measures provided herein, a two-percent slope away from structures should be provided and is in substantial compliance with the 2013 CBC.

20. Utility Installation and Trench Backfill

Utility trench excavations should encounter compacted fill materials and/or competent alluvium after grading. In general, soils across most of the site are anticipated to be classified as Type B for CalOSHA trench excavation requirements. The exception will be the deeper trenches that may extend into saturated bedrock with adverse bedding conditions, which may be classified as Type C soils for CalOSHA. Excavations should conform to the applicable safety requirements. Trenches should be shored or the sides sloped in accordance with the CalOSHA excavation requirements. Additional measures (i.e., shoring, etc.) may be required to protect existing improvements.
Native soils should be suitable for use as trench backfill. Native backfill materials should be compacted to a minimum of 90 percent relative compaction, as indicated in Section 2, General Earthwork and Grading. Select granular backfill may be used in lieu of native soils, but should also be compacted.

21. Additional Laboratory Testing

Additional laboratory testing will need to be performed at the completion of precise grading in order to confirm/update the geotechnical recommendations presented in this report.

22. Geotechnical Review of Future Plans

Future revisions/changes to the precise grading plan should be reviewed and accepted by the geotechnical consultant.

23. Geotechnical Observation and Testing during Grading and Construction

The findings, conclusions and recommendations in this report are based upon interpretation of data and data points having limited spatial extent. Verification and refinement of recommendations based on actual geotechnical conditions encountered during grading is very important.

At minimum, geotechnical observation and testing should be conducted during grading at the following stages:

- During site preparation and clearing, prior to site processing;
- During precise grading and placement of compacted fill;
- Upon completion of any foundation and footing excavations prior to pouring of the concrete;
- During subgrade preparation for buildings, pool and spa decks, parking lot pavement, and hardscape;

- Upon completion of presaturation of subgrade for sidewalk, pools and spa decks, and hardscape;
- During construction of subdrains and deck drains;
- During excavations for light pole standards;
- During backfill for utility trenches; and
- When any unusual or unexpected soil and/or geotechnical conditions are encountered during grading and construction.

LIMITATIONS

This report has been prepared for the exclusive use of our client, Irvine Company, within the specific scope of services requested by our client for the design and construction of the subject improvements. This report or its contents should not be used or relied upon for other projects or purposes or by other parties without the written consent of NMG. Our methodology for this study is based on local geotechnical standards of practice, care, and requirements of governing agencies. No warranty or guarantee, express or implied is given.

The findings, conclusions, and recommendations are professional opinions based on interpretations and inferences made from geologic and engineering data from specific locations and depths, observed or collected at a given time. By nature, geologic conditions can be very different in between points, and can also change over time. Our conclusions and recommendations are subject to verification and/or modification with more exploration and/or during grading and construction when more subsurface conditions are exposed.

NMG's expertise and scope of services did not include assessment of potential subsurface environmental contaminants or environmental health hazards.

If you have any questions regarding this report, please contact our office. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.

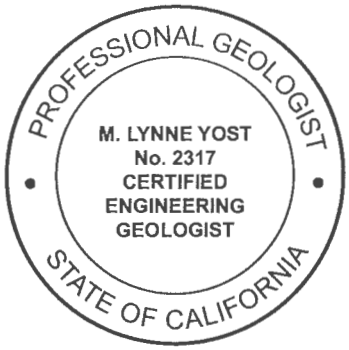
Shahrooz "Bob" Karimi, RCE 54250
Principal Engineer

Lynne Yost, CEG 2317
Associate Geologist

SBK/LY/grd

Distribution: (1) Addressee (E-Mail)
(2) Mr. Kevin Brandt, Stantec Consulting (includes copies for submittal to the City of Irvine)
(1) Mr. Scott Jones, ICDC (E-Mail)





GEOTECHNICAL CHECKLIST

Applicant: Irvine Company Community Development Code Compliance No.: _____
Geotechnical Firm: NMG Geotechnical, Inc. Grading Permit No.: _____
Date of Report: July 6, 2016 Geotechnical Report: Precise Grading Plan Review
Project Address: Ceremony and Hemisphere, Planning Area 6, Neighborhood 5A, Pool Park 1

Soil Bearing Value: 3,000 psf (maximum)
Continuous Footing: Yes
Isolated Footing: per structural recommendations
Extra Depth of Footing Required: per structural recommendations
Size of Footing: per structural recommendations
Minimum Footing Reinforcement: per structural recommendations
Coefficient of Friction: 0.38
Earth Pressure: Active 40 psf/ft. level
Passive 360 psf/ft. level
At Rest 60 psf/ft. level
Drainage System: Subdrain Yes
Drainage Behind Basement Wall N/A
Piles: Vertical Capacity N/A
Lateral Capacity N/A
Fixed or Pinned Head N/A
Depth of Point of Inflection N/A
Minimum Pile Length N/A
Size N/A
Spacing N/A
Interconnecting Ties N/A
*Slab On Grade: Thickness per structural recommendations
Reinforcement per structural recommendations
Actual Design Loading: Column Concentrated Load per structural recommendations
Wall Uniform Load per structural recommendations
Finish Floor Elevation: Per Civil Engineer
Expansive Index: Medium
Sulfate Content: Negligible
Finish Pad Elevation: Per Civil Engineer
R-Value: 20
ASTM Standards Utilized: _____

_____
City Grading Engineer

S. Sob Karimi
Geotechnical Engineer

_____
City Plan Check Engineer

REGISTERED PROFESSIONAL ENGINEER
SHAHROOZ KARIMI
No. C054250
CIVIL
STATE OF CALIFORNIA



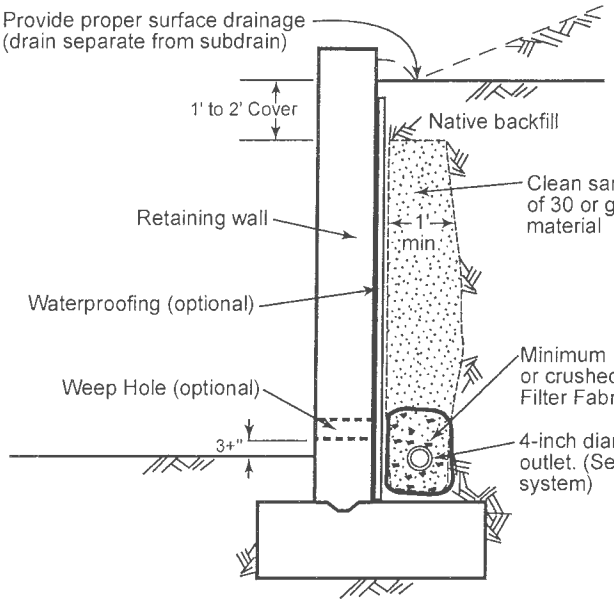
Base Map: Stantec

SITE LOCATION MAP

PORTOLA SPRINGS COMMUNITY PARK LOT 1 OF TRACT 17769 PLANNING AREA 6, NEIGHBORHOOD 4B CITY OF IRVINE, CALIFORNIA	Project Number: 99070-35 Project Name: ICDC / PA6 NH4B Date: 7/6/16 Figure 1	NMG Geotechnical, Inc.

OPTION 1:

AGGREGATE SYSTEM DRAIN



Clean sand vertical drain having sand equivalent of 30 or greater or other free-draining granular material

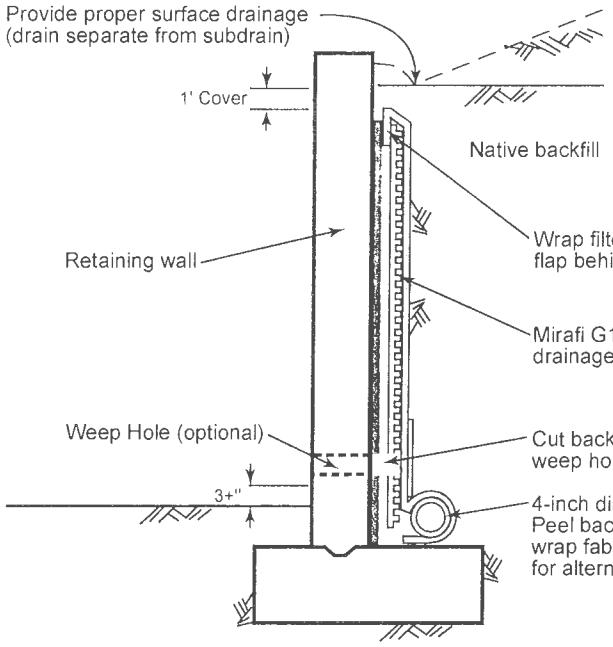
Minimum 1 ft.^{3}/ft. of 1/4 to 1 1/2" size gravel or crushed rock encased in approved Filter Fabric

4-inch diameter perforated pipe with proper outlet. (See Notes below for alternate discharge system)

Alternative: Class 2 permeable filter material (Per Caltrans specifications) may be used for vertical drain and around perforated pipe (without filter fabric)

OPTION 2:

COMPOSITE DRAINAGE SYSTEM



Wrap filter fabric flap behind core

Mirafi G100N, Contech C-Drain 15K, or equivalent drainage composite.

Cut back of core to match size of weep hole. Do not cut fabric.

4-inch diameter perforated pipe with proper outlet. Peel back the bottom fabric flap,place pipe next to core, wrap fabric around pipe and tuck behind core. (See Notes for alternate weep hole discharge system)

NOTES:

1. PIPE TYPE SHOULD BE PVC OR ABS, SCHEDULE 40 OR SDR35 SATISFYING THE REQUIREMENTS OF ASTM TEST STANDARD D1527, D1785, D2751 , OR D3034.
2. FILTER FABRIC SHALL BE APPROVED PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL.
3. DRAIN PIPE SHOULD HAVE A GRADIENT OF 1 PERCENT MINIMUM.
4. WATERPROOFING MEMBRANE MAY BE REQUIRED FOR A SPECIFIC RETAINING WALL (SUCH AS A STUCCO OR BASEMENT WALL).
5. WEEP HOLES MAY BE PROVIDED FOR LOW RETAINING WALLS (LESS THAN 3 FEET IN HEIGHT) IN LIEU OF A VERTICAL DRAIN AND PIPE AND WHERE POTENTIAL WATER FROM BEHIND THE RETAINING WALL WILL NOT CREATE A NUISANCE WATER CONDITION. IF EXPOSURE IS NOT PERMITTED, A PROPER SUBDRAIN OUTLET SYSTEM SHOULD BE PROVIDED.
6. IF EXPOSURE IS PERMITTED, WEEP HOLES SHOULD BE 2-INCH MINIMUM DIAMETER AND PROVIDED AT 25-FOOT MAXIMUM SPACING ALONG WALL. WEEP HOLES SHOULD BE LOCATED 3+ INCHES ABOVE FINISHED GRADE.
7. SCREENING SUCH AS WITH A FILTER FABRIC SHOULD BE PROVIDED FOR WEEP HOLES/OPEN JOINTS TO PREVENT EARTH MATERIALS FROM ENTERING THE HOLES/JOINTS.
8. OPEN VERTICAL MASONRY JOINTS (I.E., OMIT MORTAR FROM JOINTS OF FIRST COURSE ABOVE FINISHED GRADE) AT 32-INCH MAXIMUM INTERVALS MAY BE SUBSTITUTED FOR WEEP HOLES.
9. THE GEOTECHNICAL CONSULTANT MAY PROVIDE ADDITIONAL RECOMMENDATIONS FOR RETAINING WALLS DESIGNED FOR SELECT SAND BACKFILL.

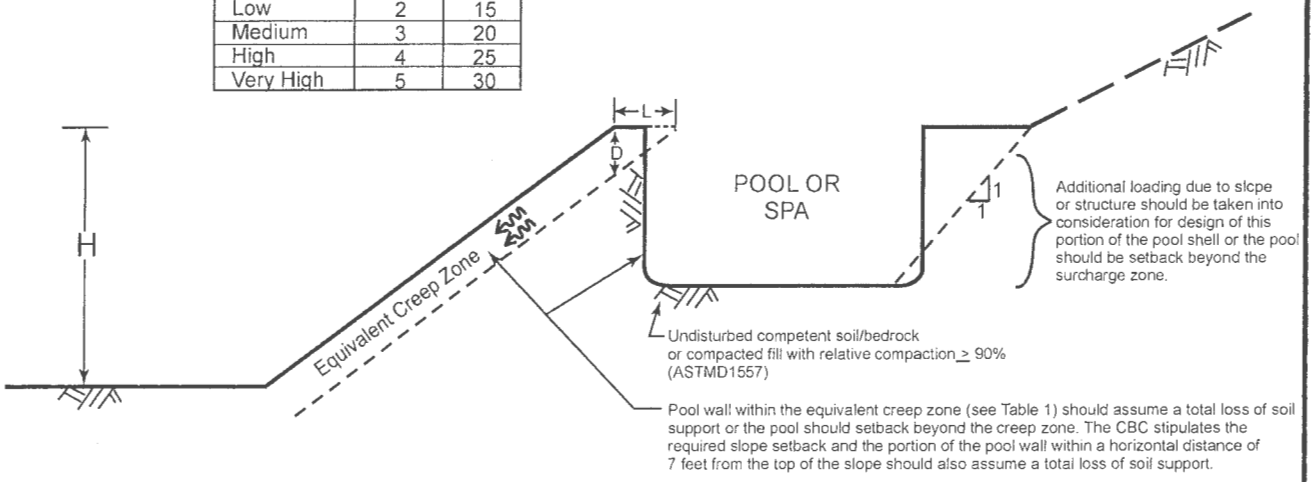
RETAINING WALL DRAINAGE DETAIL

NMG Geotechnical, Inc.

FIGURE 2

TABLE 1
ASSUMED EQUIVALENT CREEP ZONE
(for pool design only)

EXPANSION POTENTIAL	D (feet)	L (feet)
Very Low	1	7
Low	2	15
Medium	3	20
High	4	25
Very High	5	30



NOTE: • THIS DETAIL IS TYPICAL AND SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT.
• IN ACCORDANCE WITH THE 2013 CBC SECTION 1808.7.3

1) The pool walls should be designed to account for soil expansion forces. Where constructed in soils possessing "medium" expansion potential, the pool walls should be designed for an equivalent lateral fluid pressure of 100 lbs./cu. ft. For soils possessing "high" or "very high" expansion potential, the pool walls should be designed for and equivalent lateral fluid pressure of 125 lbs./cu. ft. The actual expansiveness of soils exposed in pool excavations should be evaluated upon completion of the excavation as pool subgrade soils are exposed.

2) Pools and spas should conform to setback criteria pertaining to slopes as established in the California Building Code. The CBC indicates that the pool should be setback from descending slopes a minimum distance of one-sixth of the descending slope height (20 feet maximum). In addition, that portion of the pool wall within a horizontal distance of 7 feet from the top of the slope shall be capable of supporting the water in the pool without soil support. In addition, we recommend that the portion of the pool wall within the equivalent soil creep zone (Table 1) should also assume a total loss of soil support. Where pools are planned near toes-of-slopes and/or structures, appropriate surcharge loads should be incorporated into design and construction.

3) Pool/spa excavations exposing bedrock should be evaluated by a qualified geotechnical consultant to determine the need for special design to account for bedding plane surcharges. If encountered, the pool walls should be designed to support any daylight bedding. The bedding plane surcharge value will vary depending upon bedding angle, rock type, and strength.

4) In order to provide uniform conditions, the pool excavation may need to be overexcavated a depth of 3 feet below bottom of pool and replaced to pool subgrade with compacted fill. As an alternative, the reinforcing steel in the area of a transition area may be increased to account for the differences in engineering properties and the potential differential behavior.

5) Consideration should be given to incorporating provisions for mitigating subsurface water. Whereas pool excavations may be free of water at the time of construction, future irrigation could result in the development of perched water zones which could affect subsurface improvements. Heavy-duty pipes and couplings should be used for the pool plumbing system to minimize leaking which may produce additional pressures on the pool shell. In addition, installation of a pressure valve in the pool bottom may be considered to mitigate potential build-up of pressure.

6) In general, all below grade improvements must be constructed by qualified professionals utilizing appropriate designs which account for the on-site (lot) geotechnical and geologic conditions. Observation/testing should be performed by a geotechnical consultant during pool/spa excavation to verify exposed soil conditions are consistent with the assumed design conditions.

SWIMMING POOL AND SPA DESIGN CRITERIA DETAIL

NMG Geotechnical, Inc.

6/14 POOL.ai

FIGURE 3

NOTE: RECOMMENDATIONS DEPICTED ON THIS DETAIL ARE TYPICAL AND SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT OR ARCHITECT/DESIGNER

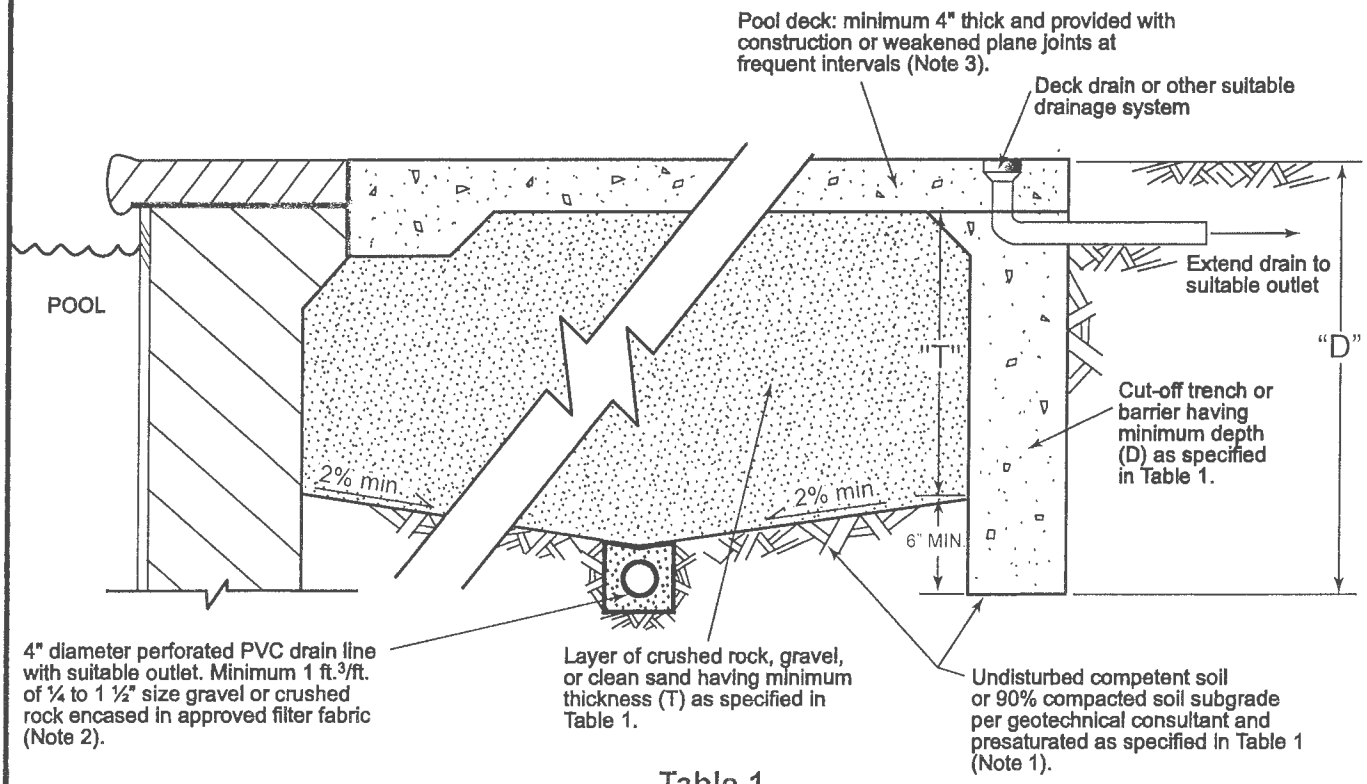


Table 1

Expansion Potential	Min. Depth of Cut-off "D"	Min. Thickness of Sand Back-fill "T"	Min. Depth of Presaturation	Min. Presaturation Moisture Content
Low	12"	4"	6"	120% of Optimum
Medium	18"	6"	12"	130% of Optimum
High	24"	12"	18"	140% of Optimum
Very High	30"	18"	24"	140% of Optimum

Notes:

1) To reduce the potential for excessive cracking due to expansive soil forces, pool deck concrete slabs should be a minimum of 4 inches thick and provided with construction or weakened plane joints at frequent intervals (e.g., every 6 feet or less). Slabs should be underlain by a layer of crushed rock, gravel, or clean sand having a minimum thickness as indicated in Table 1. This layer is not required for very low expansion potential subgrades. For very low expansion potential subgrade, water spraying the subgrade prior to pouring concrete is considered adequate otherwise, the subgrade should be presaturated to the minimum depth and minimum moisture content (as a percentage of optimum moisture content) indicated in Table 1. Presoaking should be observed, tested, and accepted by a geotechnical consultant prior to placement of concrete.

2) The Subgrade below pool decks should have a drain line consisting of 4-inch diameter perforated pipe (PVC Schedule 40, SDR 35, Armco A2000 PVC, or approved equivalent), surrounded by approved gravel which is wrapped with filter fabric (Mirafi 140N, or approved equivalent) provided below the sand layer. One line of subdrain around the swimming pool area is generally sufficient. The drain pipe should have a gradient of 1 percent minimum.

3) All concrete has a tendency to crack and cracks in concrete can be caused by many different factors. When constructing concrete decks, it is important that the ground on which these improvements are to rest be properly prepared, including moisture conditioning. Slab thickness, location of joints, reinforcement, and concrete mixture must also be appropriate for the intended use. Proper placement, finishing, and curing of concrete are also very important factors in minimizing cracking. Reinforcement of slabs may also be considered to further reduce unsightly cracking especially for high or very high expansion potential areas. Adjacent landscaping should provide appropriate surface and subdrainage to minimize overwetting the soils.

POOL AND SPA DECK SUBGRADE DETAIL

NMG Geotechnical, Inc.

6/14 POOL DECK.ai

FIGURE 4

APPENDIX A

APPENDIX A

REFERENCES

NMG Geotechnical, Inc., 2001, Revised Preliminary Geotechnical Investigation and Planning Study for Conceptual Design, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 99070-01, dated August 17, 2001.

NMG Geotechnical, Inc., 2003. Preliminary Geotechnical Review of Tentative Tract 15652, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 99070-01, dated December 29, 2003.

NMG Geotechnical, Inc., 2004, Preliminary Geotechnical Investigation for Zone 4 Domestic and Zone C Reclaimed Water Tanks Site, Planning Area I-6, City of Irvine Sphere of Influence, County of Orange, California, Project No. 03087-01, dated April 15, 2004.

NMG Geotechnical, Inc., 2005a, Preliminary Geotechnical Investigation and Review of Tentative Tract 16814 Map, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated January 10, 2005.

NMG Geotechnical, Inc., 2005b, Geotechnical Investigation and Review of 40-Scale Preliminary Grading Plan, Neighborhood 4, a Portion of Tentative Tract Map 16814, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated October 24, 2005.

NMG Geotechnical, Inc., 2006, Geotechnical Investigation and Review of 40-Scale Preliminary Grading Plan, Neighborhood 4B, a Portion of Tentative Tract Map 16814, Phase 2 of Planning Area 6, City of Irvine, California, Project No. 99070-01, dated November 27, 2006.

NMG Geotechnical, Inc., 2014, Supplemental Geotechnical Investigation and Review of Updated 40-Scale Preliminary Grading Plan, Neighborhood 4B, Tentative Tract Map 16814, Planning Area 6, City of Irvine, California, Project No. 99070-35, dated March 21, 2014.

NMG Geotechnical, Inc., 2016a, Geotechnical Review of Updated 40-Scale Preliminary Grading Plan, Portion of Tentative Tract Map 16814 and 17769, Neighborhood 4B of Planning Area 6, City of Irvine, California, Project No. 99070-35, dated January 29, 2016.

NMG Geotechnical, Inc., 2016b, In-Grading Geotechnical Investigation for Temporary Backcut Failure during Preliminary Grading of Portola Springs Community Park, Tentative Tract 17769, Neighborhood 4B, City of Irvine, California, Project No. 99070-64, dated May 26, 2016.

Pirzadeh & Associates, Inc., 2016, Planning Area 6 Neighborhood 4B Traffic Indices, dated January 19, 2016.

APPENDIX A

REFERENCES (Continued)

U.S. Geological Survey, 2013, 2008 Interactive Deaggregations Program; web site address: https://geohazards.usgs.gov/deaggint/2008/.

U.S. Geological Survey, 2014, U.S. Seismic Design Maps, web site address: http://geohazards.usgs.gov/designmaps/us/application.php.

APPENDIX B

Boring No. IGB-1

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.): 26
DRIVE DROP (in.): 12
DRIVE WEIGHT (lbs.): 0'-25': 2150 lbs.; 25'-45': 1350 lbs, 45'-68', 650 lbs.

GROUND SURFACE ELEVATION: 671 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: N/A

Elevation (ft.)	Depth (ft.)	Graphic Log (N / S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
670							**Artificial Fill (Afu)** @ Surface: Dark yellowish brown clayey/silty sand, damp, medium dense, porous, root hairs, FeO stained			
			@ 2' GB: N30W, 26SW				**Landslide Material (Qls)** @ 2': Cobble bed, some siltstone, 6" thick, silty sandstone below, friable, dense.			
	5						@ 5': Silty fine to medium sandstone, friable.			
							@ 5.8': Silty medium to coarse sandstone, friable. 1' thick			
							@ 6': Sandy siltstone.			
							@ 8': Sandy siltstone becomes fissile.			
			@ 9' B: N20W, 23SW				@ 9': Bedding, 2" thick sandstone bed, continuous			
	10		@ 10' B: N10W, 24SW				@ 10': Bedding, thin clayey siltstone.			
660										
			@ 11.8' B N11W, 24SW				@ 11.8' Clayey siltstone, laminated, beds vary from 1/4" to 2' thick in interbedded silty sandstone to clayey siltstone.			
							@ 13', 3" sandstone bed, below is very broken, easy to hack, 6" thick clayey siltstone, then a 3" friable sandstone.			
			@ 14' S/B N16W, 24-26SW	SB-2			@ 14': Top of clayey zone, planar, broken to 14.7', roots, clayey siltstone/claystone. Sample downhole			
	15		@ 14.7' RS: N16W, 20SW				@ 14.7': Rupture Surface, sheared bedding, highly fractured and sheared.			
			@ 16' B N18W, 23SW	SB-3			**Puente Formation-Soquel Member (Tps)** @ 15', FeO stained contact with 8" thick sandstone bed, clayey siltstone below			
			@ 16.5' CB, N15W, 23SW				@ 16': Clayey siltstone bedding, well bedded. @ 16.5': Clay bed, 1" thick, gray, plastic, soft to medium stiff, hacked all around boring, laminated. Sample downhole. Interbedded 6-18" sandstone/siltstone beds below, siltstone is fissile			
							@ 18': More dense, less fractured			
	20			SB-1			@ 19': Cobbles in siltstone, sandstone at 20'.			
650										
			@ 21.7' CB: N20W, 20-24SW				@ 21': Claystone with 3" clay bed, laminated, soft, plastic. Silty clay bed has some sandy laminations in it, sandstone below. Sample taken from cuttings.			
	25						@ 25': 1.5' thick conglomeratic sandstone, moist, massive, very friable, cobbles up to 6-8" diameter, rounded			
							@ 29': conglomeratic sandstone, 6" diameter cobbles, very friable.			
	30									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

Report: BUCKET AUGER, Project: 99070-64.GPJ, Data Template: NMG_GINT_20*6.GDT, Printed: 5/19/16

Boring No. IGB-1

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.) 26
DRIVE DROP (in.) 12
DRIVE WEIGHT (lbs.) 0'-25': 2150 lbs ; 25'-45': 1350 lbs; 45'-68': 650 lbs

GROUND SURFACE ELEVATION: 671 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: N/A

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
640		N S					@ 30-35': Interbedded sandstone and conglomeratic sandstone, very moist, friable, massive, clasts are meta-volcanic to siltstone derived			
	35		@ 36.5' C N60W, 18SW				@ 36.4': Clayey sandstone, iron-stained contact, irregular, no planar surface. @ 37.5': Fine to medium sandstone, wet.			
			@ 38.5' J: N88W, 73SW				@ 38.5': Prominent joint in joint set dipping down to 44'.			
	40		@ 39.5' B: N4W, 28-30SW				@ 39.5' Bedding, clayey siltstone, cobbles, bottom of sandstone above is highly FeO stained, irregular, cobbles on bottom @ 39.8' Gray clayey siltstone, seepage on top of siltstone, approximately 1' thick @ 41- 44' Boring is belled out at least 1' deep on E wall, 6" on W wall, in saturated conglomeratic sandstone			
630										
	45						@ 44', Sandstone and conglomeratic sandstone below joint set.			
							Notes: Total Depth Drilled: 45 Feet. Downhole Logged to 43 Feet. Seepage at 38.5 Feet Standing Water at 44' After Logging			
	50									
620										
	55									
	60									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

Report BUCKET AUGER, Project 99070-64.GPJ, Data Template NMG_GINT_2016.GDT, Printed 5/19/16

NMG Geotechnical, Inc.

Boring No. IGB-2

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.) 26
DRIVE DROP (in.) 12
DRIVE WEIGHT (lbs.) 0'-25': 2150 lbs.; 25'-45': 1350 lbs, 45'-68': 650 lbs

GROUND SURFACE ELEVATION: 655 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: N/A

Elevation (ft.)	Depth (ft.)	Graphic Log (N / S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Artificial Fill (Afu) @ Surface: Dark yellowish brown clayey/silty sand, damp, medium dense, porous, root hairs, FeO stained.			
							Landslide Material (Qls) @ 1-4.5': Silty sandstone, very friable, damp.			
650	5		@ 4.6' C: N50W, 20SW				@ 4.7-7': Siltstone, fairly intact, contact with sandstone at 4.7'.			
							@ 8-9': High angle joint, roots in joint			
			@ 9' J: N60E, 80SE				@ 8.8': Claystone broken, joint at 9'.			
	10		@ 9.5' B: N36W, 23SW				@ 9.5': Bedding, siltstone bed.			
			@ 11' B: N40W, 25SW				@ 11.3': Bedding, clay bed, 1" thick, sheared			
							@ 11.9': 0.5-1" thick clay bed			
			@ 12.2' CB: N40W, 30-32SW				@ 12': 5" thick fat plastic claystone. 6" thick sandstone below. 3-4" claystone below the sandstone.			
							@ 13.2- 13.5': Fat clay, highly plastic			
640	15			SB-1			@ 15': Rupture Surface, undulating, silty clay, 1/4" thick white sandstone within parting of rupture surface			
			@ 15' RS: N7W 24-30SW				**Puente Formation-Soquel Member (Tps)** @ 15.5': Below rupture is sandstone, very moist, friable			
							@ 16-16.8': Claystone, massive, more dense, laminations. Sandstone below.			
			@ 17' S/B: N72W, 39SW				@ 17-17.2': Very clayey siltstone, some shearing in clay.			
							@ 17.5': Gray plastic clay, sheared bedding. Wet, friable sandstone below			
	20		@ 19.3' CB: N46W, 25SW				@ 19': Claystone 6" thick, minor seepage on top of bed. Gray plastic clays associated with claystone.			
							@ 19.3': Bedding, clay bed.			
							@ 21': Gray silty fine sandstone, saturated.			
							@ 23': FeO stained silty fine to coarse sandstone, saturated			
630	25						@ 25': Caving 3-5' above water level.			
							@ 25': Yellow brown to gray interbedded silty sandstone/conglomeratic fine to coarse sandstone, saturated.			
	30									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

Report: BUCKET AUGER, Project: 99070-64 GPJ, Data Template: NMG_GINT_2015.GDT, Printed: 5/18/16

Boring No. IGB-2

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.) 26
DRIVE DROP (in.) 12
DRIVE WEIGHT (lbs.) 0'-25': 2150 lbs.; 25'-45': 1350 lbs; 45'-68': 650 lbs

GROUND SURFACE ELEVATION: 655 ft
DATUM: msl
LOCATION:
COORD/STATION:

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Logged By: TW Sampled By: N/A			
							@ 30': Granitic cobbles, and abundant meta-volcanic subrounded cobbles			
620	35						Notes: Total Depth: 32 Feet (Refusal on Cobble) Downhole Logged to 20 Feet Seepage at 19 Feet. Slight Caving below 22 Feet in Friable Sand. Standing Water at 28.3 Feet.			
	40									
610	45									
	50									
600	55									
	60									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

Report: BUCKET AUGER; Project: 99070-64.GPJ; Data Template: NMG_GINT_2016.GDT; Printed: 5/18/16

Boring No. IGB-3

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.) 26
DRIVE DROP (in.) 12
DRIVE WEIGHT (lbs.) 0'-25': 2150 lbs , 25'-45': 1350 lbs, 45'-68': 650 lbs.

GROUND SURFACE ELEVATION: 655 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: N/A

Elevation (ft.)	Depth (ft.)	Graphic Log (N / S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Puente Formation-Soquel Member (Tps)			
							@ 0-1.5': Sheared clay bed, sandstone within plastic clay sheared zone			
			@ 1.5' CB N40W, 27SW							
			@ 2.9' B: N50W, 23SW				@ 2.9': Bedding, clayey siltstone, foraminifera fossils @ 3-4.5': Fine to coarse sandstone, friable			
650	5		@ 4.7' CB: N40W, 24SW				@ 4.5-5.5': Clayey siltstone, foraminifera in laminated partings			
							@ 5.5- 6.5': Interbedded repeating sandstone/siltstone beds			
			@ 6.5' B: N65W, 25SW				@ 6.5' Bedding, massive sandstone below.			
	10						@ 9.5': Moist, very dense, slightly friable, more fines in sandstone.			
			@ 11' B/C: N75W, 24SW				@ 11': Bedding contact, FeO stained silty fine sandstone above light gray fine to coarse sandstone, very dense, more friable. @ 11.7-12.5'. Conglomeratic sandstone. Less cobbles after 12.5'			
640	15						@ 14': Silty fine sandstone, moist very dense, massive			
							@ 17.5' More gravelly fine to coarse sandstone.			
	20		@ 18.8' B N70W, 25SW				@ 18.5'. Bedding, 3" thick cobble layer in fine to coarse sandstone. Silty fine to medium sandstone below to 22'.			
							@ 22-23.5' Bedding, gravel and conglomeratic bed. Back into silty fine to medium sandstone, very dense, massive, below			
			@ 23' B: N65W, 24SW							
630	25						@ 26.8'. Chunks of 6"x12" siltstone within sandstone, very broken bed-like appearance, irregular @ 27': Weathered granitic cobble, 1' diameter.			
			@ 28.8' B/C: N40W, 33SW				@ 29': 1' thick fine to medium sandstone in between cobble sandstone above and below			
	30									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

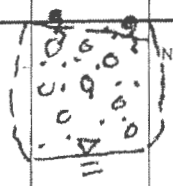
Report BUCKET AUGER; Project: 99070-64.GPJ; Data Template: NMG_GINT_2016.GDT; Printed: 5/18/16

Boring No. IGB-3

DATE STARTED: 5/17/16 DATE ENDED: 5/17/16
DRILLING COMPANY: Alroy Drilling Services
EQUIPMENT USED: Earth-Drill
HOLE DIAMETER (in.) 26
DRIVE DROP (in.) 12
DRIVE WEIGHT (lbs.) 0'-25': 2150 lbs.; 25'-45': 1350 lbs, 45'-68', 650 lbs.

GROUND SURFACE ELEVATION: 655 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: N/A

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
620	35		@ 30' GB: N52W, 34SW				@ 30': Seepage. Abundant cobbles, rounded river rocks, belled out at 30' and below to water.			
	40						Notes: Total Depth: 35 Feet Downhole Logged to 33 Feet Seepage at 30 Feet. Standing Water at 33 Feet			
610	45									
	50									
600	55									
	60									

GEOTECHNICAL LOG OF BORING

99070-64

ICDC/ PA6 N4B

NMG

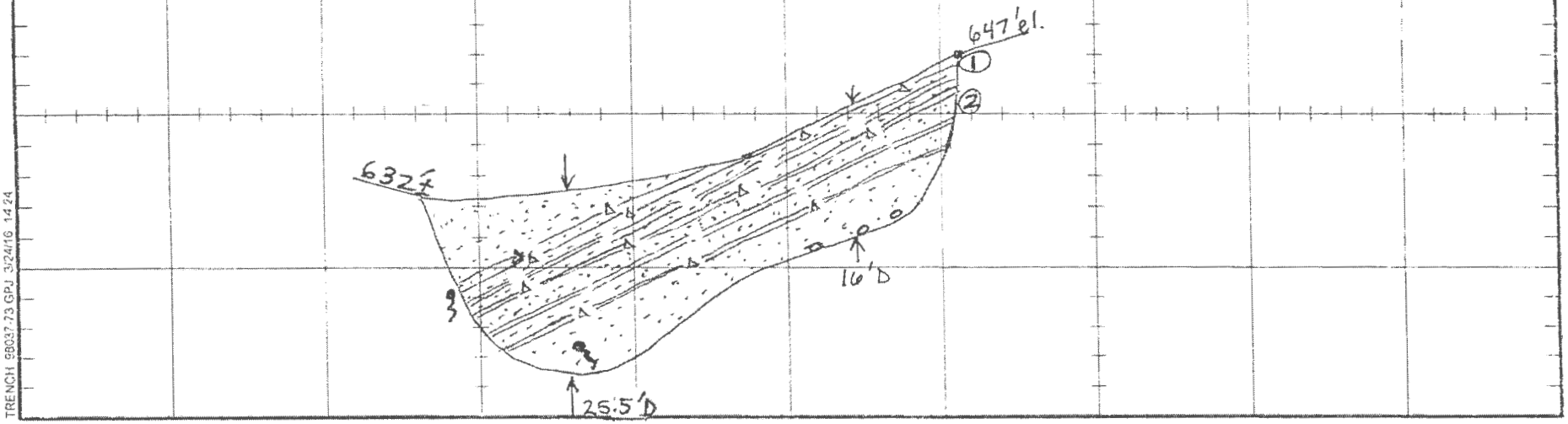
Report BUCKET AUGER, Project 99070-64.GPJ, Data Template NMG_GINT_2016.GDT, Printed 5/18/16

NMG Geotechnical, Inc.

Project Name: PA6 N4B | Logged By: LY | TRENCH NO.: T-IG-1
Project Number: 99070-64 | Elevation: 647'± to 632'±
NMG Equipment: Excavator | Location: West of slide

GEOLOGIC ATTITUDES	DESCRIPTION	GEOLOGIC UNIT	ENGINEERING PROPERTIES: U.S.C.S	SAMPLE NO	MOISTURE CONTENT (%)	DRY DENSITY (pcf)
DATE 5/13/16 & 5/14/16						
① B: N80W, 29SW ② B: N55W, 27SW	Bedrock: Puente Formation, Soquel Member: Interbedded lt gray brown sandstone with siltstone. Gray clayey siltstone and claystone with thin clay beds. White to light gray sandstone with local FeO stain and cobble layers toward bottom. @20' Very heavy seepage. (Minor seep @11' above.) @25' Refusal on cemented SS and Cg SS layer T.D. 25.5'	Tps				

GRAPHIC REPRESENTATION: West Wall | SCALE: 1" = 20'± | SURFACE SLOPE: | TREND: N37E →



TRENCH 99037-73.GPJ 3/24/16 14:24

LOG OF TRENCH NO. T-IG-1

Boring No. B-81

DATE STARTED: 2/6/14 DATE ENDED: 2/6/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.): 26"
DRIVE DROP (in.): 12"
DRIVE WEIGHT (lbs.): 0'-30': 3300 lbs.; 31'-55': 2200 lbs.; 56'-62': 1100 lbs.

GROUND SURFACE ELEVATION: 660 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW/AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
				B-1			**Puente Formation, Soquel Member (Tps)** @ 0-3': Highly weathered and fractured light gray and light yellowish brown fine sandy SILTSTONE, FeO and jarosite staining.			B-1 @ 3'-5'
	5		@ 5.7' GB: N50W 24SW	D-1	4	SM-ML	@ 5' SAMPLE: Pale yellowish brown to reddish brown silty fine SANDSTONE/sandy SILTSTONE, damp, dense, FeO staining, fractures with calcium carbonate infilling, massive. @ 6.7': Gypsum along bedding and fractures up to 1/2" thick.	110.3	13.6	
			@ 8' CB: N17W, 25SW	SB-1			@ 7.7': 1" to 3" thick gypsum along bedding on the northeast wall. @ 7.8': Reddish yellow silty SANDSTONE, beds are 1/4" thick, irregular/undulatory. SILTSTONE below. @ 7.9': Sheared silty CLAY, up to 1" to 2" thick, pinches/swells, sub parallel discontinuous surfaces.			SB-1 @ 6' & 45' AL GS
650	10			D-2	5	SM-ML	@ 9': Gypsum along bedding, up to 1" thick. @ 10' SAMPLE: Pale yellowish gray silty very fine SANDSTONE/sandy SILTSTONE, moist, dense, massive, jarosite staining. @ 10': Light gray (tuffaceous?) bed mottled with jarosite. @ 11.5': Up to 1" thick gypsum along bedding. Transitions to clayey and sandy SILTSTONE, less fractured, dense/very stiff, laminated, parts easily.	110.4	13.1	
			@ 12.5' B: N10W, 24W							
	15						@ 14.8': Gypsum 1/4" thick along bedding within SILTSTONE, less fractured.			
			@ 17.5' GB: N12W, 23W							
							@ 18.5: Fracture zone with FeO and jarosite staining and 1/4" thick gypsum along fractures.			
			@ 19' J: N10E, 90 @ 19' B: N85W, 24SW							
640	20			D-3	4	SM-ML	@ 20' SAMPLE: Strong brown to reddish brown silty fine SANDSTONE/sandy SILTSTONE, moist, dense/very stiff, fractured, FeO staining. @ 21': SILTSTONE with discontinuous stringers of jarosite, increasingly less weathered and fractured.	99.9	22.6	
			@ 22' GB: N27W, 22SW							
	25									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/12/14

Boring No. B-81

DATE STARTED: 2/6/14 DATE ENDED: 2/6/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.; 56'-62': 1100 lbs.

GROUND SURFACE ELEVATION: 660 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW/AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (N / S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
			@ 25.5' J: N45E, 73SE @ 26.5' B: N74W, 24S	B-2			@ 25.5': High angle gypsum lined joint, 2" thick, truncated by conjugate joint at 29'.			B-1 @ 27'-29'
630	30		@ 29' J: N70E, 68NW @ 30' SH: N65W, 29S @ 31' J: N67E, 73N @ 32' B: N60W, 16S @ 32.1' B: N35W, 25SW	D-4	9	SM-ML	@ 29': Dark brown to reddish brown SILTSTONE shear zone 4" - 8" thick with paper thin clay partings, gypsum below and along bedding up to 1/4" thick. @ 30' SAMPLE: Yellowish brown to olive clayey SILTSTONE and silty fine SANDSTONE, moist, very stiff to very dense, thinly interbedded, gypsum along bedding. @ 30.5': Poorly cemented beds, less fractured/weathered. @ 32': Random clay lined shears in SILTSTONE.	111.0	19.2	
	35						@ 34': High angle (near vertical) joint, gypsum lined, up to 1" thick. @ 35': Patches of unoxidized dark gray sandy SILTSTONE. Mostly unoxidized by 36'.			
							@ 37.5': Gypsum along bedding up to 1/8" thick.			
620	40		@ 38.5' J: N65E, 85SE @ 38.5' B: N50W, 18SW @ 42' B: N80W, 23S @ 43.5' B: N70E, 17S	D-5	18	SM-ML	@ 40' SAMPLE: Dark olive brown silty fine SANDSTONE/sandy SILTSTONE, moist, very dense, massive to poorly bedded, abundant gypsum. @ 43': Dark gray to black SILTSTONE interbedded with brown sandy SILTSTONE, very stiff to hard, poorly bedded, conjugate fractures with gypsum lining. @ 43.5': Minor seepage along bedding and fractures, mostly on northwest wall.	112.7	15.0	DS
	45		@ 45' CB: N35W, 18S	SB-1			@ 45': Bedrock laminated with gray silty clay-lined partings, planar 1/8" thick, continuous. @ 46': Foraminifera fossils, little to no fractures.			
				B-3			@ 47.4': High angle gypsum lined joint on the north wall 1/2" thick, seepage along joint.			B-1 @ 45'-50'
610	50						@ 49.5': High angle gypsum lined joint, west wall.			

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-81

DATE STARTED: 2/6/14 DATE ENDED: 2/6/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.; 56'-62': 1100 lbs.

GROUND SURFACE ELEVATION: 660 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW/AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (N / S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
			@ 50.5' J: N70W, 83N @ 51.5' CB: N12W, 24 @ 53.5' J: N15E, 67SE @ 54' B: N17W, 18SW	D-6	8	ML	@ 50' SAMPLE: Dark olive gray fine sandy SILTSTONE, moist, very stiff to hard, massive to poorly bedded. @ 51': Laminated zone 1' thick, with SILTSTONE and CLAY, random shears, planar basal surface. Gypsum lining along bedding, up to 1" thick. @ 53.5': Hard shale bed, fractures, well bedded, polished clayey parting surfaces. @ 53.5': Little to no fractures, dark gray SILTSTONE, poorly to well bedded, laminated. @ 55': Seepage on southwest wall.	98.7	20.8	
600	55 60									
590	65 70 75						Notes: Total Depth: 62 Feet. Downhole Logged to 57 Feet. Seepage at 43.7', 47.4', and 55'. Standing water at 60 Feet. Backfilled with Cuttings and Tamped.			

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-82

DATE STARTED: 2/6/14 DATE ENDED: 2/7/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 667 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ/LY
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (E W)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Undcertified Artificial Fill (Afu) @ 0'-3': Yellowish brown to dark brown silty SAND, damp, loose, fine to coarse gravel, roots.			
				B-1			**Alluvium (Qal)** @ 3': Subhorizontal contact with gray-brown silty clayey SAND, damp, some coarse gravel, organic.			B-1 @ 2'-5'
	5			D-1	6	SC	@ 4.5': Transition to dark brown clayey fine to coarse SAND, damp to moist, medium dense. @ 5' SAMPLE: Dark yellowish brown clayey fine to coarse SAND, medium dense, damp, root hairs, trace pinhole pores.	117.4	5.1	
660							@ 6.2': Gradational change to pale yellowish brown silty fine to coarse SAND, friable, moist.			
							@ 8': FeO and jarosite staining, moist to very moist.			
	10			D-2	6	SM	@ 10' SAMPLE: Yellowish brown silty fine to coarse SAND, moist, medium dense to dense, slightly friable.	114.0	7.4	
				B-2						B-2 @ 10'-13'
							Puente Formation, Soquel Member (Tps) @ 13.8': Light gray to yellowish brown silty fine to coarse SANDSTONE. High point 13.8' on north east wall; Low point 15' on the west wall. Subrounded gravel and FeO staining along contact, sharp contact, bedrock weathered to 16'.			
	15		@ 15' B: N25W, 24SW	D-3	6	SM	@ 15' SAMPLE: Pale olive to yellowish brown silty fine to medium SANDSTONE, moist, dense, FeO staining, weathered. @ 15.5': Transition to gray silty fine SANDSTONE, FeO stained, moist. High point on east wall; Low point at 16.7' on west wall. Interbedded and discontinuous, SILTSTONE stringers.	118.8	10.5	
650							@ 18.4': Incease in density/less fractured, damp, and massive.			
			@ 19': B: N55W, 29SW				@ 19': Bedding highlighted by FeO staining.			
	20			D-4	7	SM-ML	@ 20' SAMPLE: Gray to olive gray silty fine SANDSTONE, moist, dense, FeO staining.	112.8	17.0	
							@ 21.8': Tansition to light gray silty fine to medium SANDSTONE, FeO and MnO staining, massive, jarosite. High point 21.8' on east wall, low point 23' on west wall.			
			@ 22.5' B: N58W, 24SW							
	25									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-82

DATE STARTED: 2/6/14 DATE ENDED: 2/7/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 667 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ/LY
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
		E W					@ 25': Pebble bed, 1"-2" thick, FeO, MnO and jarosite staining, siltstone rip-up clasts. High point 25' on east wall; low point 26' on west wall.			
640			@ 26.5' J: N67W, 71N				@ 26.3': Thinly interbedded fine to coarse SANDSTONE and gray fine sandy SILTSTONE, poorly bedded, slightly undulatory, FeO staining.			
	30			D-5	7	SM-ML	@ 30' SAMPLE: Thinly interbedded gray SILTSTONE and light gray silty fine SANDSTONE, moist, hard/dense, FeO staining, moderately well bedded.	101.8	20.5	
							@ 31': Transition to clayey SILTSTONE with thin interbeds of light gray and reddish brown fine to medium SANDSTONE.			
			@ 32.5' GB: N39W, 28SW							
			@ 33' B: N46W, 21SW				@ 33': SANDSTONE bedding, high point 32.5' east wall, low point 33.5' west wall.			
							@ 33.2': Dark brownish gray clayey SILTSTONE and minor fine SANDSTONE, thinly interbedded, foraminifera fossils.			
	35		@ 35' CB: N41W, 22SW				@ 35': Dark brown paper thin CLAY beds 1" apart (four total). High point 34' on east wall; low point 35.5' on west wall. Clay lined joint below truncates at lowest clay bed.			
630			@ 35' J: N51E, 66SW							
			@ 35.3' CB: N34W, 36SW				@ 37': Very moist to wet SILTSTONE clast, soft, west wall only.			
							@ 37.8': 1.3' thick zone of multiple clay beds and parting surfaces along bedding within SILTSTONE.			
	40		@ 39.5' CB: N54W, 30SW	D-6	9	SM-ML	@ 39.1': Contact with dark gray unoxidized SILTSTONE and thinly interbedded fine SANDSTONE, foraminifera fossils, very stiff/dense, 1.1' thick. Contact highlighed by clay. High point 39.1' east wall; low point 39.9' west wall. Bottom of unoxidized zone: high point 40.2' east wall; low point 41.1' west wall.	99.7	21.2	DS
							@ 40' SAMPLE: Upper: Thinly interbedded gray SILTSTONE and light gray silty fine SANDSTONE, moist, hard/dense, FeO staining, moderately well bedded. Tip: Dark gray SILTSTONE, moist, hard, unoxidized, foraminifera fossils.			
							@ 40.2': Gray interbedded SANDSTONE and SILTSTONE.			
			@ 43' B: N25W, 21SW				@ 42.8': Light gray fine to medium SANDSTONE, 1/2" thick, seepage on west wall. High point 42.8' east wall; low point 43.7' west wall.			
	45						@ 44.7': Base of SILTSTONE package. Underlying contact with light gray silty fine to coarse SANDSTONE, FeO and MnO staining, scattered pebbles, seepage.			
620							@ 45.9': Sandy CONGLOMERATE, rounded coarse pebbles and cobbles, 8" to 1' thick, heavy seepage. High point 45.9' east wall; low point is at 46.5' west wall. Massive SANDSTONE below with jarosite staining.			
	50									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-82

DATE STARTED: 2/6/14 DATE ENDED: 2/7/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 667 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ/LY
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (E W)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
				D-7	11	SM	@ 50': SAMPLE: Light gray silty fine to medium SANDSTONE, moist, dense, FeO and jarosite staining, massive.	123.2	10.2	
	55		@ 52.5' GB: N10W, 33W				@ 52.5': Grades to dark gray SILTSTONE, hard, unoxidized.			
610										
	60						Notes: Total Depth: 56 Feet. Downhole Logged to 52.5 Feet. Seepage at 43.7', 44.7', and 45.9'. Backfilled with Cuttings and Tamped.			
	65									
600										
	70									
	75									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-83

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.

GROUND SURFACE ELEVATION: 594 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (E W)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Uncertified Artificial Fill (Afu) @ 0 - 5': Dark yellowish brown silty fine to medium SAND, moist, roots, loose to medium dense, friable.			
590	5			D-1	1	CL	**Slopewash Material (Qsw)** @ 5' SAMPLE: Dark brown sandy CLAY, very moist, soft to medium stiff, roots	104.7	18.9	
				B-1			@ 5': Contact dipping slightly southward; Dark brown silty CLAY, stiff, moist, massive, root hairs down to 8'. @ 5.5': Change to sandy CLAY, soft to medium stiff, very moist.			B-1 @ 5-8 MD
							@ 9': Clayey and sandy SILT, moist, stiff, root hairs, caliche, massive.			
	10			D-2	4	SC	@ 10' SAMPLE: Dark yellowish brown clayey fine to medium SAND, moist, medium dense to dense, caliche stringers.	120.0	13.0	
							@ 11': Gradational change to sandy SILT, moist, massive, scattered pebbles/cobbles,			
580							@ 13': Increase in moisture.			
	15			D-3	6	SC/SM	@ 14.8': Brown silty SAND with gravel. @ 15' SAMPLE: Upper: Yellowish brown clayey/silty fine to coarse SAND, moist, medium dense, trace fine to coarse rounded gravel.	126.0	10.8	
							Puente Formation, Soquel Member (Tps) Tip: Reddish yellow to olive gray silty fine to medium SANDSTONE, moist, medium dense, FeO staining. @ 15.8': Subhorizontal contact, pebbles/cobbles along contact, FeO and jarosite staining. Silty fine to medium SANDSTONE, very dense, few fractures.			
	20		@ 20' GB: N10W, 13W	D-4	9	SM	@ 20' SAMPLE: Light olive to reddish yellow silty fine to coarse SANDSTONE, moist, dense, FeO staining, slightly friable. @ 20': Brown to strong brown SILTSTONE bed.	113.4	15.9	
			@ 22' B: N10E, 20W				@ 21.4': Fine to medium clean SANDSTONE, trace pebbles, sharp planar basal contact. High point 21.4' northeast wall; low point 21.9' southwest wall. @ 21.9': Silty SANDSTONE, very dense. @ 22.6': Fine to medium clean SANDSTONE, 3" thick. High point 22.6' northeast wall; low point 23' southwest wall.			
570			@ 23' B: N15E, 16W @ 23.5' J: N40E, 50E				@ 22.6': Sandy SILTSTONE bed, 1' thick. @ 23.5': Silty SANDSTONE, wet, seepage, jointed.			
	25									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/25/14

Boring No. B-83

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.

GROUND SURFACE ELEVATION: 594 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
		N S		D-5	9	SM	@ 25' SAMPLE: Light gray silty fine to coarse SANDSTONE, moist, dense, FeO staining, slightly friable. @ 25': Cobble/concretion, 6" diameter, north wall. @ 26': Seepage.	119.4	15.4	
	30			D-6	12	SM	@ 30' SAMPLE: Light gray silty fine to coarse SANDSTONE, moist, dense, FeO staining, slightly friable.	118.4	14.4	
560	35						Notes: Total Depth: 31 Feet. Downhole Logged to 26 Feet. Seepage at 23.5' and 26'. Standing Water at 29 Feet (Prior to Backfilling). Backfilled with Cuttings and Tamped.			
550	40									
	45									
	50									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-84

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (In.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 620 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Uncertified Artifical Fill (Afu) Yellowish brown, silty fine to medium SAND, moist, loose to medium dense, fine to coarse rounded gravel.			
	5			D-1	Push	SC	@ 5' SAMPLE: Dark yellowish brown to dark brown silty/clayey SAND, moist, loose trace fine gravel.	98.8	14.3	
				B-1						B-1 @ 5'-9'
610	10			D-2	2	SC-CL	@ 10' SAMPLE: Olive brown clayey fine to medium SAND/sandy CLAY, very moist, medium dense/medium stiff, trace fine rounded gravel.	116.6	15.1	
							@ 12' - 15': Seepage/caving.			
							@ 13': Dark gray organic sandy CLAY, wet.			
	15			D-3	2	CL	**Slopewash Material (Qsw)** @ 15' SAMPLE: Very dark gray silty CLAY, very moist to wet, medium stiff, caliche, root hairs.	106.0	21.3	
600	20			D-4	3	CL	@ 20' SAMPLE: Dark brown to brownish gray silty/sandy CLAY, very moist, medium stiff, trace pores and caliche.	108.8	17.1	
	25									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/12/14

NMG Geotechnical, Inc.

Boring No. B-84

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 620 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
				D-5	1	SM-SC	**Puente Formation, Soquel Member (Tps)** @ 25' SAMPLE: Yellowish brown to gray silty/clayey fine SANDSTONE, highly weathered, very moist, medium dense, FeO staining.	103.2	22.4	
590	30			D-6	8	SM-ML	@ 30' SAMPLE: Olive to light yellow brown silty very fine SANDSTONE/very fine sandy SILTSTONE, moist, dense/very stiff, FeO staining, poorly bedded.	110.2	17.2	
	35			D-7	7	SM-ML	@ 35' SAMPLE: Olive and reddish brownsilty fine SANDSTONE/sandy SILTSTONE, moist, dense/very stiff, FeO staining.	110.2	19.7	
580	40						Notes: Total Depth: 36 Feet. Not Downhole Logged Due to Caving. Seepage at 12 to 15 Feet. Backfilled with Cuttings and Tamped.			
	45									
570	50									

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/5/14

Boring No. B-85

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 619 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
						SM	**Uncertified Artificial Fill (Afu)** Surface: Yellowish brown silty fine to medium SAND, moist, fine to coarse rounded gravel and bedrock fragments.			
	5			D-1	2	CL-ML	@ 5' SAMPLE: Light olive gray silty CLAY/clayey SILT, very moist, medium stiff, bedrock fragments.	108.9	17.8	
610				B-1						B-1 @ 7'-10'
	10			D-2	Push	CL	@ 10' SAMPLE: Dark olive gray sandy CLAY, wet to saturated, soft, trace fine rounded gravel. @ 10' - 12': Seepage/caving.	97.1	23.1	
	15			D-3	Push	CL	**Slopewash Material (Qsw)** @ 15' SAMPLE: Dark brown silty CLAY, very moist to wet, soft, abundant root hairs, organics.	101.2	21.6	
600										
	20			D-4	3	CL	@ 20' SAMPLE: Strong brown to dark brown silty CLAY, very moist, medium stiff, caliche stringers, trace root hairs.	108.1	18.2	
				B-2						B-2 @ 20'-23'
	25									

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/12/14

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Boring No. B-85

DATE STARTED: 2/10/14 DATE ENDED: 2/10/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 619 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
				D-5	1	CL	@ 25' SAMPLE: Dark brown silty CLAY, very moist, soft to medium stiff, trace pinhole pores.	109.0	17.8	GS AL CN
590	30			D-6	2	SM CL	@ 30' SAMPLE: Upper: Dark yellowish brown silty fine to medium SAND, very moist, medium dense, slightly friable. Tip: Dark brown silty/sandy CLAY, very moist, medium stiff.	104.9	19.0	
	35			D-7	3	SM-ML	**Puente Formation, Soquel Member (Tps)** @ 35' SAMPLE: Light yellow brown fine sandy SILTSTONE and silty fine SANDSTONE, moist to very moist, medium dense, interbedded, FeO staining, weathered. @ 35' - 40': Heavy seepage.	109.0	19.4	
580	40			D-8	8	SM-ML	@ 40' SAMPLE: Olive gray and reddish brown silty fine to medium SANDSTONE and fine sandy SILTSTONE, moist, dense/stiff, interbedded, FeO staining, massive.	109.6	17.9	
	45			D-9	5	ML	@ 45' SAMPLE: Olive gray reddish brown fine sandy SILTSTONE, moist, stiff, FeO staining.	120.5	12.4	
570	50						Notes: Total Depth: 46 Feet. Not Downhole Logged Due to Caving.. Seepage at 10-12 and 35-40 Feet. Backfilled with Cuttings and Tamped.			

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/5/14

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

NMG Geotechnical, Inc.

Boring No. B-86

DATE STARTED: 2/11/14 DATE ENDED: 2/11/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 643 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Uncertified Artificial Fill (Afu) Surface: Yellowish brown clayey SAND, wet, loose to medium dense.			
640	5			D-1	4	SM	@ 5' SAMPLE: Dark yellowish brown silty fine to coarse SAND, wet, medium dense, siltstone bedrock fragments, fine to coarse rounded gravel.	124.1	11.0	
				B-1			@ 6': Seepage from agricultural irrigation.			B-1 @ 5'-8'
	10			D-2	3	CL	@ 10' SAMPLE: Dark yellowish brown and olive silty/sandy CLAY, very moist, medium stiff.	101.6	18.7	
630							@ 12': Olive and dark gray silty/clayey SAND, very moist. @ 12' - 13.5': Seepage/caving.			
	15			D-3	3	SM-SC	@ 15' SAMPLE: Gray to dark gray silty/clayey SAND, very moist, medium dense, slightly friable, clayey lenses.	117.1	9.1	
	20			D-4	Push	CL	@ 20' SAMPLE: Upper: Light olive gray sandy CLAY, very moist, soft, trace fine rounded gravel. Tip: Very dark gray to black silty CLAY, very moist, root hairs, organic.	105.5	19.1	
620							**Slopewash Material (Qsw)** @ 23': Very dark gray to black silty CLAY, very moist, soft to medium stiff, organic, root hairs and roots up to 3/4" diameter.			
	25									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Boring No. B-86

DATE STARTED: 2/11/14 DATE ENDED: 2/11/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 643 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: AZ
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
				D-5	2	CL	@ 25' SAMPLE: Dark brown silty/sandy CLAY, very moist, soft to medium stiff, caliche stringers, trace fine sub-rounded gravel.	105.4	20.5	AL GS CN
							@ 28': Increase in stiffness.			
	30			D-6	3		@ 30': No Sample Recovery.			
						ML	**Puente Formation, Soquel Member (Tps)** @ 31' SAMPLE: Light yellow sandy SILTSTONE, moist to very moist, medium stiff to stiff, weathered, massive.	107.1	17.6	
610										
	35			D-7	8	SM-ML	@ 35' SAMPLE: Light yellowish brown fine sandy SILTSTONE/silty fine to medium SANDSTONE, very moist to wet, stiff/medium dense, micaceous. (Disturbed)		28.5	
							@ 37': SILTSTONE less massive, thinly bedded/laminated.			
	40			D-8	7	ML	@ 40' SAMPLE: Light olive gray fine sandy SILTSTONE, moist to wet, stiff to very stiff, thinly bedded to laminated, dipping ~45°-50°.	73.1	43.4	
600							Notes: Total Depth: 41 Feet. Not Downhole Logged Due to Caving. Seepage at 6', 12'-13.5', and 35-36'. Backfilled with Cuttings and Tamped.			
	45									
	50									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-87

DATE STARTED: 2/11/14 DATE ENDED: 2/11/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 630 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log (N–S)	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
							Uncertified Artificial Fill (Afu) @ 0-3': Yellowish brown to dark brown sandy SILT, damp, roots, pores, caliche, krotovina.			
							@ 2.9': Irrigation Pipe			
							Puente Formation, Soquel Member (Tps) @ 3': Subhorizontal contact; bedrock weathered/fractured, caliche, discontinuous bedding.			
	5		@ 5' B: N62W, 23S @ 6' J: N80W, 63S @ 7' B: N65W, 48S	D-1	4	ML-CL	@ 5' SAMPLE: Reddish brown and olive gray interbedded SILTSTONE and CLAYSTONE, moist, stiff, weathered, calcium carbonate infilled fractures, FeO staining. @ 5.5': Caliche and clay lined fractures. @ 7': SANDSTONE bed, 1/4" thick, truncated by clay bed with gypsum lining at 8'.	95.7	16.7	
			@ 8.5' CB: N36E, 14SW				@ 8': Gray CLAY, medium stiff, plastic, gypsum along bedding, 1" to 3" thick, less fractured below. @ 8.2'-10.5': Light gray tuffaceous SILTSTONE/very fine SANDSTONE, mottled with jarosite and MnO staining. @ 9.5': Gypsum lined joint, 1" to 3 " thick, minor roots.			
620	10		@ 10.5' J: N75W, 49S @ 11' J: N83W, 75N	D-2	9	SM-ML	@ 10' SAMPLE: Light yellow to light gray fine sandy SILTSTONE/silty fine SANDSTONE, moist, very stiff/dense, FeO staining, gypsum lined fractures. @ 11': Sub-vertical gypsum lined joint.	110.8	16.0	
							@ 13': Gray SILTSTONE, jarosite stained stringers, random discontinuous shear surfaces. @ 14': Gypsum along bedding; roots up to 1/4" diameter.			
	15						@ 16.5': 1/2" thick gypsum lined joint, north wall.			
			@ 18' GB: N70W, 36S				@ 18': Bedding highlighted by FeO staining within gray sandy SILTSTONE.			
610	20			D-3	6	ML	@ 20' SAMPLE: Olive fine sandy SILTSTONE, moist, very stiff to hard, FeO staining, minor interbedded CLAY, abundant gypsum. @ 20': Discontinuous clay lens, 1" thick. @ 21': Concretion bed, 6" to 7" thick, gypsum along bedding. @ 21.5': Sheared clayey zone, tectonic shearing, discontinuous.	105.7	18.8	
			@ 21.8' B: N80W, 36S @ 22' GB: N76W, 32S				@ 23': High-angle gypsum lined joint, heavy FeO and jarosite staining.			
			@ 24.5' J: N72W, 76N							
	25									

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Boring No. B-87

DATE STARTED: 2/11/14 DATE ENDED: 2/11/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 630 ft
DATUM: msl
LOCATION:
COORD/STATION:

Logged By: TW
Sampled By: AZ

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
		N S					@ 25': Foraminifera fossils; jarosite staining.			
			@ 26.8' SH: N50W, 50SW				@ 26.5': Sheared clayey SILTSTONE, discontinuous sub-parallel polished surfaces. @ 27': Sub-vertical joint, gypsum lined along joint and bedding, FeO and MnO staining. @ 28': Gray clayey SILTSTONE, abundant gypsum stringers.			
							@ 29': Gypsum lined bedding (1" to 3" thick) and high angle joint.			
600	30		@ 30' GB/C: N10E, 15W	D-4	9	SM-ML	@ 30' SAMPLE: Olive and light yellowish brown fine sandy SILTSTONE and silty fine SANDSTONE, moist, very stiff/dense, FeO staining.	114.5	14.4	DS
			@ 32.5' J: N78W, 67S							
	35						@ 34.3': Near vertical joint, 1/2" to 1" thick gypsum lining, FeO staining. @ 35': Grades to unoxidized dark gray clayey SILTSTONE, massive.			
			@ 37.5' B: N30W, 23SW				@ 37': Brown fine sandy SILTSTONE, 1" to 3" thick. High point 37' north wall; low point 37.8' south wall.			
			@ 39.2' B: N65W, 40S				@ 39.2': Laminated SILTSTONE, 1/2" thick, sheared. High point 39.2' north wall; low point 40.6' south wall.			
590	40			D-5	12	ML	@ 40' SAMPLE: Black clayey SILTSTONE, moist, hard, foraminifera fossils, unoxidized, clayey parting surfaces.	120.4	17.7	
			@ 41' CB: N85W, 12-30S	SB-1			@ 40.5': Light gray laminated tuffaceous bed. @ 40.8': 1/2" to 2" thick CLAY bed, continous, undulatory polished shears, planar basal surface. @ 41.5': Poorly cemented SILTSTONE. @ 42': Clayey SILTSTONE zone, random shearing, polished clayey surfaces. Unoxidized dark gray clayey SILTSTONE below, foraminifera fossils.			SB-1 @ 41' AL GS DS
			@ 43.5' SH: N70W, 63S				@ 43.5': Vertical clayey shears.			
	45									
			@ 45.7' B: N56W, 28S @ 46' SH: N22W, 58W				@ 45.7': 3" thick laminated SILTSTONE zone. Discontinuous cemented SILTSTONE below.			
580	50									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Boring No. B-87

DATE STARTED: 2/11/14 DATE ENDED: 2/11/14
DRILLING COMPANY: Big Johnny's Drilling
EQUIPMENT USED: Bucket Auger
HOLE DIAMETER (in.) 26"
DRIVE DROP (in.) 12"
DRIVE WEIGHT (lbs.) 0'-30': 3300 lbs.; 31'-55': 2200 lbs.

GROUND SURFACE ELEVATION: 630 ft
DATUM: msl
LOCATION:
COORD/STATION:

Elevation (ft.)	Depth (ft.)	Graphic Log	Attitudes	Sample Method and Number	Blows Per Foot	Soil Class. (U.S.C.S.)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Remarks
		N S		D-6	12	ML	Logged By: TW Sampled By: AZ @ 50' SAMPLE: Very dark gray fine sandy SILTSTONE, moist, hard, unoxidized, micaceous, massive to poorly bedded. @ 50.5': High angle joint, very tight.	112.7	16.0	
	55									
570	60						Notes: Total Depth: 56 Feet. Downhole Logged to 54 Feet. No Groundwater and/or Seepage. Backfilled with Cuttings and Tamped.			
	65									
560	70									
	75									

GEOTECHNICAL LOG OF BORING

99070-35

ICDC/PA-6 N4B

NMG

Report: BUCKET AUGER; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 2/26/14

Report: HOLLOW STEM; Project: P:\1999\99070-01\GINT\99070-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/5/14

Date(s) Drilled	12/13/99	Logged By	KV
Drilling Company	2R Drilling	Drill Bit Size/Type	8"
Drill Rig Type	CME 55	Hammer Data	140 lbs @ 30 Inch Drop
Sampling Method(s)	Modified California and SPT		
Approximate Groundwater Depth:	Groundwater at 27.3 ft.		
Comments	Bedrock at 25 ft.		

H-14

Sheet 1 of 2

Total Depth Drilled (ft)	30.8
Approximate Ground Surface Elevation (ft)	583.0 MSL

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SP/SM	UNCERTIFIED ARTIFICIAL FILL (AFU) Surface: Light brown gravelly SAND, dry, loose, scattered dead weeds.			
580										
	5		D-1	17		SP/SM	ALLUVIUM (QAL) @ 5' Light brown to light gray brown slightly silty fine SAND, damp, medium dense, micaceous, trace gravel.	1.6	111.7	
	10		D-2	22			@ 10' Light brown slightly silty fine to coarse SAND, dry to damp, medium dense, micaceous, slightly friable.	2.7		
570										
	15		D-3	18		SM	@ 15' Light brown silty fine SAND, damp, medium dense, trace caliche, micaceous.	13.9	107.4	
	20		D-4	67/11"			@ 20' No recovery, large rock in tip.			
560										
	25		S-1	79		SST	CAPISTRANO FORMATION, OSO MEMBER (Tco) @ 25' Green gray silty fine SANDSTONE, moist, very dense, micaceous, FeO stained, weathered.	15.8		
	30									

LOG OF BORING

ICDC PA 6
Irvine, CA
PROJECT NO. 99070-01

NMG

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30	D-4		72/9"		SST, SLST	@ 30' Light green gray silty fine SANDSTONE/fine sandy SILTSTONE, moist, very dense, micaceous, abundant FeO stain.	19.9	110.4	
550										
	35						NOTES Total Depth 31 ft. Bedrock Encountered at 25 ft. Groundwater Encountered at 27.3 ft. Backfilled with Cuttings			
	40									
540										
	45									
	50									
530										
	55									
	60									
520										
	65									

LOG OF BORING

ICDC PA 6
Irvine, CA

PROJECT NO. 99070-01

NMG

Report: HOLLOW STEM; Project: P:\1999\99070-01\GINT\99070-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 11/18/04

Date(s) Drilled	7/9/04	Logged By	SWP
Drilling Company	2R Drilling	Drill Bit Size/Type	8"
Drill Rig Type	CME 55	Hammer Data	140 lbs @ 30" drop
Sampling Method(s)	Bulk, Modified California		
Approximate Groundwater Depth:	Not Encountered		
Comments	Bedrock Encountered at 25 Ft.		

H-52

Sheet 1 of 1

Total Depth Drilled (ft)	18.0
Approximate Ground Surface Elevation (ft)	571.0 MSL

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
570	0					SM	Artificial Fill (Af) Surface: Pale yellow silty fine to medium SAND, moist.			Bag Sample Collected From 0-5'
			B-1			SC	@ 2' Dark olive brown clayey fine to coarse SAND, moist.			
	5		D-1	26		SP	@ 5' Light yellowish brown fine to coarse SAND with fine gravel, damp to moist, dense, friable, trace silt.	3.8	117.2	
560	10		D-2	10		SM	@ 10' Top: Dark yellowish brown silty fine to coarse SAND with gravel, moist to very moist, medium dense, friable. Tip: Dark yellowish brown silty fine to medium SAND with trace clay, very moist, medium dense.	7.5	106.7	CN
	15		D-3	16		SM/GM	@ 15' Disturbed Sample: Dark yellowish brown silty fine to coarse SAND, moist to very moist, medium dense, friable, gravel. @ 17' Abundant gravel, very hard drilling.	5.6		
550	20						Notes: Total Depth 18 Ft. Due to Refusal Groundwater Not Encountered Bedrock Not Encountered Backfilled with Cuttings			
	25									
	30									

LOG OF BORING

ICDC PA 6
Irvine, CA
PROJECT NO. 99070-01

NMG

Report: HOLLOW STEM; Project: P:\1999\99070-01\GINT\99070-01.GPJ; Data Template: NMGNOV98.GDT; Printed: 7/19/06

Date(s) Drilled	6/27/05	Logged By	MD
Drilling Company	2R Drilling	Drill Bit Size/Type	8"
Drill Rig Type	CME 55	Hammer Data	140 lbs @ 30 Inch Drop
Sampling Method(s)	Bulk, Modified California		
Approximate Groundwater Depth:	Encountered at 23.8 ft.		
Comments	12" Thick Wall Sampler		

H-76

Sheet 1 of 1

Total Depth Drilled (ft)	25.9
Approximate Ground Surface Elevation (ft)	627.0 MSL

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0		B-1			SC	**Slopewash (Qsw)** @ 0' Dark yellow brown clayey fine to coarse SAND, moist, abundant small to medium pebbles.			Bag Sample Collected from 0'-5'.
			D-1	19		SM	@ 2.5' Dark gray slightly clayey silty fine to coarse SAND, moist, medium dense, abundant small to large pebbles, scattered roots.	5.9	117.8	
	5		D-2	39		SM/SP	@ 5' Dark gray brown silty, small to large pebbly, fine to coarse SAND, very moist, medium dense.	3.9	116.8	
620			D-3	40		SM	@ 7.5' Dark gray brown clayey silty fine to coarse SAND, very moist to wet, medium dense, scattered small to large pebbles, trace pinhole pores.	9.5	116.8	
	10		D-4	21		CL	@ 10' Dark to very dark gray brown sandy CLAY, very moist to wet, stiff to very stiff, scattered medium to large pebbles, plastic.	18.2	112.2	
	15		D-5	32		SC/CL	@ 15' Very dark gray brown clayey fine to coarse SAND/ fine to coarse sandy CLAY, wet, medium dense/ very stiff, scattered small to large pebbles. Tip: Olive yellow clayey fine to coarse SAND/ fine to coarse sandy CLAY, wet, possible weathered bedrock.	13.8	120.2	
610										
	20		D-6	82/11"		SC	**Capistrano Formation-Oso Member (Tco)** @ 20' Olive clayey fine to medium SANDSTONE, wet, very dense, micaceous, scattered FeO staining, scattered silty interbeds. ▼ @ 23.8' Groundwater encountered during drilling.	12.9	122.1	
	25		D-7	70/11"		SM	@ 25' Olive silty fine SANDSTONE, wet, very dense, highly micaceous beds, scattered FeO staining.	14.7	117.8	
600							Notes: Total Depth 25.9 ft. Groundwater Encountered at 23.8 ft. Tco Encountered at 20 ft. Backfilled with Cuttings 6/27/05.			
	30									

LOG OF BORING

ICDC PA 6
Irvine, CA
PROJECT NO. 99070-01

NMG

Report: HOLLOW STEM; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/5/14

Date(s) Drilled	1/24/14	Logged By	AZ
Drilling Company	2R Drilling	Drill Bit Size/Type	8"
Drill Rig Type	CME 75	Hammer Data	140 lbs @ 30" Drop
Sampling Method(s)	Modified California, Bulk		
Approximate Groundwater Depth:	Groundwater Encountered at 35.2 Feet.		
Comments			

H-81

Sheet 1 of 2

Total Depth Drilled (ft)	60.5
Approximate Ground Surface Elevation (ft)	581.0 msl

Elevation (ft)	Depth (ft)	SAMPLES Type	SAMPLES Number	SAMPLES Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	0					SM	**Undocumented Artificial Fill (Afu)**			
580										
	5		D-1	26			@ 5': Dark yellowish brown silty fine to coarse SAND, moist, medium dense, trace fine to coarse rounded gravel, slightly friable.	6.9		
	10		D-2	45		SP-SM	@ 10': No intact ring recovery. Pale yellowish brown silty fine to medium SAND, damp, medium dense, highly friable, fine to coarse sub-rounded gravel.			
570			D-3	37			@ 12.5': Pale yellowish brown silty fine to medium SAND, damp, medium dense, highly friable, fine to coarse sub-rounded gravel.	3.8		
	15		D-4	50/2"		SM	@ 15': Yellowish brown silty fine to medium SAND, damp, medium dense, highly friable.	3.1		
			B-1							
			D-5	38		SP	**Alluvium/Older Alluvium? (Qal/Qalo)** @ 17.5': Yellowish brown fine to coarse SAND, damp, medium dense, highly friable, fine to coarse sub-rounded to rounded gravel.	2.5	114.3	B-1 @ 15'-20' MD, CC, DS
	20		D-6	46		SM	@ 20': Yellowish brown silty fine to coarse SAND, damp to moist, dense, fine to coarse sub-angular to sub-rounded gravel, friable.	4.4	109.8	
560			D-7	77			@ 22.5': Yellowish brown silty fine to coarse SAND, damp, dense, fine to coarse sub-angular to sub-rounded gravel, friable.	3.4	115.4	
	25		D-8	22		SP-SM	@ 25': Upper: Light yellowish brown silty fine to coarse SAND, moist, medium dense, highly friable, fine rounded gravel. Tip: Yellowish brown silty fine to medium SAND, moist, medium dense, slightly friable.	3.8	113.5	CN
			D-9	59		SP	@ 27.5': Light yellowish brown fine to coarse SAND, moist, medium dense, highly friable, fine rounded gravel.	2.9	106.6	
	30									

LOG OF BORING

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG

Elevation (ft)	Depth (ft)	Sample Type	Sample Number	Blows per foot	Graphic Log	USCS	MATERIAL DESCRIPTION	Moisture Content (%)	Dry Density (pcf)	OTHER TESTS and REMARKS
	30		D-10	50/3"		SP-SM	@ 30': Yellowish brown silty fine to coarse SAND, damp to moist, dense, coarse rounded gravel, friable.	2.8	122.7	
550			D-11	68		SP	@ 32.5': Yellowish brown fine to coarse SAND, damp to moist, dense, coarse rounded gravel, friable.	3.6	91.0	CN
	35		D-12	80/11"			▽ @ 35': Yellowish brown fine to coarse SAND, saturated, dense, coarse rounded gravel, friable.	10.5	91.7	
			D-13	56		SP-SM	@ 37.5': Dark brownish gray silty fine to coarse SAND, saturated, dense, fine to coarse rounded gravel, friable.	9.3	127.0	
	40		D-14	70		SM	@ 40': Yellowish brown to gray silty fine to coarse SAND, saturated, dense, fine to coarse sub-angular gravel, friable.	10.8	127.9	
540			D-15	26		SP-SM	@ 42.5': Yellowish brown to gray silty fine to coarse SAND, saturated, dense, fine to coarse sub-angular gravel, friable.	7.9	131.8	
	45		D-16				@ 45': No Sample (too gravelly).			
			D-17	50/4"		SM	@ 47.5': Dark yellowish brown silty fine to coarse SAND, saturated, very dense, fine to coarse sub-rounded gravel, friable.	16.0	119.2	
	50		D-18	50/5"			@ 50': Upper: Dark brownish gray silty fine to coarse SAND, saturated, very dense, friable.	22.5	108.9	
530						SM	**Capistrano Formation, Oso Member** (Tco) Tip: Light gray silty fine SANDSTONE, wet, very dense, slightly friable.			
	55		D-19	90/9"			@ 55': Dark olive gray silty fine SANDSTONE, very moist, very dense, massive, micaceous, trace coarse sand.	17.0	113.0	
	60		D-20	50/4"			@ 60': Dark olive gray silty fine SANDSTONE, very moist, very dense, massive, micaceous, trace coarse sand.	18.7	112.5	
520							Notes: Total Depth: 60.5 Feet. Groundwater Encountered at 35.2 Feet. Backfilled with Cuttings and Tamped.			
	65									

LOG OF BORING

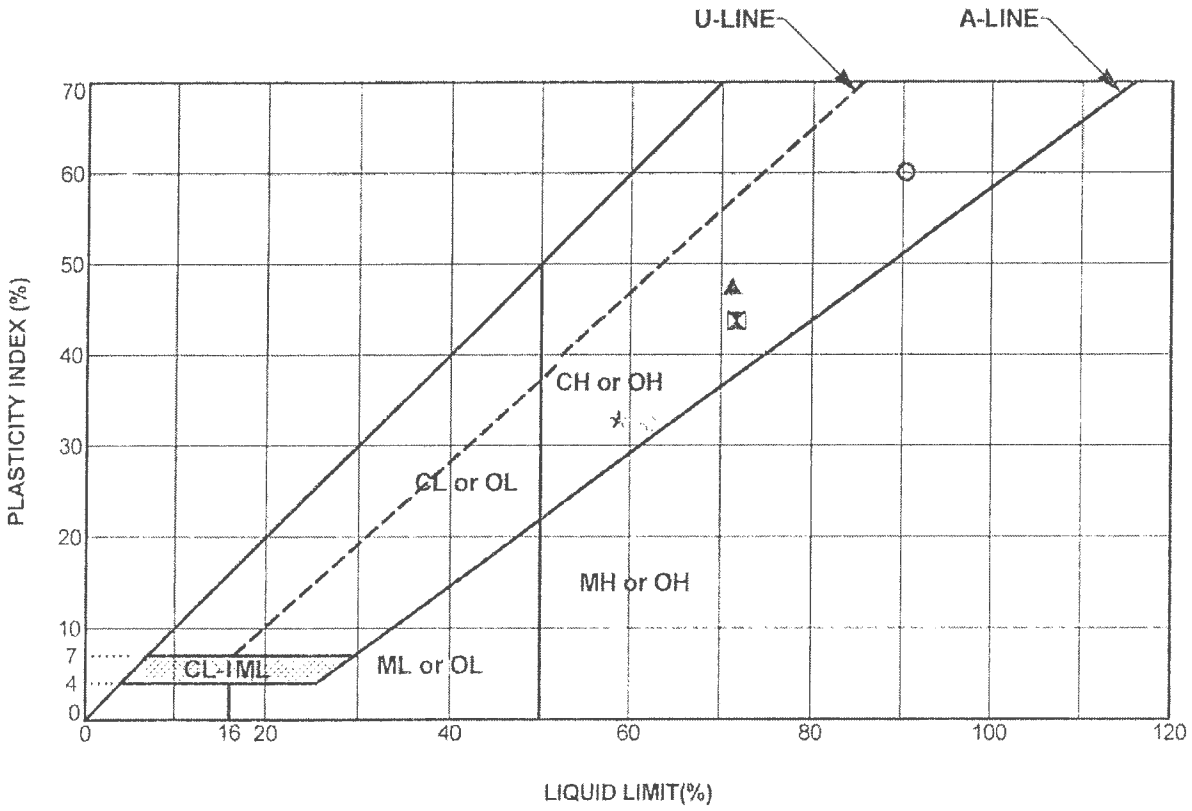
ICDC/PA-6 N4B
Irvine, CA

PROJECT NO. 99070-35

NMG

Report: HOLLOW STEM; Project: P:\1999\99070-35\GINT\99070-35.GPJ; Data Template: NMGNOV98.GDT; Printed: 3/5/14

APPENDIX C

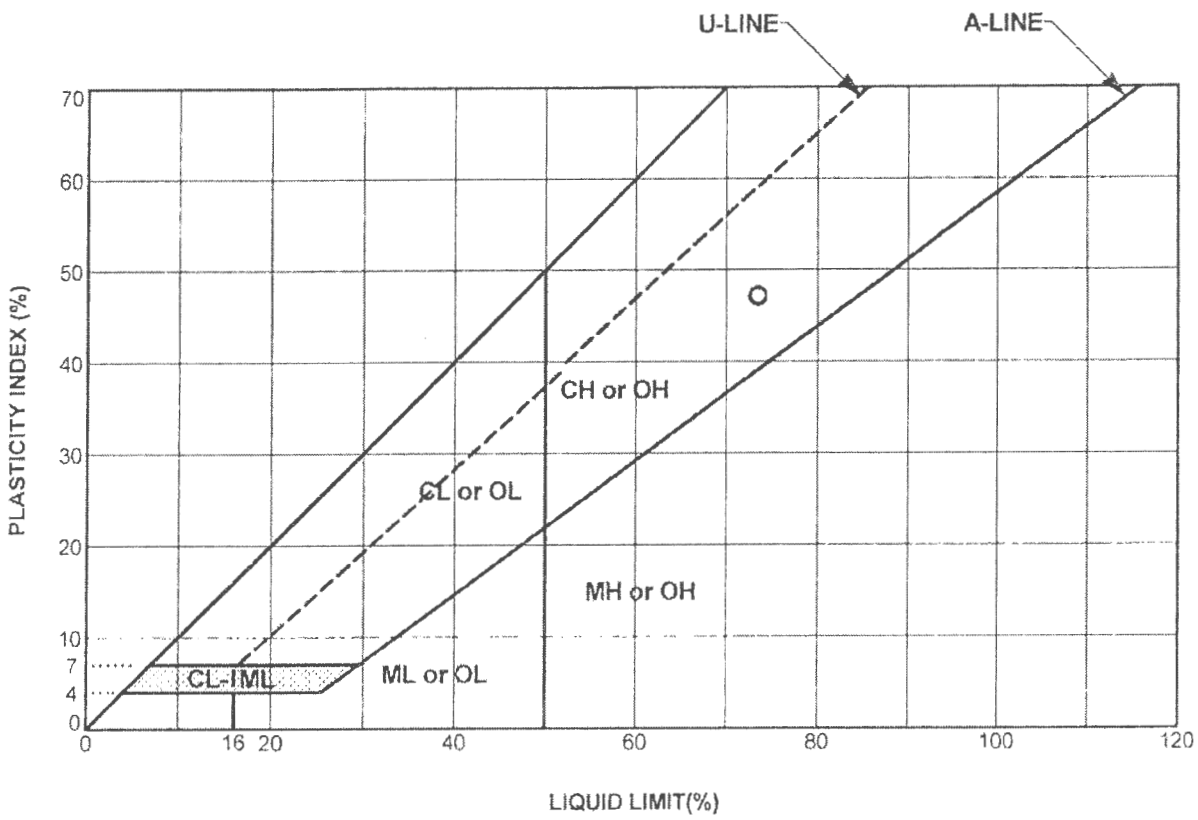


Symbol	Boring Number	Sample Number	Depth (feet)	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	Backcut	S-1	0.0	97	90	60	CH	(Tps) Gray CLAY
⊠	IGB-1	SB-2	14.5	88	72	44	CH	(Tps) Gray CLAY
▲	IGB-2	SB-1	15.0	95	71	47	CH	(Tps) Olive gray CLAY
✱	TIG-1	S-2	12.0	73	59	33	CH	(Tps) Gray CLAY
✱	TIG-1	S-3	15.0	74	62	32	CH	(Tps) Gray CLAY

PLASTICITY CHART

ICDC/ PA6 N4B
Irvine, CA
PROJECT NO. 99070-64

NMG Geotechnical, Inc.



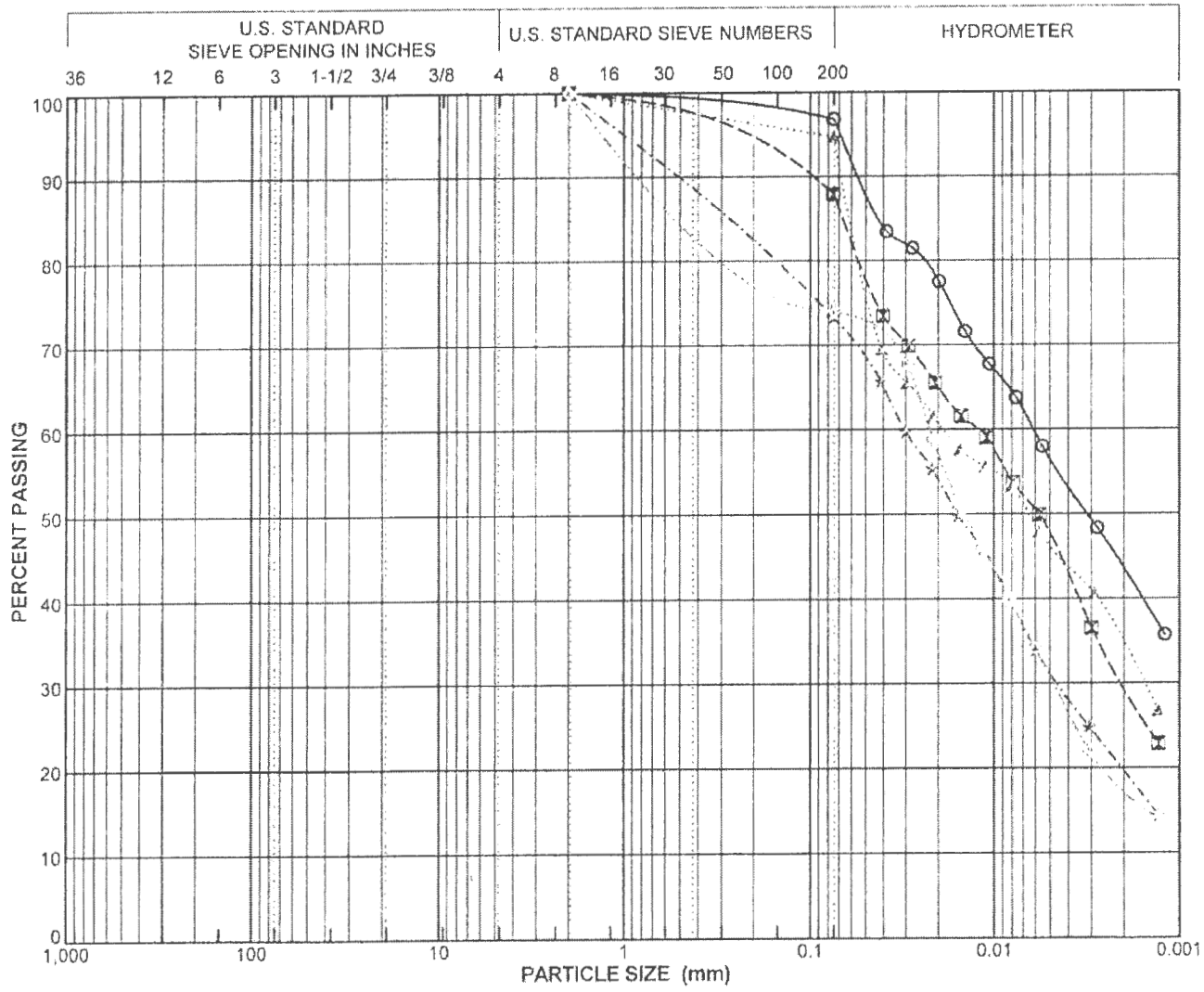
Symbol	Boring Number	Sample Number	Depth (feet)	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
O	IGB-1	SB-3	16.5	96	74	48	CH	(Tps) Gray CLAY

PLASTICITY CHART

ICDC/ PA6 N4B
Irvine, CA
PROJECT NO. 99070-64

NMG Geotechnical, Inc.

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	



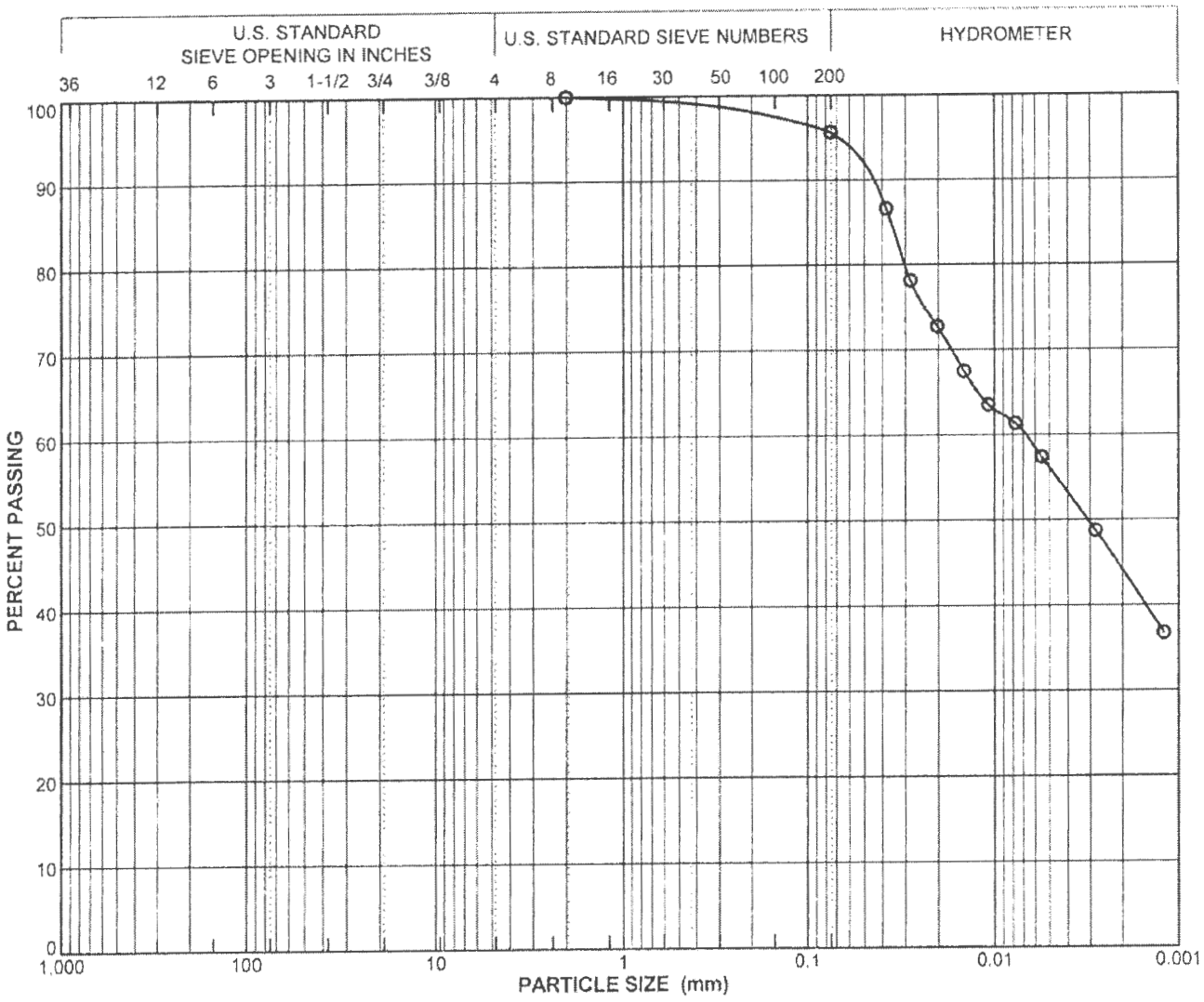
Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
O	Backcut	S-1	0.0		90	60	1.40			97	43	CH
⊠	IGB-1	SB-2	14.5		72	44	1.47			88	30	CH
◭	IGB-2	SB-1	15.0		71	47	1.38			95	34	CH
★	TIG-1	S-2	12.0		59	33	1.65			73	20	CH
◇	TIG-1	S-3	15.0		62	32	1.78			74	18	CH

PARTICLE SIZE DISTRIBUTION

ICDC/ PA6 N4B
Irvine, CA
PROJECT NO. 99070-64

NMG Geotechnical, Inc.

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	

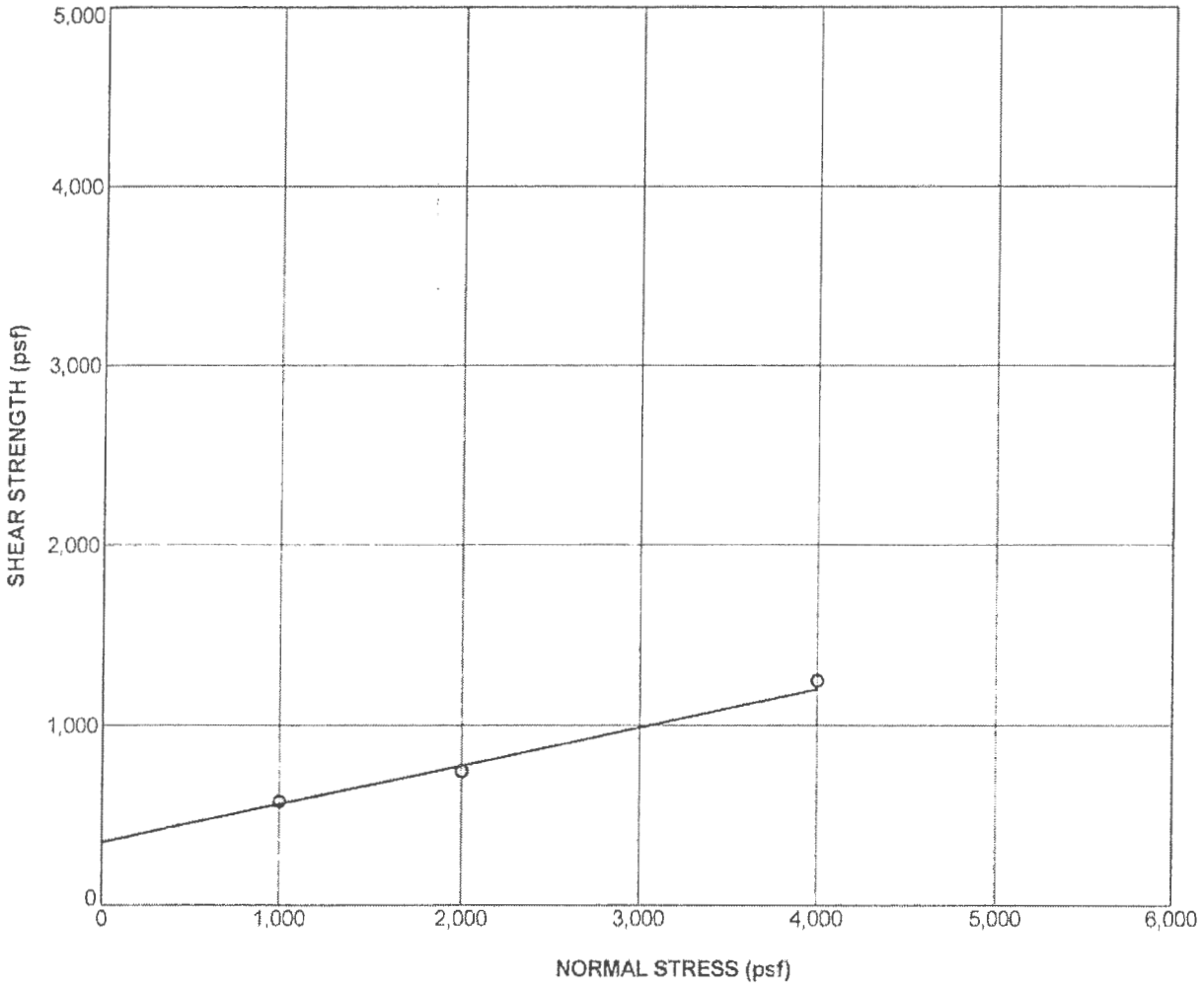


Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
O	IGB-1	SB-3	16.5		74	48	1.09			96	44	CH

PARTICLE SIZE DISTRIBUTION

ICDC/ PA6 N4B
Irvine, CA
PROJECT NO. 99070-64

NMG Geotechnical, Inc.



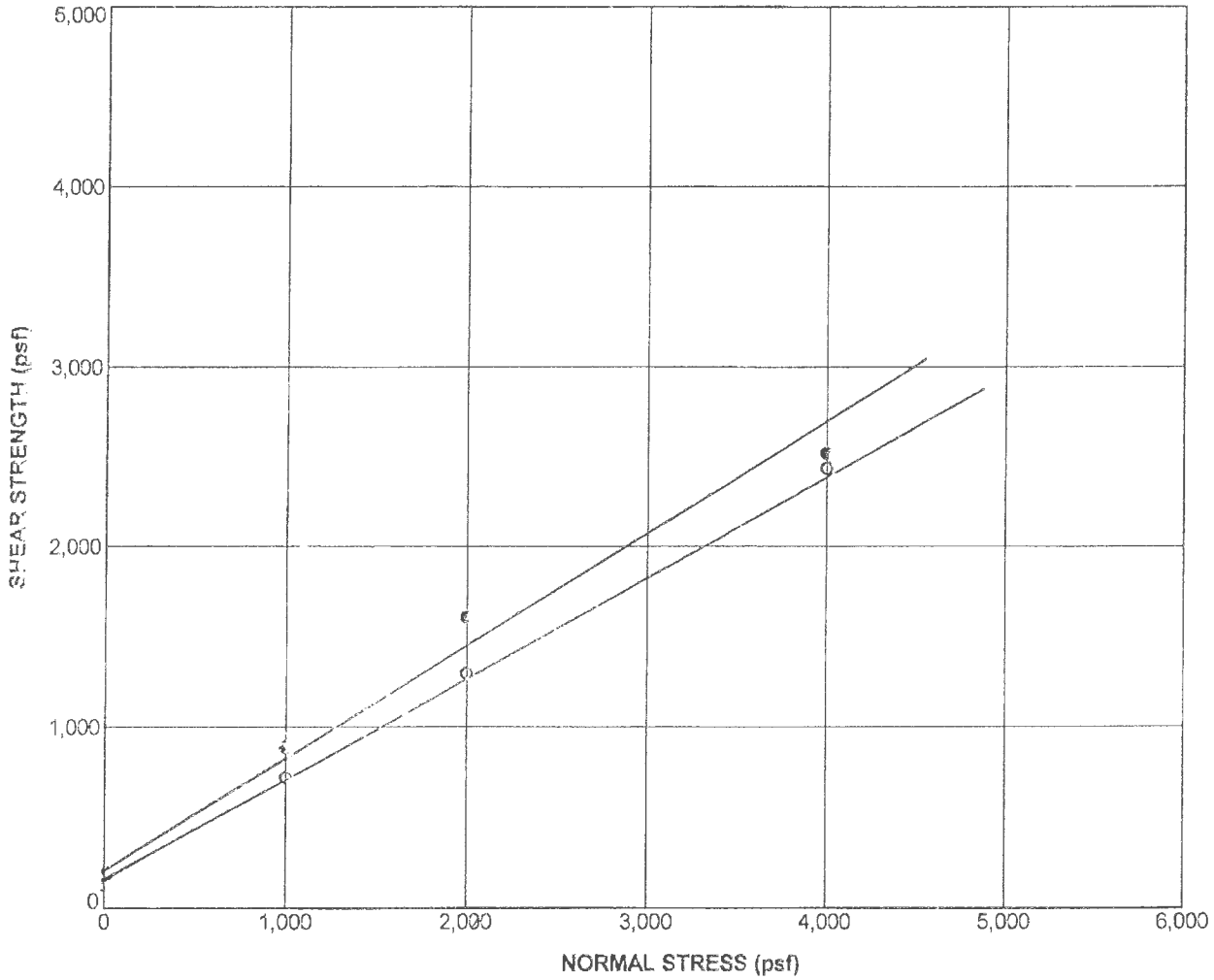
Boring No. TIG-1		Sample No. S-3		Depth: 15.0 ft	
Sample Description: (Tps) Gray CLAY				USCS:	CH
Liquid Limit:	62	Plasticity Index:	32	Percent Passing No. 200 Sieve:	74
Moisture Content (%):	35.1	Dry Density (pcf):	90.0	Degree of Saturation (%):	100
Sample Type:	Residual	Rate of Shear (in./min.):		0.001	

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	--	350
Friction Angle (degrees)	--	12.0

DIRECT SHEAR TEST RESULTS

ICDC/ PA6 N4B
Irvine, CA
PROJECT NO. 99070-64

NMG Geotechnical, Inc.



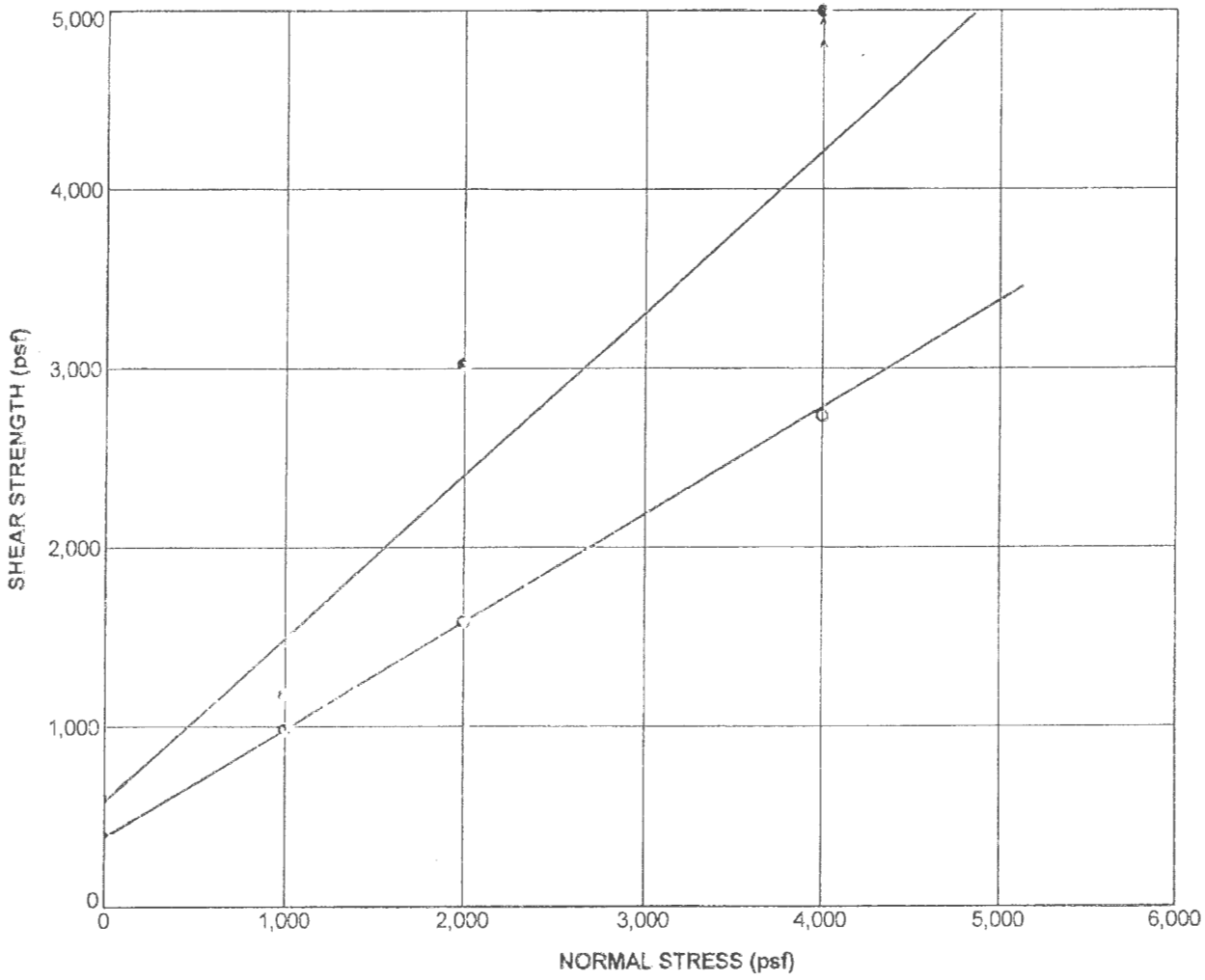
Boring No. H-81		Sample No. B-1		Depth: 15.0 ft	
Sample Description:	Brown Silty SAND w/some gravel				
Liquid Limit:		Plasticity Index:		Percent Passing No. 200 Sieve:	31
Moisture Content (%):	15.6	Dry Density (pcf):	118.1	Degree of Saturation (%):	99
Sample Type:	Remolded	Rate of Shear (in./min.):	0.005		

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	200	150
Friction Angle (degrees)	31	29.0

DIRECT SHEAR TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



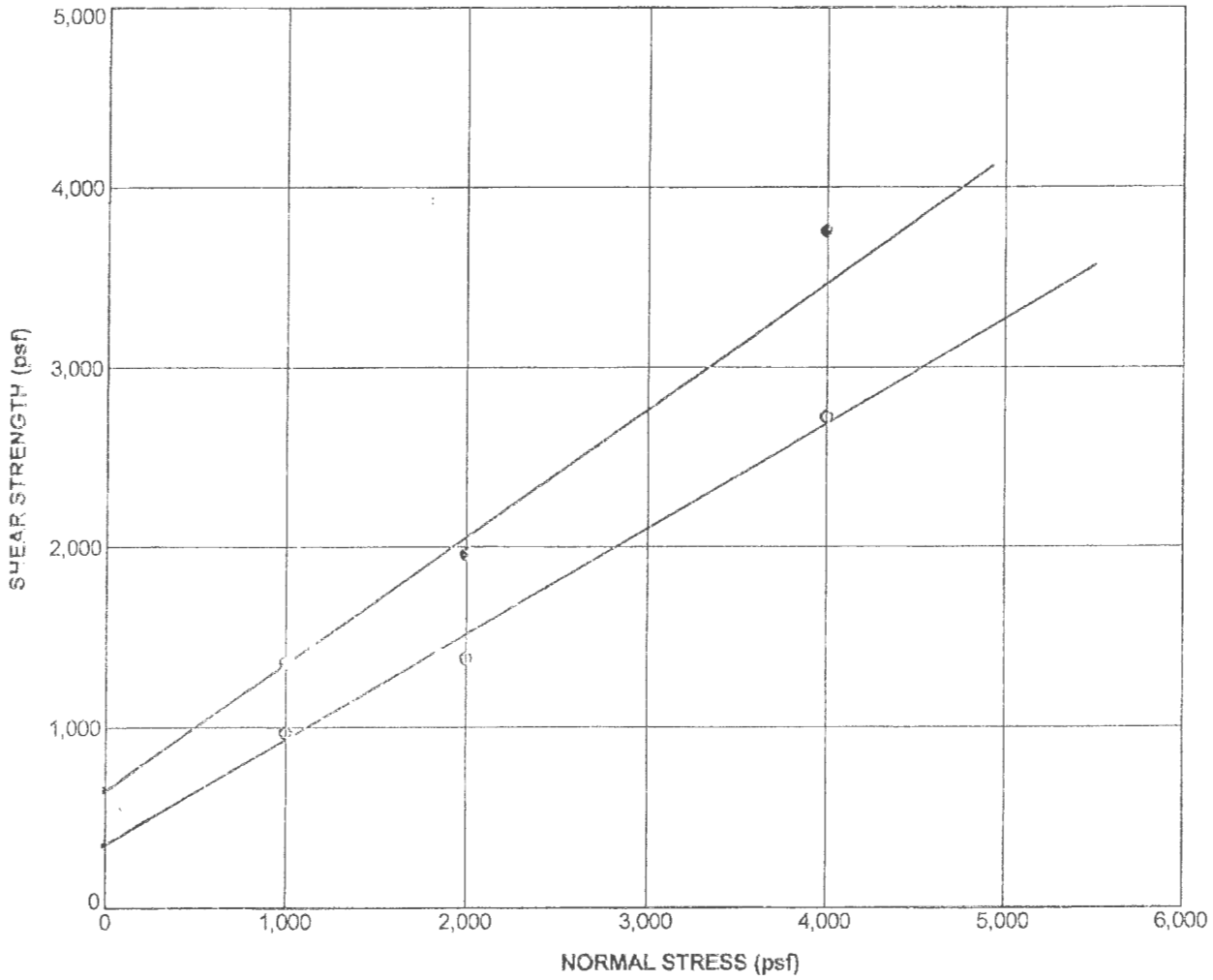
Boring No. B-81	Sample No. D-5	Depth: 40.0 ft
Sample Description:	(Tps) Dark Olive Brown Siltstone	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:
Moisture Content (%): 18.5	Dry Density (pcf): 111.1	Degree of Saturation (%): 100
Sample Type: Undisturbed	Rate of Shear (in./min.): 0.005	

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	600	400
Friction Angle (degrees)	42	31.0

DIRECT SHEAR TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



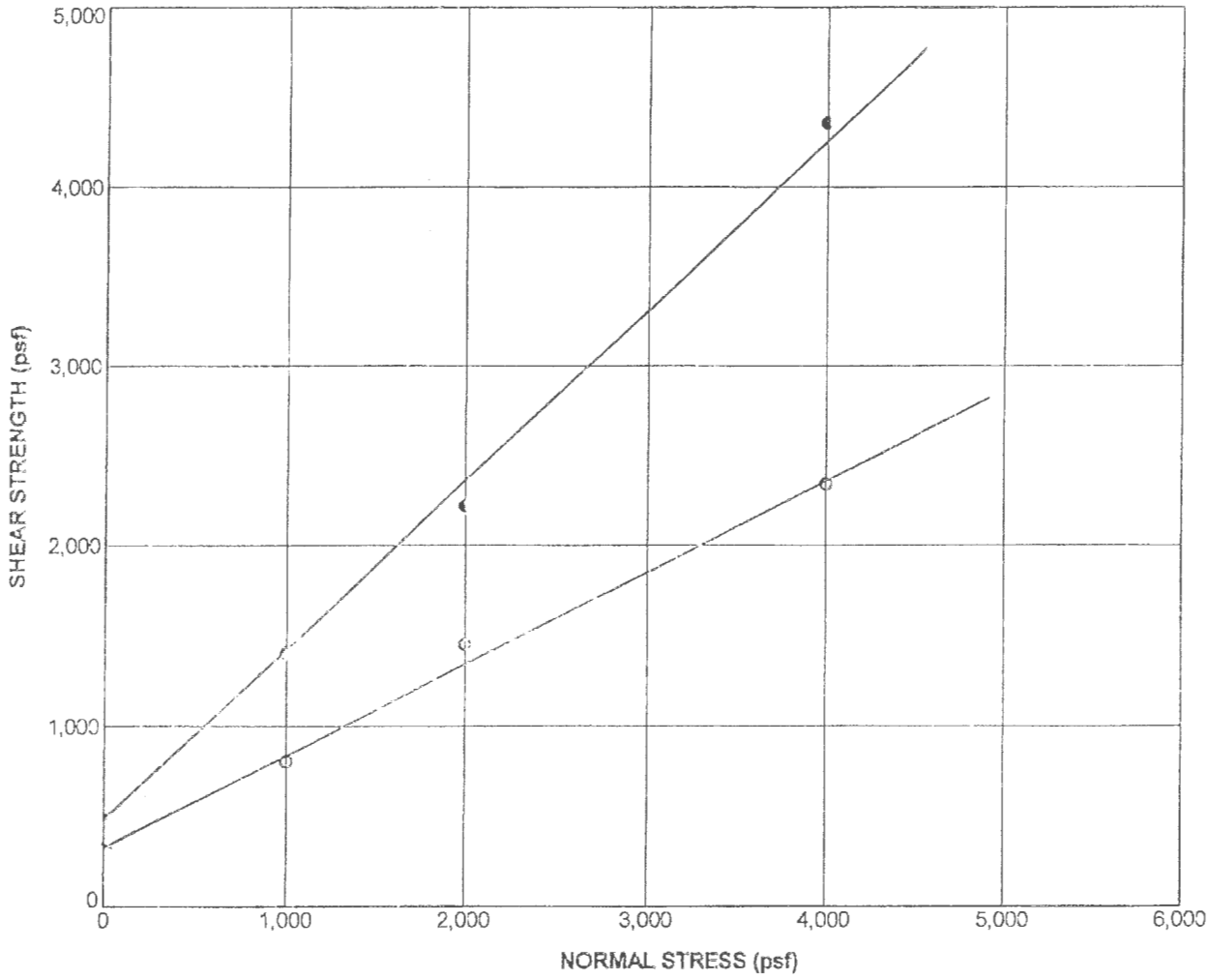
Boring No. B-82	Sample No. D-6	Depth: 40.0 ft
Sample Description:	(Tps) Dark Olive Brown Siltstone	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:
Moisture Content (%): 29.7	Dry Density (pcf): 94.0	Degree of Saturation (%): 100
Sample Type: Undisturbed	Rate of Shear (in./min.): 0.005	

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	650	350
Friction Angle (degrees)	35	30.0

DIRECT SHEAR TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



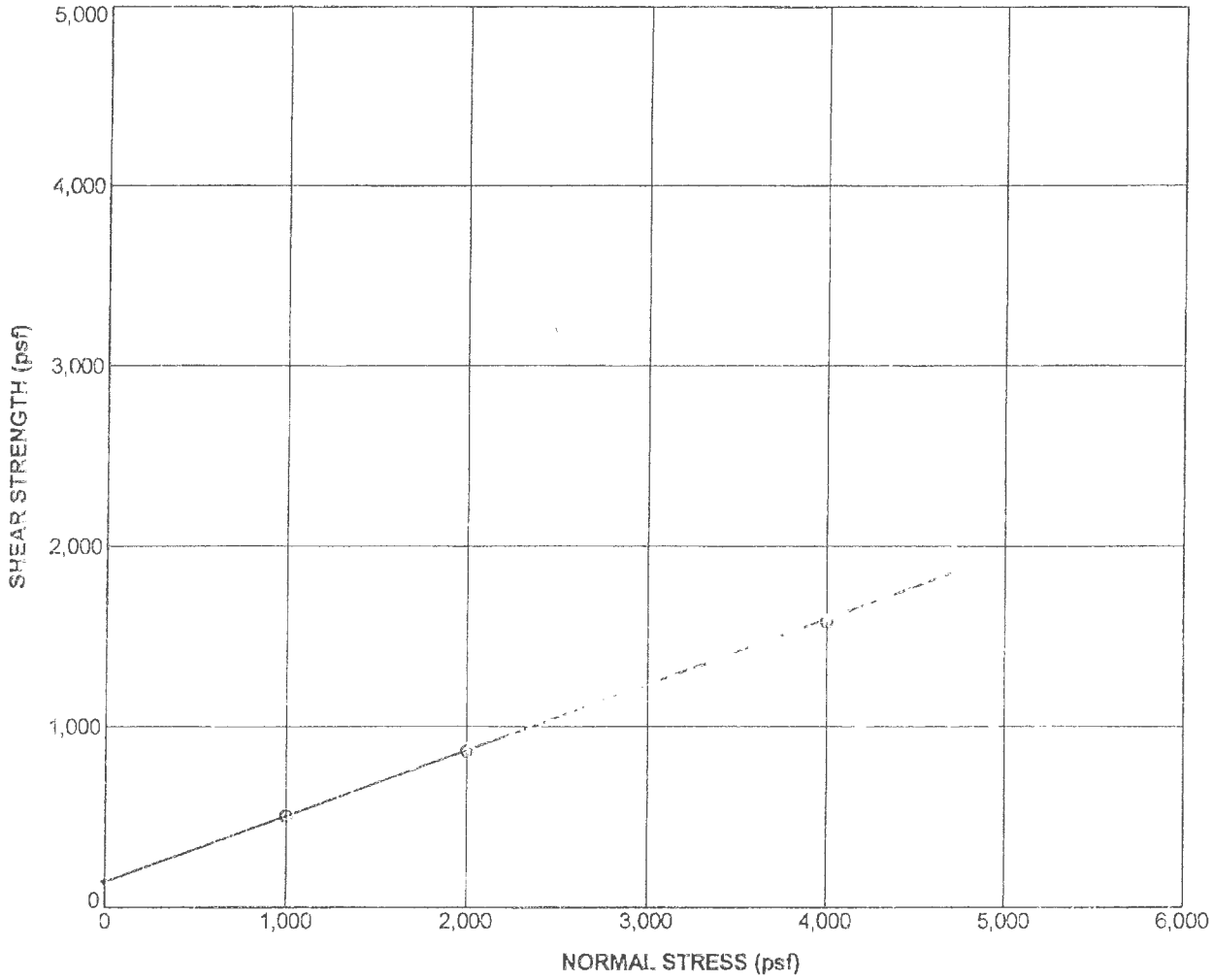
Boring No. B-87	Sample No. D-4	Depth: 30.0 ft
Sample Description: (Tps) Gray Brown Siltstone		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:
Moisture Content (%): 21.4	Dry Density (pcf): 113.4	Degree of Saturation (%): 100
Sample Type: Undisturbed	Rate of Shear (in./min.): 0.005	

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)	500	320
Friction Angle (degrees)	43	27.0

DIRECT SHEAR TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



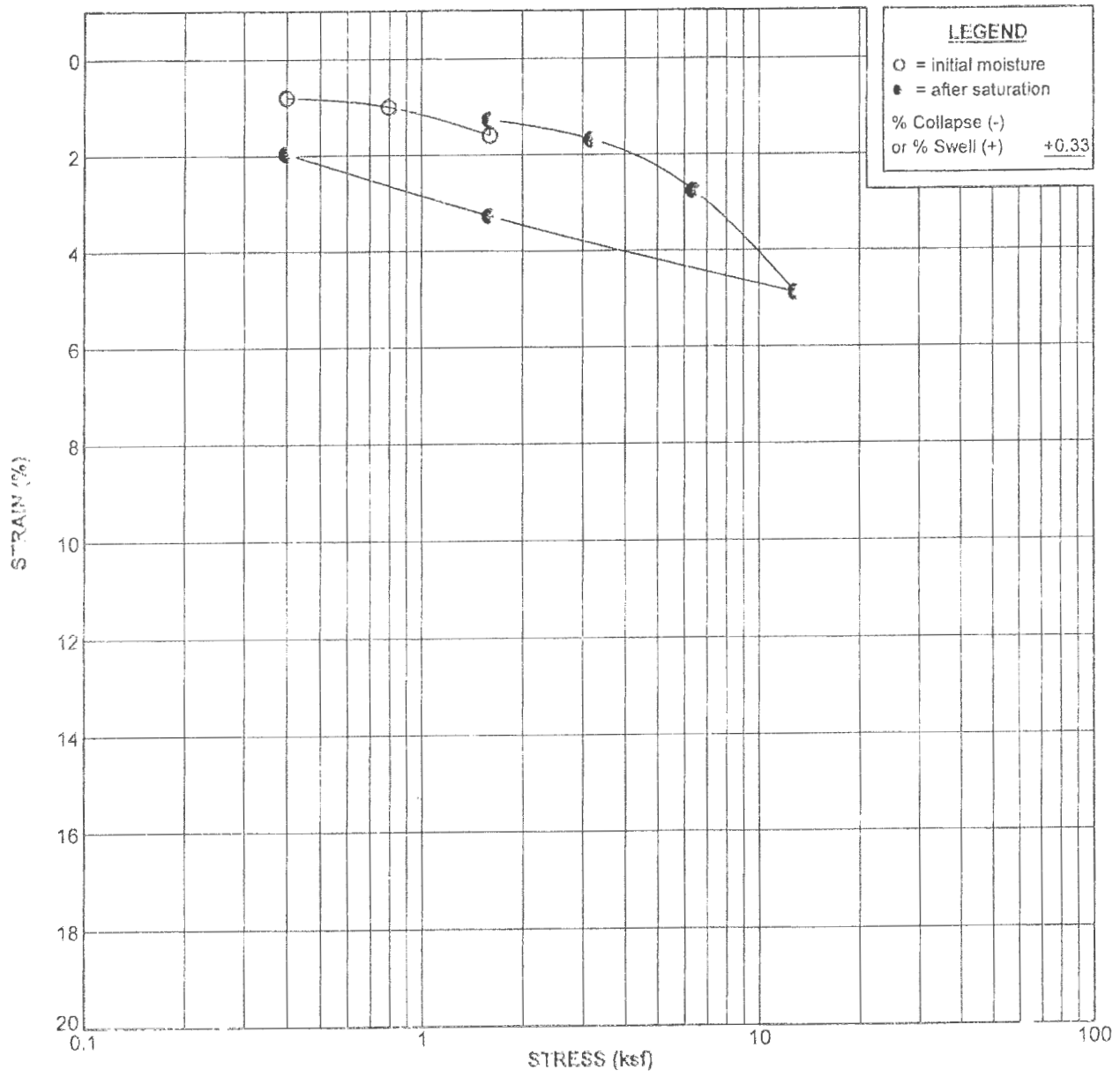
Boring No. B-87		Sample No. SB-1		Depth: 41.0 ft	
Sample Description:	Dark Olive Brown Silty CLAY				
Liquid Limit:	52	Plasticity Index:	33	Percent Passing No. 200 Sieve:	94
Moisture Content (%):	24.9	Dry Density (pcf):	102.7	Degree of Saturation (%):	100
Sample Type:	Remolded	Rate of Shear (in./min.):	0.005		

SHEAR STRENGTH PARAMETERS		
Parameter	Peak ●	Ultimate ○
Cohesion (psf)		150
Friction Angle (degrees)		20.0

DIRECT SHEAR TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



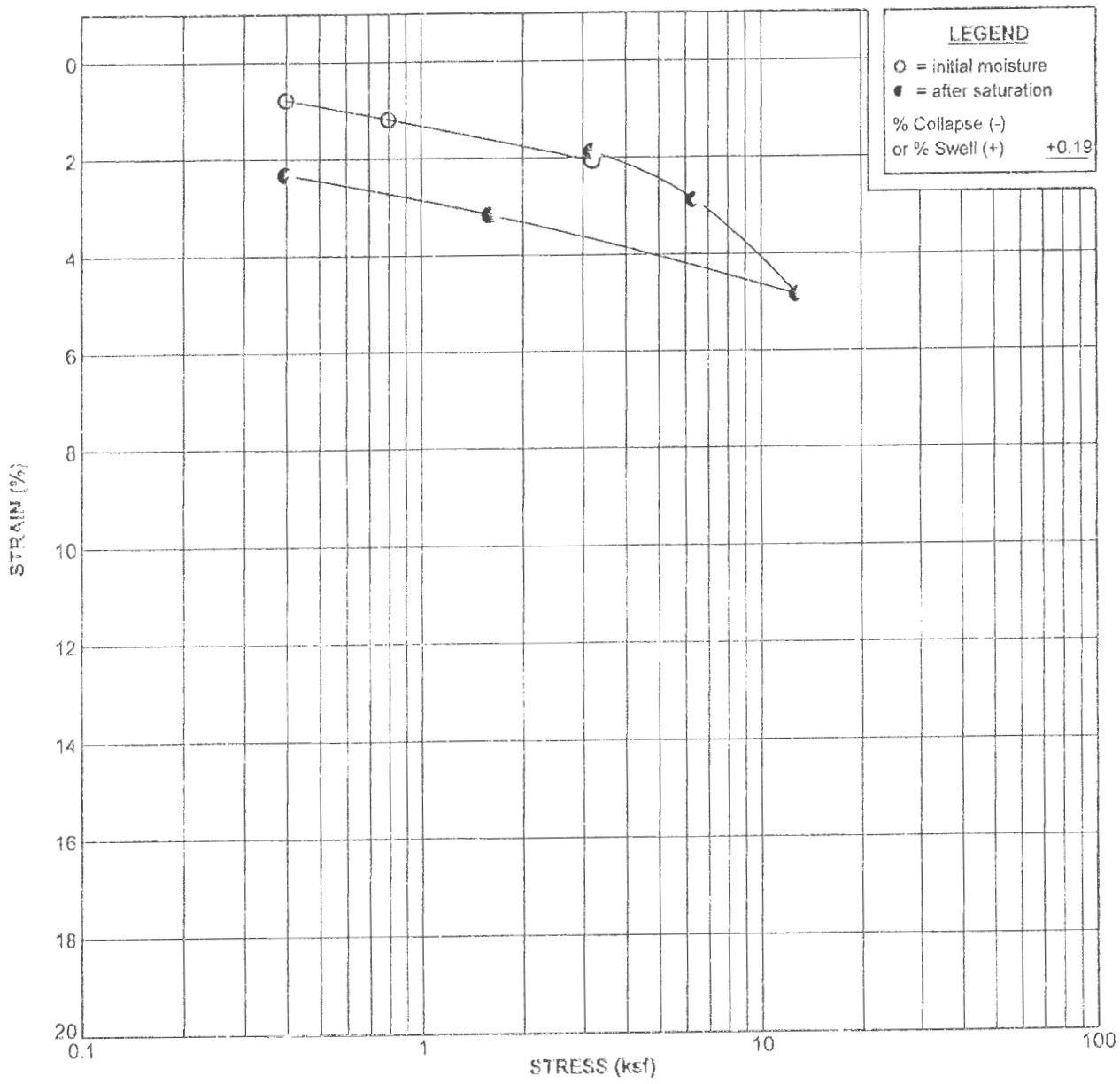
Boring No. B-86	Sample No. D-5	Depth: 25.0 ft
Sample Description:	(Qsw) Brown Sandy CLAY	
Liquid Limit: 47	Plasticity Index: 31	Percent Passing No. 200 Sieve: 63

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	20.6	104.9	91.8	0.606
Final	21.5	106.4	99.5	0.583

CONSOLIDATION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



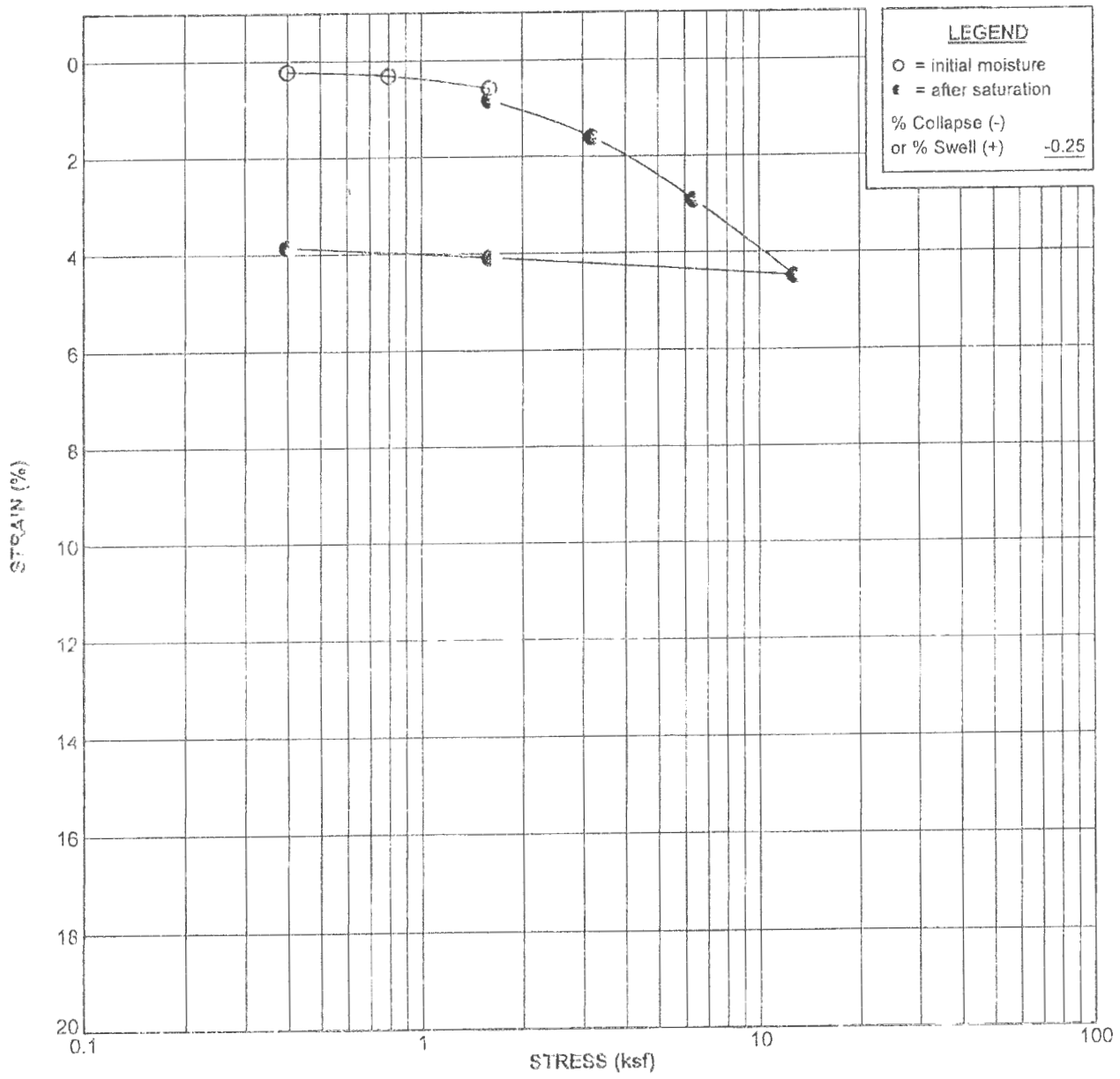
Boring No. B-85	Sample No. D-5	Depth: 25.0 ft
Sample Description:	(Qsw) Brown Sandy Silty CLAY	
Liquid Limit: 42	Plasticity Index: 27	Percent Passing No. 200 Sieve: 62

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	18.8	106.9	88.7	0.570
Final	19.8	109.4	99.7	0.534

CONSOLIDATION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



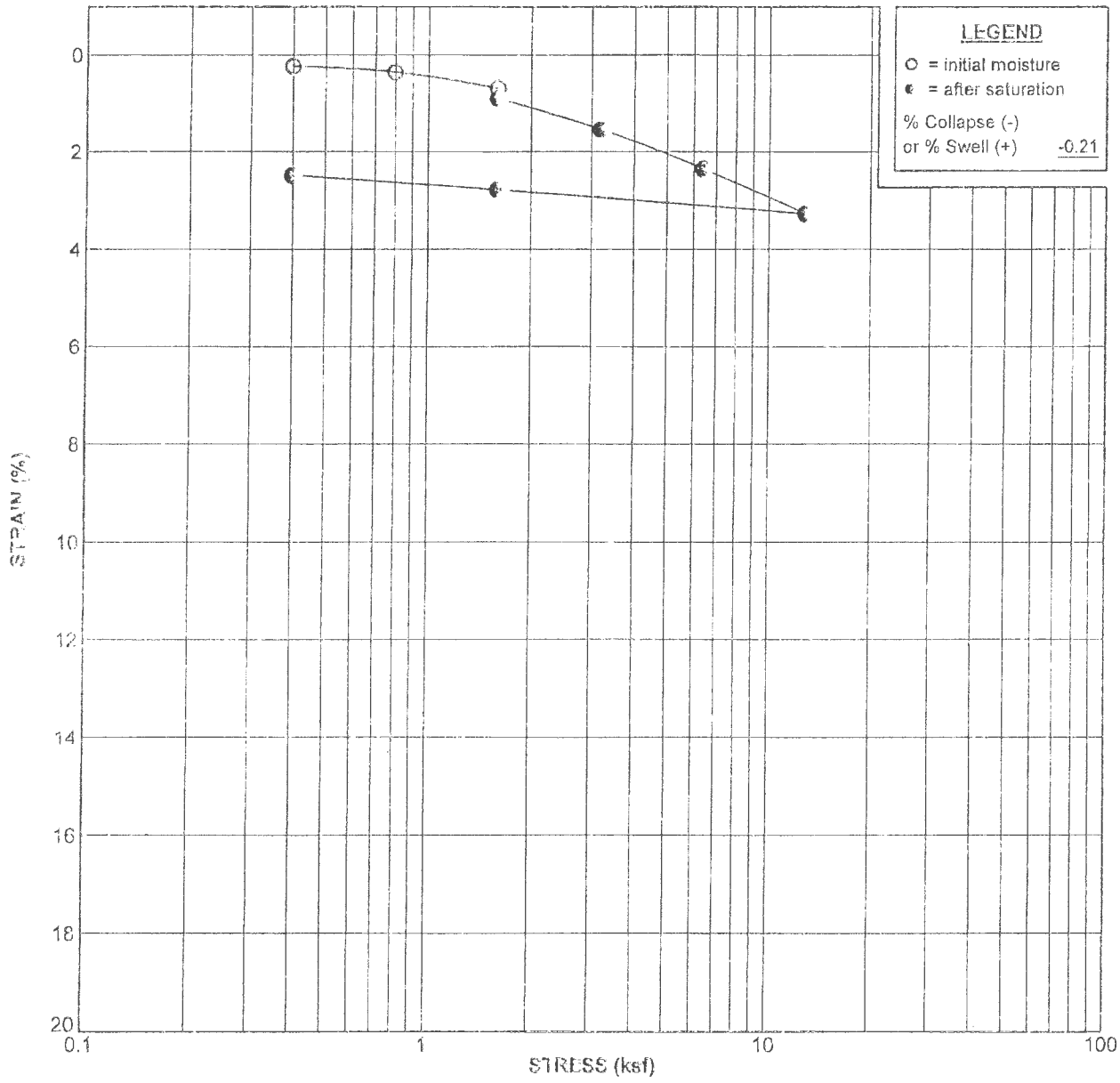
Boring No. H-81	Sample No. D-11	Depth: 32.5 ft
Sample Description:	(Qal/Qalo) Brown Gravelly SAND	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	5.6	107.6	27.6	0.537
Final	15.4	111.8	85.2	0.479

CONSOLIDATION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



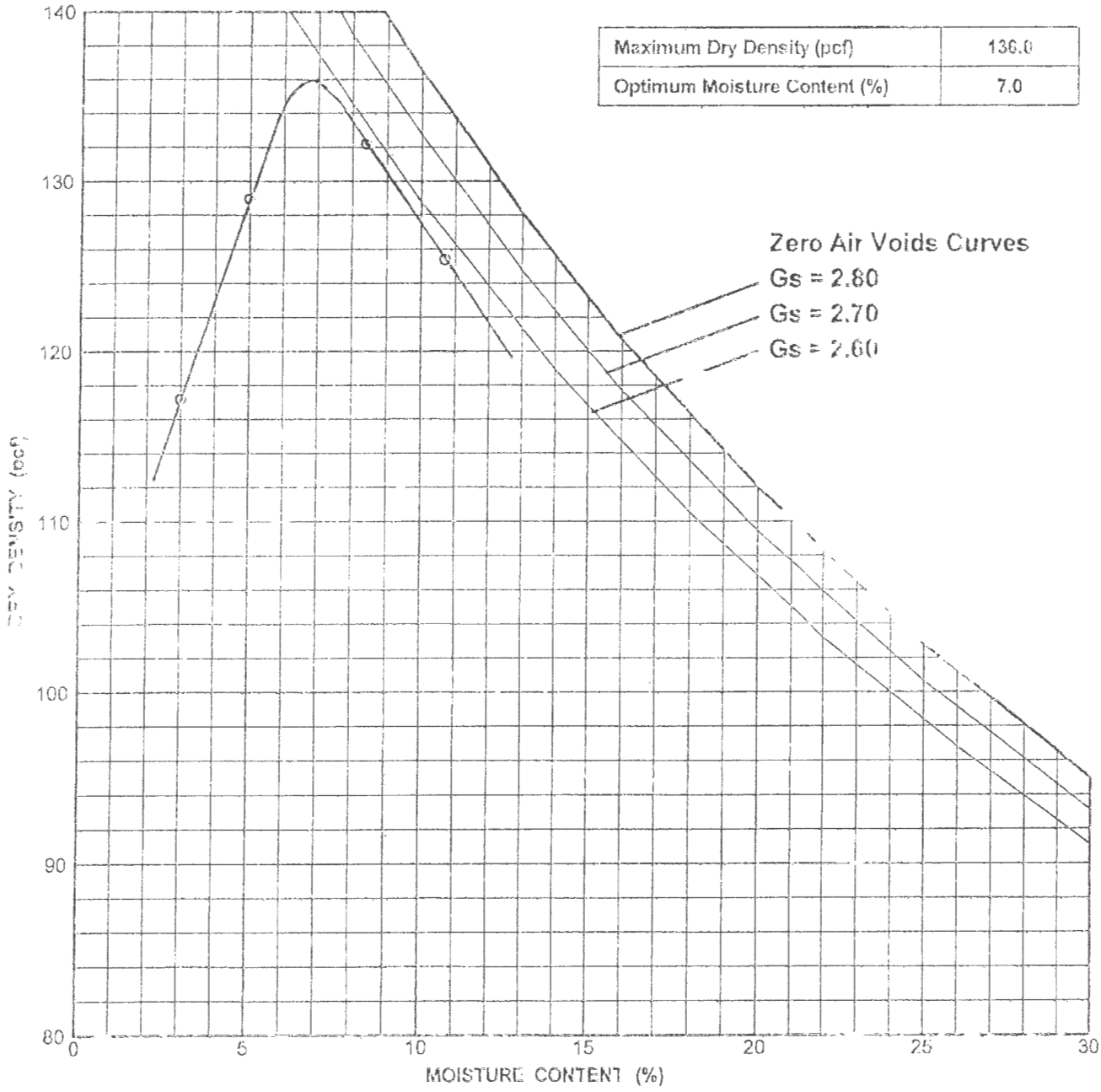
Boring No. H-81	Sample No. D-8	Depth: 25.0 ft
Sample Description:	(Qal/Qalo) Light Brown Silty SAND w/some gravel	
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	9.7	104.2	43.6	0.587
Final	18.4	106.8	88.9	0.548

CONSOLIDATION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



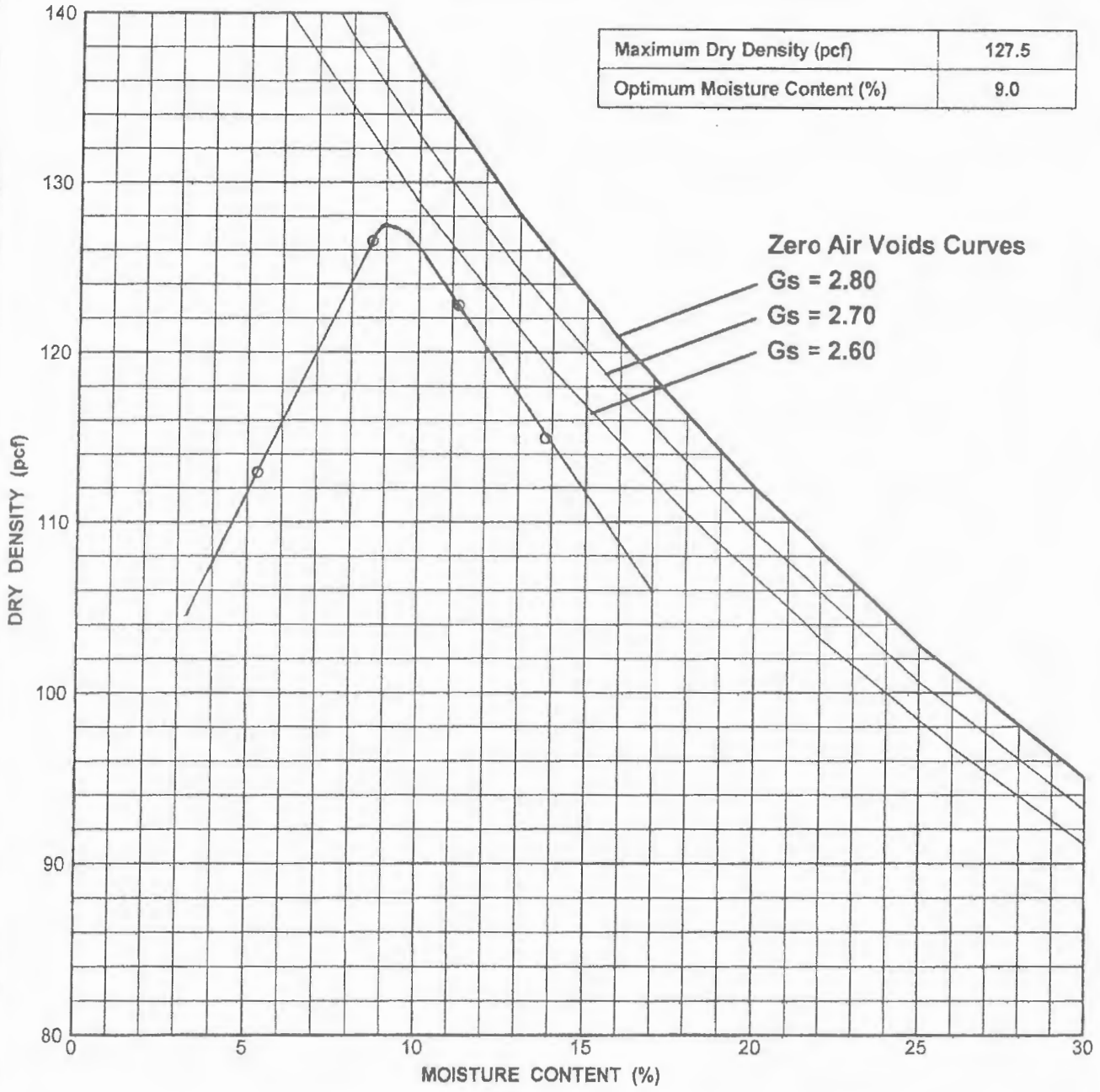
Maximum Dry Density (pcf)	136.0
Optimum Moisture Content (%)	7.0

Boring No. H-81	Sample No. B-1	Depth: 15.0 ft
Sample Description: Brown Silty SAND w/some gravel		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve: 31
Comments: 1557C		

COMPACTION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



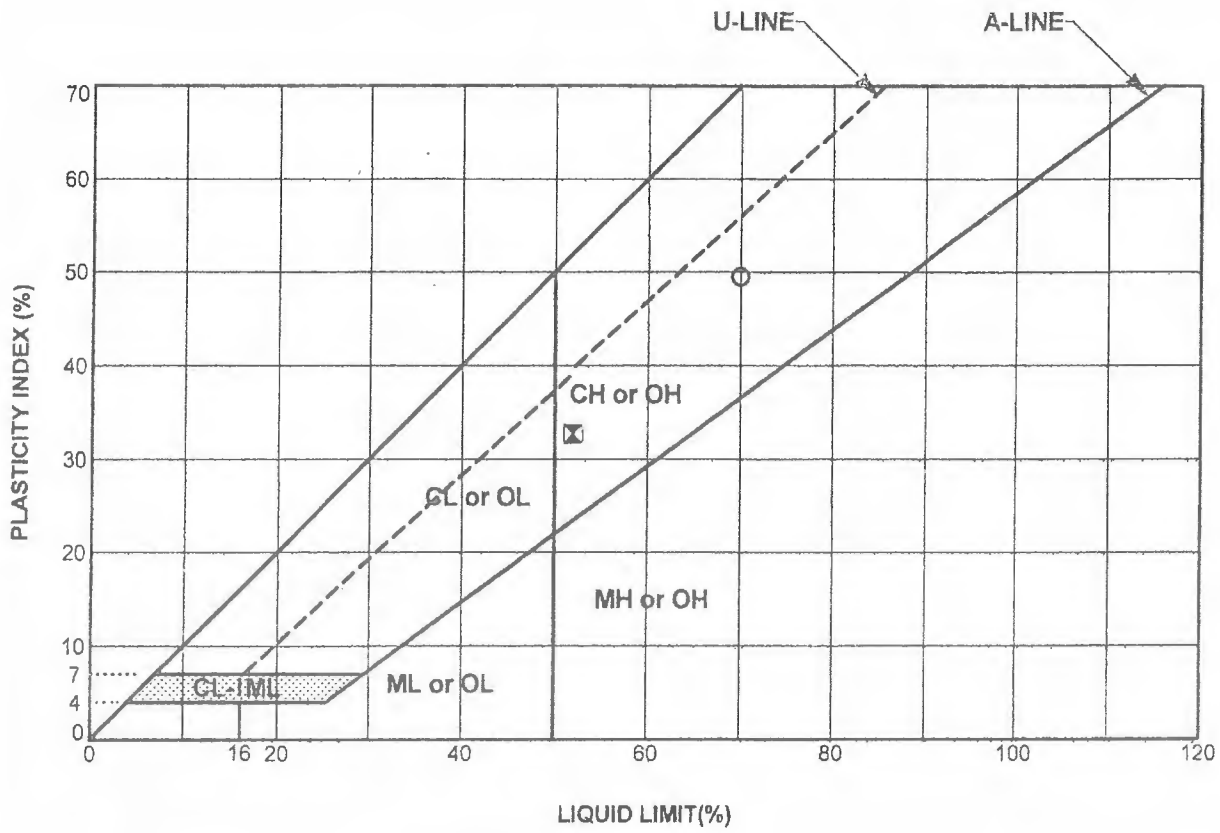
Maximum Dry Density (pcf)	127.5
Optimum Moisture Content (%)	9.0

Boring No. B-83	**Sample No. B-1**	**Depth: 5.0 ft**
Sample Description: Dark Brown Sandy SILT w/some Clay		
Liquid Limit:	**Plasticity Index:**	**Percent Passing No. 200 Sieve:** 65
Comments: 1557A		

COMPACTION TEST RESULTS

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



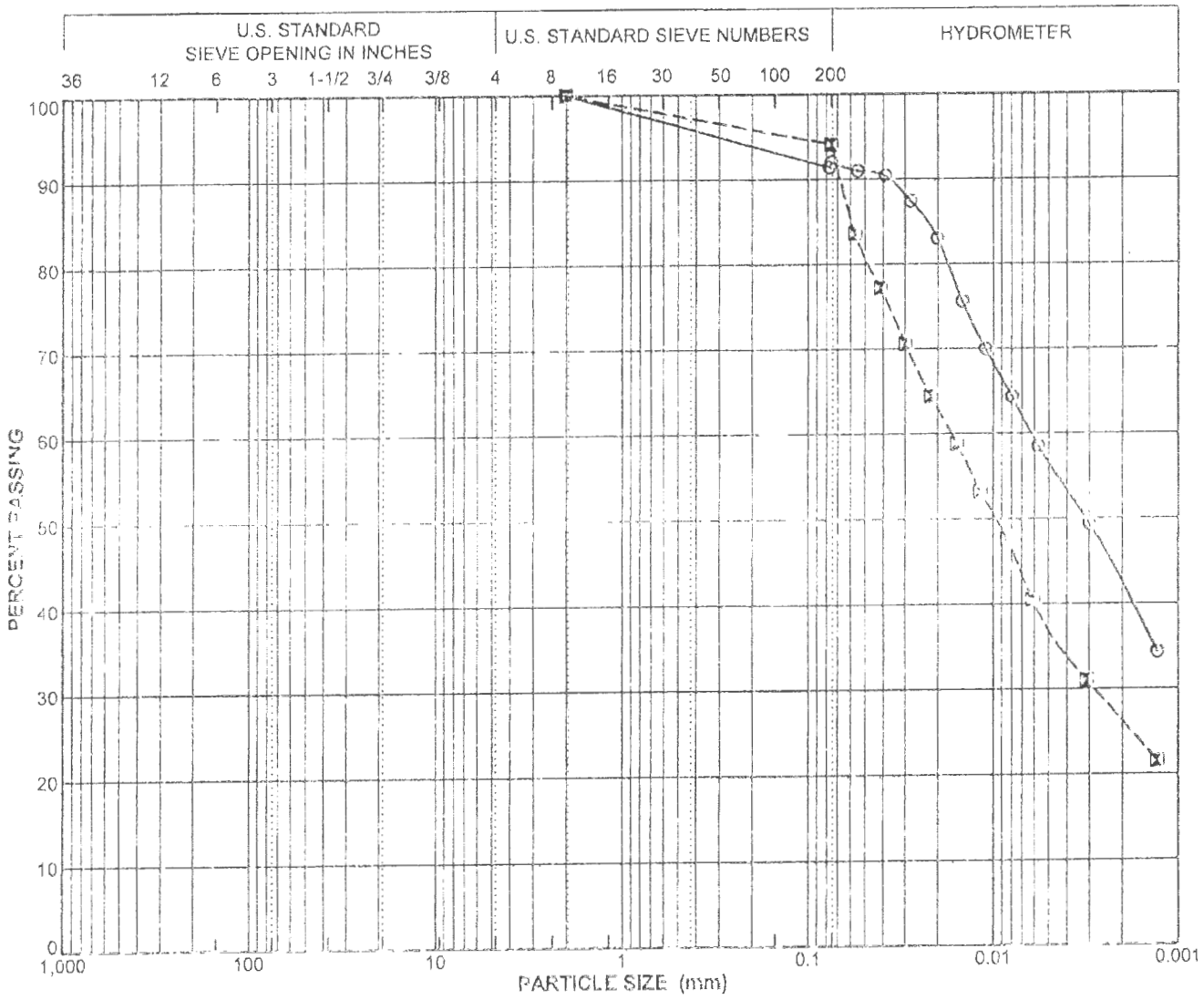
Symbol	Boring Number	Depth (feet)	Sample Number	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
O	B-81	8.0	SB-1	92	70	50	CH	Dark Gray Silty CLAY
⊠	B-87	41.0	SB-1	94	52	33	CH	Dark Olive Brown Silty CLAY

PLASTICITY CHART

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	



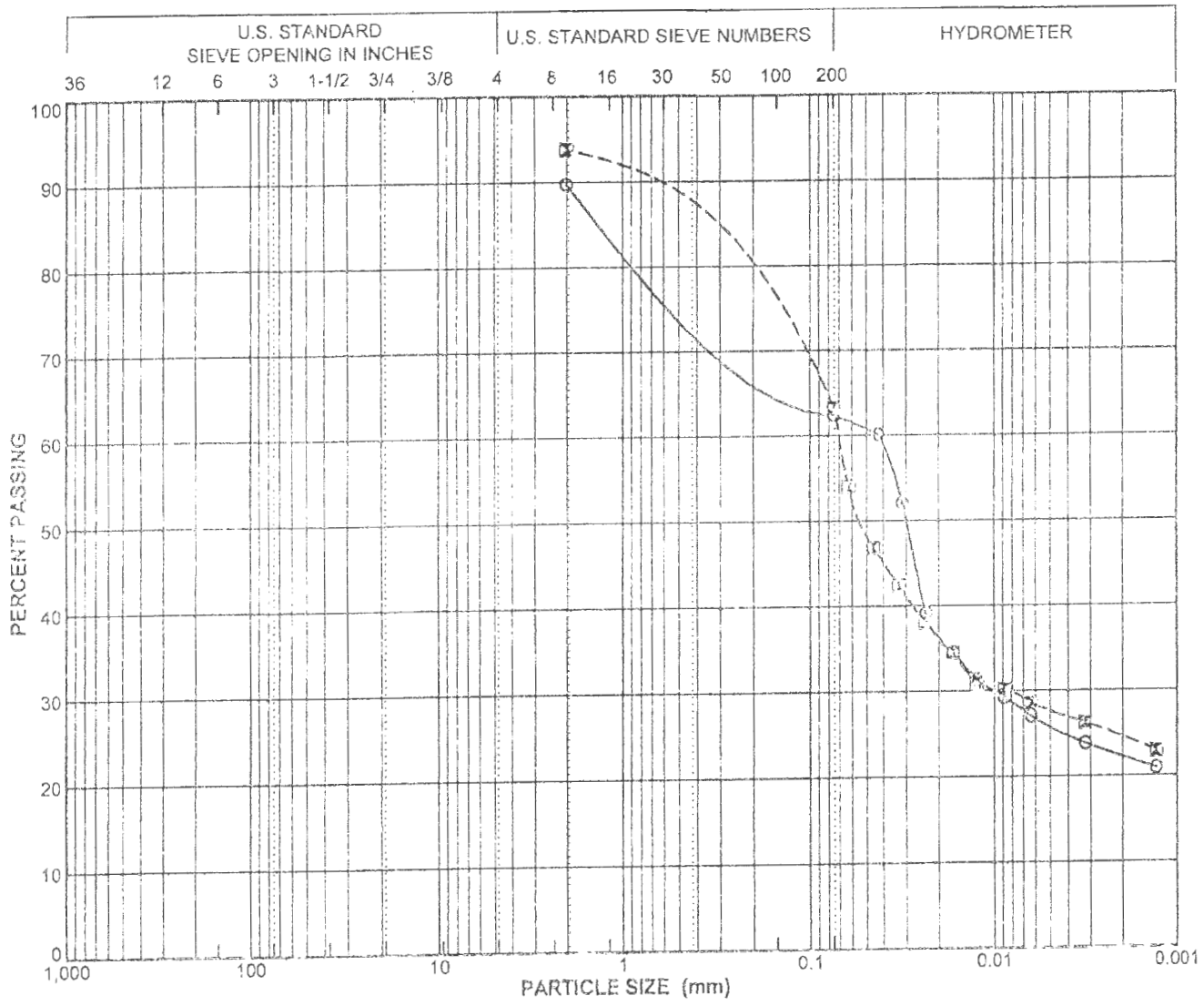
Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
O	B-81	SB-1	8.0		70	50				92	42	CH
⊠	B-87	SB-1	41.0		52	33				94	26	CH

PARTICLE SIZE DISTRIBUTION

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	

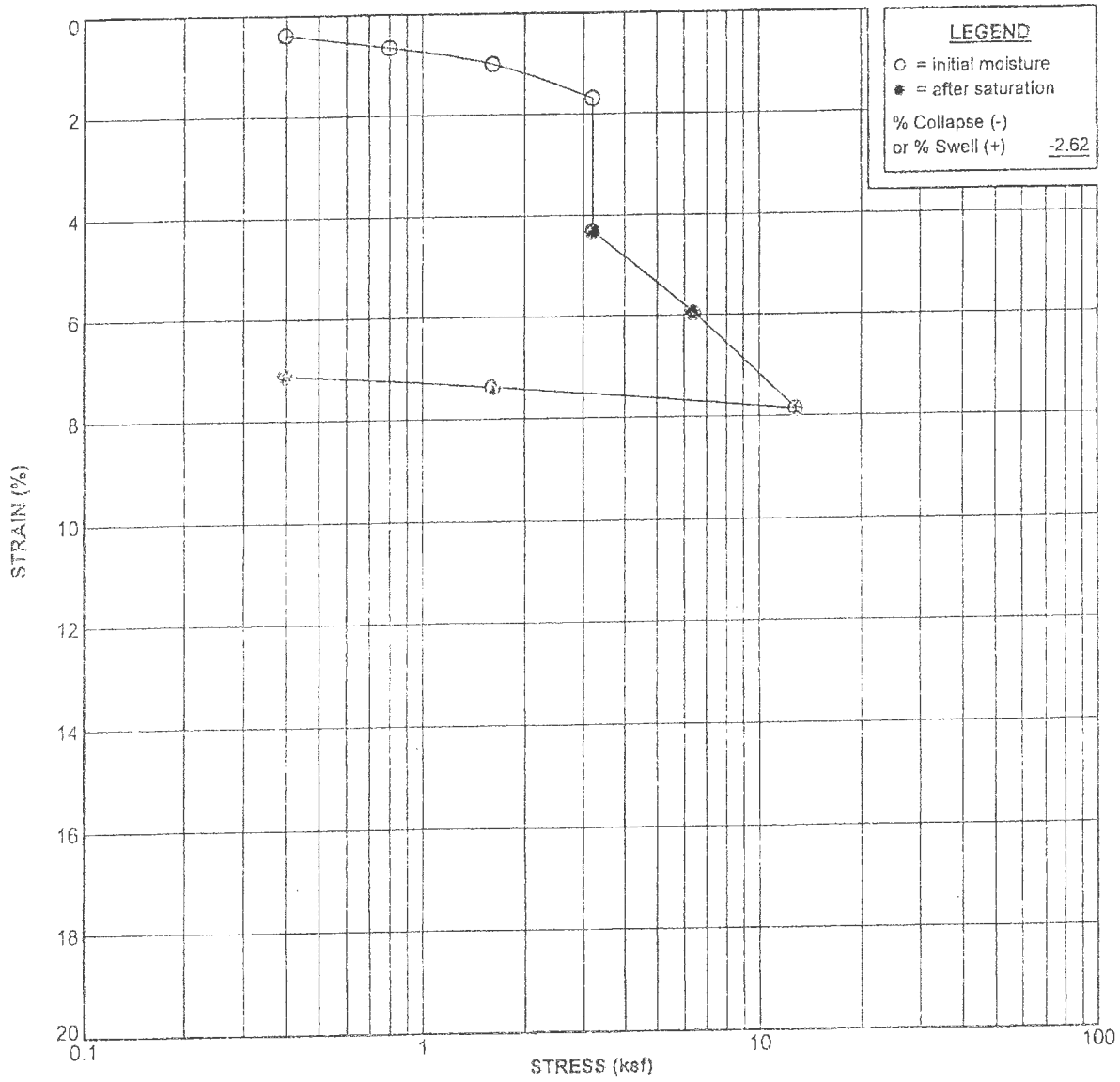


Symbol	Boring Number	Sample Number	Depth (feet)	Field Moisture (%)	LL	PI	Activity PI/-2μ	C_u	C_c	Passing No. 200 Sieve (%)	Passing 2μ (%)	USCS
○	B-85	D-5	25.0	18	42	27				62	22	CL
⊠	B-86	D-5	25.0	21	47	31				63	24	CL

PARTICLE SIZE DISTRIBUTION

ICDC/PA-6 N4B
Irvine, CA
PROJECT NO. 99070-35

NMG Geotechnical, Inc.



Boring No. H-52	Sample No. D-2	Depth: 10.0 ft
Sample Description: SAND		
Liquid Limit:	Plasticity Index:	Percent Passing No. 200 Sieve:

Test Stage	Moisture Content (%)	Dry Density (pcf)	Degree of Saturation (%)	Void Ratio
Initial	5.8	104.0	25.9	0.590
Final	16.3	111.4	89.2	0.484

CONSOLIDATION TEST RESULTS

ICDC PA 6
Irvine, CA
PROJECT NO. 99070-01

NMG Geotechnical, Inc.

APPENDIX D

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.6977°N, 117.7043°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From **Figure 22-1** [1] $S_S = 1.487$ g

From **Figure 22-2** [2] $S_1 = 0.548$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3-1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.487 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.548 g, F_v = 1.500

Equation (11.4-1): $S_{MS} = F_a S_S = 1.000 \times 1.487 = 1.487$ g

Equation (11.4-2): $S_{M1} = F_v S_1 = 1.500 \times 0.548 = 0.822$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

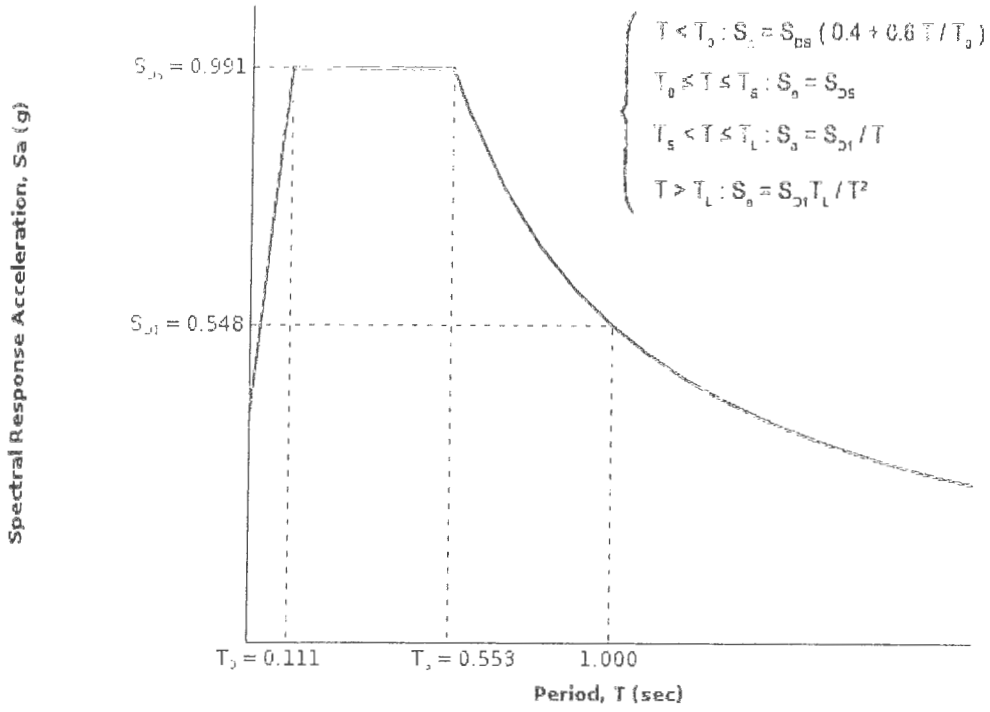
Equation (11.4-3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.487 = 0.991$ g

Equation (11.4-4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.822 = 0.548$ g

Section 11.4.5 — Design Response Spectrum

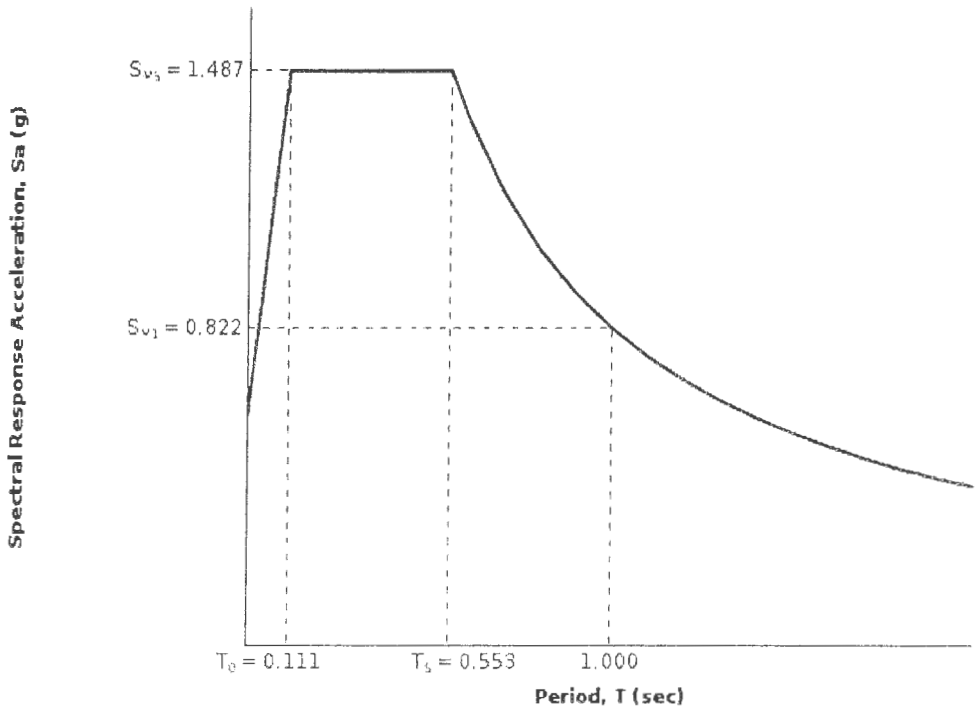
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4-1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.538

Equation (11.8-1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.538 = 0.538$ g

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.538 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.028

From Figure 22-18 [6] C_{R1} = 1.058

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 0.991 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.548 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

*** Deaggregation of Seismic Hazard at One Period of Spectral Accel. ***
*** Data from U.S.G.S. National Seismic Hazards Mapping Project, 2008 version ***
PSHA Deaggregation. %contributions. site: Unnamed long: 117.704 W., lat: 33.698 N.
Vs30(m/s)= 250.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.5939 g. Weight * Computed_Rate_Ex
0.410E-03
#Pr[at least one eq with median motion>=PGA in 50yrs]=0.00015
#This deaggregation corresponds to Mean Hazard w/all GMPEs

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
6.0	5.05	2.421	0.947	1.342	0.133	0.000	0.000	0.000
13.1	5.05	0.202	0.202	0.000	0.000	0.000	0.000	0.000
6.1	5.20	4.740	1.625	2.630	0.486	0.000	0.000	0.000
13.3	5.20	0.532	0.532	0.000	0.000	0.000	0.000	0.000
6.3	5.40	4.475	1.343	2.504	0.628	0.000	0.000	0.000
13.5	5.40	0.729	0.725	0.004	0.000	0.000	0.000	0.000
6.5	5.60	3.989	1.091	2.275	0.623	0.000	0.000	0.000
13.7	5.60	0.900	0.854	0.046	0.000	0.000	0.000	0.000
6.6	5.80	3.397	0.819	2.017	0.561	0.000	0.000	0.000
13.9	5.80	0.986	0.896	0.091	0.000	0.000	0.000	0.000
23.2	5.81	0.090	0.090	0.000	0.000	0.000	0.000	0.000
6.9	6.01	3.544	0.785	2.219	0.541	0.000	0.000	0.000
14.3	6.01	1.198	0.993	0.204	0.000	0.000	0.000	0.000
23.8	6.00	0.166	0.166	0.000	0.000	0.000	0.000	0.000
7.0	6.20	3.868	0.726	2.505	0.637	0.000	0.000	0.000
14.0	6.21	1.937	1.275	0.662	0.000	0.000	0.000	0.000
23.9	6.21	0.297	0.297	0.000	0.000	0.000	0.000	0.000
33.7	6.21	0.062	0.062	0.000	0.000	0.000	0.000	0.000
7.5	6.41	4.119	0.686	2.650	0.783	0.000	0.000	0.000
15.6	6.39	2.584	1.770	0.815	0.000	0.000	0.000	0.000
25.5	6.41	0.348	0.348	0.000	0.000	0.000	0.000	0.000
34.9	6.41	0.133	0.133	0.000	0.000	0.000	0.000	0.000
45.4	6.47	0.100	0.100	0.000	0.000	0.000	0.000	0.000
6.3	6.60	5.334	0.807	3427	1.085	0.015	0.000	0.000
17.4	6.60	4.305	2.912	1.392	0.000	0.000	0.000	0.000
24.1	6.61	0.619	0.580	0.039	0.000	0.000	0.000	0.000
35.1	6.60	0.097	0.097	0.000	0.000	0000	0.000	0.000
45.6	6.58	0.188	0.188	0.000	0.000	0.000	0.000	0.000
6.4	6.80	5.372	0.732	3.352	1.275	0.013	0.000	0.000
17.5	6.77	5.246	3.440	1.806	0.000	0.000	0.000	0.000
24.1	6.80	0.820	0.727	0.093	0.000	0.000	0.000	0.000
34.0	6.81	0.150	0.147	0.003	0.000	0.000	0.000	0.000
46.0	6.76	0.254	0.254	0.000	0.000	0.000	0.000	0.000
55.8	6.79	0.092	0.092	0.000	0.000	0.000	0.000	0.000
6.6	6.95	5.568	0.708	3.300	1.524	0.036	0.000	0.000
17.9	6.97	5.459	3.017	2.441	0.001	0.000	0.000	0.000
25.1	6.99	1.242	0.903	0.339	0.000	0.000	0.000	0.000
31.0	6.99	0.188	0.159	0.029	0.000	0.000	0.000	0.000
45.8	7.02	0.239	0.239	0.001	0.000	0.000	0.000	0.000
55.7	7.02	0.404	0.404	0.000	0.000	0.000	0.000	0.000
65.7	7.05	0.057	0.057	0.000	0.000	0.000	0.000	0.000
6.7	7.13	2.418	0.269	1.237	0.845	0.066	0.000	0.000
18.0	7.19	3.269	1.326	1.943	0.000	0.000	0.000	0.000
23.7	7.17	0.790	0.434	0.356	0.000	0.000	0.000	0.000
30.1	7.14	0.194	0.129	0.065	0.000	0.000	0.000	0.000
44.2	7.19	0.352	0.320	0.032	0.000	0.000	0.000	0.000
55.4	7.25	0.484	0.482	0.002	0.000	0.000	0.000	0.000
65.6	7.20	0.074	0.074	0.000	0.000	0.000	0.000	0.000
71.0	7.24	0.051	0.051	0000	0.000	0.000	0.000	0.000
6.7	7.31	0.218	0.023	0.109	0.079	0.008	0.000	0.000
18.0	7.37	1.498	0.649	0.839	0.010	0.000	0.000	0.000
23.7	7.38	0.578	0.290	0.288	0.000	0000	0.000	0.000
44.0	7.34	0.353	0.294	0.059	0.000	0.000	0.000	0.000

57.2	7.43	0.816	0.808	0.008	0.000	0.000	0.000	0.000
66.0	7.37	0.290	0.290	0.000	0.000	0.000	0.000	0.000
71.3	7.42	0.116	0.116	0.000	0.000	0.000	0.000	0.000
18.0	7.60	1.921	0.651	1.199	0.071	0.000	0.000	0.000
25.7	7.56	1.262	0.595	0.666	0.001	0.000	0.000	0.000
42.4	7.56	0.131	0.104	0.027	0.000	0.000	0.000	0.000
56.9	7.60	1.188	1.107	0.081	0.000	0.000	0.000	0.000
66.0	7.60	0.686	0.686	0.000	0.000	0.000	0.000	0.000
70.9	7.60	0.085	0.085	0.000	0.000	0.000	0.000	0.000
18.0	7.77	2.188	0.539	1.409	0.240	0.000	0.000	0.000
28.5	7.74	0.649	0.296	0.352	0.001	0.000	0.000	0.000
41.9	7.74	0.269	0.196	0.073	0.000	0.000	0.000	0.000
56.2	7.80	0.764	0.627	0.137	0.000	0.000	0.000	0.000
65.9	7.79	0.397	0.393	0.005	0.000	0.000	0.000	0.000
70.3	7.81	0.591	0.591	0.000	0.000	0.000	0.000	0.000
18.0	7.92	0.228	0.055	0.141	0.032	0.000	0.000	0.000
55.9	7.99	0.070	0.053	0.016	0.000	0.000	0.000	0.000
65.9	7.98	0.821	0.726	0.094	0.000	0.000	0.000	0.000
70.3	7.99	0.424	0.402	0.022	0.000	0.000	0.000	0.000
65.9	8.21	0.120	0.099	0.021	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 100.0
Mean src-site R= 16.4 km; M= 6.55; eps0= 1.39. Mean calculated for all sources.
Modal src-site R= 6.6 km; M= 6.95; eps0= 0.75 from peak (R,M) bin
MODE R*= 17.6km; M*= 6.77; EPS.INTERVAL:> 2 sigma % CONTRIB.= 3.440

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	16.30	16.5	6.96	1.29
California B-faults GR	11.17	11.2	6.73	1.17
California A-faults	29.05	29.7	7.27	1.76
CA Compr. crustal gridded	43.37	8.8	5.86	1.24

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
San Joaquin Hills Char	8.03	6.7	6.98	0.72	-150.5
San Joaquin Hills GR	8.07	6.7	6.73	0.87	-148.4
Elsinore; Glen Ivy aPriori	4.50	18.0	6.82	1.81	36.0
Elsinore;GI+T aPriori	3.19	18.0	7.26	1.46	36.0
Elsinore; Whittier MoBal	2.37	17.9	6.95	1.69	30.2
Elsinore;GI MoBal	2.65	18.0	6.78	1.83	36.0

#*********End of deaggregation corresponding to Mean Hazard w/all GMPEs *********#

PSHA Deaggregation. %contributions. site: Unnamed long: 117.704 W., lat: 33.698 N.
Vs30(m/s)= 250.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.5939 g. Weight * Computed_Rate_Ex
0.193E-03
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00000
#This deaggregation corresponds to BooreAtkinson 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
5.3	5.05	0.793	0.553	0.239	0.000	0.000	0.000	0.000
5.4	5.20	1.508	0.912	0.596	0.000	0.000	0.000	0.000
12.8	5.22	0.031	0.031	0.000	0.000	0.000	0.000	0.000
5.6	5.40	1.372	0.719	0.653	0.000	0.000	0.000	0.000
13.4	5.41	0.083	0.083	0.000	0.000	0.000	0.000	0.000
5.8	5.60	1.212	0.581	0.631	0.000	0.000	0.000	0.000
14.0	5.61	0.153	0.153	0.000	0.000	0.000	0.000	0.000
6.0	5.80	1.048	0.478	0.570	0.000	0.000	0.000	0.000
14.3	5.80	0.217	0.217	0.000	0.000	0.000	0.000	0.000
23.7	5.82	0.044	0.044	0.000	0.000	0.000	0.000	0.000
6.3	6.00	1.012	0.513	0.499	0.000	0.000	0.000	0.000

14.8	6.01	0.311	0.311	0.000	0.000	0.000	0.000	0.000
24.2	6.00	0.095	0.095	0.000	0.000	0.000	0.000	0.000
6.5	6.20	1.013	0.562	0.451	0.000	0.000	0.000	0.000
14.8	6.21	0.597	0.570	0.027	0.000	0.000	0.000	0.000
24.4	6.21	0.172	0.172	0.000	0.000	0.000	0.000	0.000
33.8	6.21	0.057	0.057	0.000	0.000	0.000	0.000	0.000
7.1	6.40	1.023	0.573	0.449	0.000	0.000	0.000	0.000
16.1	6.40	1.154	0.948	0.206	0.000	0.000	0.000	0.000
25.8	6.41	0.218	0.218	0.000	0.000	0.000	0.000	0.000
35.2	6.41	0.122	0.122	0.000	0.000	0.000	0.000	0.000
45.4	6.47	0.100	0.100	0.000	0.000	0.000	0.000	0.000
6.3	6.61	1.185	0.373	0.784	0.028	0.000	0.000	0.000
17.5	6.59	2.854	1.754	1.101	0.000	0000	0.000	0.000
24.0	6.61	0.505	0.467	0.038	0.000	0.000	0.000	0.000
35.2	6.60	0.094	0.094	0.000	0.000	0.000	0.000	0.000
45.6	6.58	0.188	0.188	0.000	0.000	0.000	0.000	0.000
6.4	6.80	1.271	0.321	0.875	0.075	0.000	0.000	0.000
17.7	6.77	3.822	2.374	1.448	0.000	0.000	0.000	0.000
24.2	6.80	0.658	0.576	0.082	0.000	0.000	0.000	0.000
34.3	6.80	0.129	0.126	0.003	0.000	0.000	0.000	0.000
46.0	6.76	0.254	0.254	0.000	0.000	0.000	0.000	0.000
55.8	6.79	0.092	0.092	0.000	0.000	0.000	0.000	0.000
6.5	6.95	1.327	0.262	0.918	0.147	0.000	0.000	0.000
17.9	6.97	3.869	1.906	1.962	0.001	0.000	0.000	0.000
25.2	6.99	1.048	0.726	0.322	0.000	0.000	0.000	0.000
31.5	6.99	0.129	0.109	0.020	0.000	0.000	0.000	0.000
45.8	7.02	0.239	0.238	0.001	0.000	0.000	0.000	0.000
55.7	7.02	0.404	0.404	0.000	0.000	0.000	0.000	0.000
65.7	7.05	0.057	0.057	0.000	0.000	0.000	0.000	0.000
6.7	7.13	0.581	0.090	0.364	0.127	0.000	0.000	0.000
18.0	7.18	2.062	0.724	1.338	0.000	0.000	0.000	0.000
23.8	7.17	0.634	0.323	0.311	0.000	0.000	0.000	0.000
30.2	7.15	0.108	0.071	0.037	0.000	0.000	0.000	0.000
44.2	7.19	0.343	0.310	0.032	0.000	0.000	0.000	0.000
55.4	7.25	0.484	0.482	0.002	0.000	0.000	0.000	0.000
65.6	7.20	0.074	0.074	0.000	0.000	0.000	0.000	0.000
71.0	7.24	0.051	0.051	0.000	0.000	0.000	0.000	0.000
6.7	7.31	0.053	0.008	0.033	0.012	0000	0.000	0.000
18.0	7.36	0.996	0.344	0.641	0.010	0.000	0.000	0.000
23.7	7.38	0.438	0.192	0.246	0.000	0.000	0.000	0.000
44.0	7.34	0.336	0.277	0.059	0.000	0.000	0.000	0.000
57.3	7.43	0.813	0.805	0.008	0.000	0.000	0.000	0.000
66.0	7.37	0.290	0.290	0.000	0.000	0.000	0.000	0.000
71.3	7.42	0.116	0.116	0.000	0.000	0.000	0.000	0.000
18.0	7.58	0.997	0.283	0.655	0.059	0.000	0.000	0.000
26.0	7.56	0.904	0.386	0.517	0.001	0.000	0.000	0.000
42.4	7.56	0.122	0.095	0.027	0.000	0.000	0.000	0.000
56.9	7.60	1.150	1.069	0.081	0.000	0.000	0.000	0.000
66.0	7.60	0.685	0.685	0.000	0.000	0.000	0.000	0.000
70.9	7.60	0.084	0.084	0.000	0.000	0.000	0.000	0.000
18.0	7.76	1.314	0.327	0.852	0.136	0.000	0.000	0.000
28.6	7.74	0.461	0.189	0.271	0.001	0.000	0.000	0.000
41.9	7.74	0.232	0.159	0.073	0.000	0.000	0.000	0.000
56.2	7.79	0.712	0.575	0.137	0.000	0.000	0.000	0.000
65.9	7.79	0.378	0.374	0.005	0.000	0.000	0.000	0.000
70.3	7.81	0.582	0.582	0.000	0.000	0.000	0.000	0.000
18.0	7.92	0.121	0.028	0.078	0.016	0.000	0.000	0.000
41.9	7.91	0.029	0.019	0.010	0.000	0.000	0.000	0.000
55.9	7.99	0.062	0.045	0.016	0.000	0.000	0.000	0.000
65.9	7.98	0.759	0.665	0094	0.000	0.000	0.000	0.000
70.3	7.99	0.388	0.366	0.022	0.000	0.000	0.000	0.000
65.9	8.20	0.105	0.084	0.021	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 47.1
Mean src-site R= 23.4 km; M= 6.80; eps0= 1.60. Mean calculated for all sources.
Modal src-site R= 17.9 km; M= 6.97; eps0= 1.60 from peak (R,M) bin
MODE R*= 17.7km; M*= 6.76; EPS.INTERVAL:> 2 sigma % CONTRIB.= 2.374

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	8.09	22.9	6.97	1.62
California B-faults GR	4.20	16.6	6.74	1.59
California A-faults	21.99	32.7	7.28	1.77
CA Compr. crustal gridded	12.72	9.3	5.87	1.31

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
San Joaquin Hills Char	1.92	6.7	6.98	1.01	-150.5
San Joaquin Hills GR	1.85	6.7	6.74	1.15	-148.4
Elsinore; Glen Ivy aPriori	3.34	18.0	6.81	1.72	36.0
Elsinore;GI+T aPriori	2.03	18.0	7.25	1.39	36.0
Elsinore; Whittier MoBal	1.69	17.9	6.95	1.61	30.2
Elsinore;GI MoBal	1.98	18.0	6.78	1.74	36.0

#*********End of deaggregation corresponding to BooreAtkinson 2008 *********#

PSHA Deaggregation. %contributions. site: Unnamed long: 117.704 W., lat: 33.698 N.
Vs30(m/s)= 250.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.5939 g. Weight * Computed_Rate_Ex
0.561E-04
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00000
#This deaggregation corresponds to Campbell-Bozorgnia 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
5.9	5.05	0.327	0.270	0.057	0.000	0.000	0.000	0.000
6.2	5.20	0.770	0.589	0.181	0.000	0.000	0.000	0.000
12.5	5.22	0.036	0.036	0.000	0.000	0.000	0.000	0.000
6.5	5.40	0.905	0.668	0.237	0.000	0.000	0.000	0.000
13.0	5.41	0.101	0.101	0.000	0.000	0.000	0.000	0.000
6.7	5.60	0.877	0.621	0.256	0.000	0.000	0.000	0.000
13.4	5.60	0.159	0.159	0.000	0.000	0.000	0.000	0.000
6.8	5.80	0.726	0.462	0.264	0.000	0.000	0.000	0.000
13.6	5.80	0.170	0.170	0.000	0.000	0.000	0.000	0.000
7.0	6.01	0.739	0.495	0.244	0.000	0.000	0.000	0.000
13.9	6.01	0.205	0.205	0.000	0.000	0.000	0.000	0.000
22.9	6.01	0.009	0.009	0.000	0.000	0.000	0.000	0.000
7.0	6.20	0.854	0.562	0.292	0.000	0.000	0.000	0.000
13.3	6.20	0.318	0.318	0.000	0.000	0.000	0.000	0.000
23.0	6.21	0.023	0.023	0.000	0.000	0.000	0.000	0.000
7.5	6.41	0.987	0.568	0.419	0.000	0.000	0.000	0.000
14.7	6.38	0.270	0.263	0.007	0.000	0.000	0.000	0.000
25.1	6.42	0.030	0.030	0.000	0.000	0.000	0.000	0.000
6.4	6.60	1.731	0.379	1.132	0.220	0.000	0.000	0.000
15.1	6.60	0.061	0.060	0.001	0.000	0.000	0.000	0.000
25.6	6.60	0.031	0.031	0.000	0.000	0.000	0.000	0.000
6.4	6.80	1.634	0.322	1.086	0.226	0.000	0.000	0.000
14.2	6.80	0.068	0.064	0.004	0.000	0.000	0.000	0.000
24.9	6.78	0.031	0.031	0.000	0.000	0.000	0.000	0.000
6.6	6.95	1.665	0.261	1.080	0.325	0.000	0.000	0.000
16.0	6.99	0.031	0.029	0.001	0.000	0.000	0.000	0.000
26.4	6.95	0.016	0.015	0.000	0.000	0.000	0.000	0.000
30.3	7.01	0.017	0.017	0.000	0.000	0.000	0.000	0.000
6.7	7.13	0.718	0.089	0.406	0.224	0.000	0.000	0.000
18.0	7.18	0.018	0.018	0.000	0.000	0.000	0.000	0.000
30.0	7.15	0.019	0.019	0.001	0.000	0.000	0.000	0.000
6.7	7.31	0.062	0.008	0.035	0.019	0.000	0.000	0.000

18.0	7.35	0.010	0.010	0.000	0.000	0.000	0.000	0.000
18.0	7.59	0.010	0.010	0.000	0.000	0.000	0.000	0.000
18.0	7.78	0.010	0.010	0.000	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 13.7
Mean src-site R= 7.7 km; M= 6.27; eps0= 1.21. Mean calculated for all sources.
Modal src-site R= 6.4 km; M= 6.60; eps0= 0.91 from peak (R,M) bin
MODE R*= 6.4km; M*= 6.60; EPS.INTERVAL:> 2 sigma % CONTRIB.= 1.132

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
CA Compr. crustal gridded	8.53	8.0	5.92	1.40

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Siteto-src azimuth(d)
San Joaquin Hills Char	2.42	6.7	6.98	0.79	-150.5
San Joaquin Hills GR	2.57	6.7	6.73	0.91	-148.4
Elsinore; Glen Ivy aPriori	0.00	18.0	7.06	2.68	36.0
Elsinore;GI+T aPriori	0.02	18.0	7.26	2.62	36.0
Elsinore; Whittier MoBal	0.01	17.9	7.08	2.65	30.2
Elsinore;GI MoBal	0.00	18.0	7.06	2.68	36.0

#*********End of deaggregation corresponding to Campbell-Bozorgnia 2008 *********#

PSHA Deaggregation. %contributions. site: Unnamed long: 117.704 W., lat: 33.698 N.
Vs30(m/s)= 250.0 (some WUS atten. models use Site Class not Vs30).
NSHMP 2007-08 See USGS OFR 2008-1128. dM=0.2 below
Return period: 2475 yrs. Exceedance PGA =0.5939 g. Weight * Computed_Rate_Ex 0.161E-03
#Pr[at least one eq with median motion>=PGA in 50 yrs]=0.00051
#This deaggregation corresponds to Chiou-Youngs 2008

DIST(KM)	MAG(MW)	ALL_EPS	EPSILON>2	1<EPS<2	0<EPS<1	-1<EPS<0	-2<EPS<-1	EPS<-2
6.4	5.05	1.302	0.875	0.427	0.000	0.000	0.000	0.000
13.1	5.05	0.191	0.191	0.000	0.000	0.000	0.000	0.000
6.5	5.20	2.462	1.492	0.969	0.000	0.000	0.000	0.000
13.3	5.20	0.465	0.465	0.000	0.000	0.000	0.000	0.000
6.7	5.40	2.198	1.169	1.029	0.000	0.000	0.000	0.000
13.6	5.40	0.544	0.544	0.000	0.000	0.000	0.000	0.000
6.9	5.60	1.899	0.919	0.980	0.000	0.000	0.000	0.000
13.8	5.60	0.588	0.588	0.000	0.000	0.000	0.000	0.000
22.7	5.61	0.021	0.021	0.000	0.000	0.000	0.000	0.000
7.0	5.80	1.623	0.729	0.894	0.000	0.000	0.000	0.000
13.9	5.80	0.600	0.592	0.008	0.000	0.000	0.000	0.000
22.9	5.81	0.042	0.042	0.000	0.000	0.000	0.000	0.000
7.2	6.01	1.793	0.759	1.026	0.008	0.000	0.000	0.000
14.1	6.01	0.682	0.639	0.043	0.000	0.000	0.000	0.000
23.2	6.00	0.062	0.062	0.000	0.000	0.000	0.000	0.000
7.2	6.20	2.001	0.716	1.284	0.002	0.000	0.000	0.000
13.7	6.20	1.023	0.881	0.141	0.000	0.000	0.000	0.000
23.3	6.21	0.102	0.102	0.000	0.000	0.000	0.000	0.000
7.7	6.41	2.110	0.676	1.417	0.017	0.000	0.000	0.000
15.4	6.39	1.161	0.971	0.190	0.000	0.000	0.000	0.000
25.0	6.41	0.100	0.100	0.000	0.000	0.000	0.000	0.000
6.3	6.60	2.418	0.389	1.524	0.505	0.000	0.000	0.000
17.2	6.58	1.164	0.974	0.190	0.000	0.000	0.000	0.000
23.8	6.61	0.108	0.108	0.000	0.000	0.000	0.000	0.000
6.4	6.80	2.466	0.328	1.458	0.680	0.000	0.000	0.000
17.4	6.77	1.582	1.314	0.268	0.000	0.000	0.000	0.000
23.1	6.80	0.106	0.106	0.000	0.000	0.000	0.000	0.000
6.6	6.95	2.576	0.263	1.346	0.935	0.030	0.000	0.000
17.9	6.98	1.559	1.115	0.443	0.000	0.000	0.000	0.000
24.1	6.99	0.178	0.163	0.015	0.000	0.000	0.000	0.000
30.3	7.00	0.044	0.035	0009	0.000	0.000	0.000	0.000

6.7	7.13	1.118	0.090	0.468	0.494	0.066	0.000	0.000
18.0	7.18	0.958	0.511	0.447	0.000	0.000	0.000	0.000
23.4	7.17	0.154	0.109	0.044	0.000	0000	0.000	0.000
30.0	7.14	0.068	0.041	0.027	0.000	0.000	0.000	0.000
6.7	7.31	0.103	0.008	0.040	0.048	0.008	0.000	0.000
18.0	7.35	0.724	0.368	0.357	0.000	0.000	0.000	0.000
23.6	7.38	0.139	0.097	0.042	0.000	0.000	0.000	0.000
18.0	7.58	0.682	0.244	0.426	0.012	0.000	0.000	0.000
25.0	7.56	0.356	0.208	0.148	0.000	0.000	0.000	0.000
56.6	7.62	0.038	0.038	0.000	0.000	0.000	0.000	0.000
18.0	7.76	1.094	0.315	0.674	0.104	0.000	0.000	0.000
28.3	7.74	0.187	0.106	0.081	0.000	0.000	0.000	0.000
41.9	7.75	0.036	0.036	0.000	0.000	0.000	0.000	0.000
56.1	7.81	0.052	0.052	0.000	0.000	0.000	0.000	0.000
18.0	7.93	0.105	0.025	0.063	0.016	0.000	0.000	0.000
65.9	8.00	0.061	0.061	0.000	0.000	0.000	0.000	0.000
70.3	7.96	0.037	0.037	0.000	0.000	0.000	0.000	0.000

Summary statistics for above PSHA PGA deaggregation, R=distance, e=epsilon:
Contribution from this GMPE(%): 39.2
Mean src-site R= 11.2 km; M= 6.34; eps0= 1.20. Mean calculated for all sources.
Modal src-site R= 6.6 km; M= 6.95; eps0= 0.55 from peak (R,M) bin
MODE R*= 6.3km; M*= 6.60; EPS.INTERVAL:> 2 sigma % CONTRIB.= 1.524

Principal sources (faults, subduction, random seismicity having > 3% contribution)

Source Category:	% contr.	R(km)	M	epsilon0 (mean values).
California B-faults Char	5.71	11.5	6.95	1.01
California B-faults GR	4.40	8.6	6.71	0.91
California A-faults	7.00	20.2	7.25	1.73
CA Compr. crustal gridded	22.12	8.7	5.82	1.15

Individual fault hazard details if its contribution to mean hazard > 2%:

Fault ID	% contr.	Rcd(km)	M	epsilon0	Site-to-src azimuth(d)
San Joaquin Hills Char	3.70	6.7	6.98	0.52	-150.5
San Joaquin Hills GR	3.66	6.7	6.74	0.70	-148.4
Elsinore; Glen Ivy aPriori	1.16	18.0	6.83	2.05	36.0
Elsinore;GI+T aPriori	1.14	18.0	7.26	1.56	36.0
Elsinore; Whittier MoBal	0.67	17.9	6.97	1.89	30.2
Elsinore;GI MoBal	0.67	18.0	6.79	2.08	36.0

#*********End of deaggregation corresponding to Chiou-Youngs 2008 *********#

********** Southern California **********

APPENDIX E

APPENDIX E

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 Geotechnical Consultant: Prior to commencement of work, the owner shall employ a geotechnical consultant. The geotechnical consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing: Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed

immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General: Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).

4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.

4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing: Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum 90 percent of maximum from 1 foot above the top of the conduit to the surface, except in traveled ways (see Section 7.6 below).

7.3 Jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

7.4 Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

7.6 Trench backfill in the upper foot measured from finish grade within existing or future traveled way, shoulder, and other paved areas (or areas to receive pavement) should be placed to a minimum 95 percent relative compaction.

NMG
Geotechnical, Inc.

July 25, 2016

Project No. 99070-35

To: Irvine Company Community Development
550 Newport Center Drive
Newport Beach, California 92660

Attention: Mr. Jamie Yoshida

Subject: Preliminary Pavement Section Recommendations for Parking Lot and Maintenance Access at the Proposed Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B, City of Irvine, California within Planning Area 6, Neighborhood 5A, Portola Springs, City of Irvine, California

Reference: NMG Geotechnical, Inc., 2016, Geotechnical Review of Precise Grading Plan for Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B, City of Irvine, California, Project No. 99070-35, dated July 6, 2016.

INTRODUCTION

As requested, NMG Geotechnical, Inc. (NMG) has prepared this report to provide preliminary structural pavement section recommendations for the parking lot area and Portland Cement Concrete (PCC) maintenance access within the proposed subject Portola Springs Community Park. We had previously prepared a geotechnical precise grading plan review report for the subject park site (NMG, 2016). This report includes our preliminary pavement section recommendations based on our understanding of the ongoing grading at the site, and the anticipated subgrade soil conditions upon completion of grading. The recommendations in this report will need to be confirmed/updated based on laboratory testing which will be performed at the completion of the site grading.

PARKING LOT ASPHALT CONCRETE

In general, structural pavement sections should be based on R-value testing after completion of grading. The following pavement structural sections have been designed in accordance with the Orange County Highway Design Manual and city of Irvine's minimum requirements for parking lot pavement. Based on prior laboratory testing, the near-surface subgrade soils for the park site will likely have an R-Value of 20. These recommendations will be updated and/or confirmed once the site is graded and based on the laboratory test results for subgrade soil samples.

00675198. GPRE G2

Location	*Traffic Index*	*Pavement Section*
Parking Stall	TI – 4.0	0.25'AC/0.50'AB
Drive Areas	TI – 5.5	0.25' AC/0.80' AB 0.35'AC/0.55'AB or 0.40'AC/0.50'AB

AC = Asphalt Concrete, AB = Aggregate Base

For two-stage paving operations, the city of Irvine requires that the initial pavement section lift be a minimum of 0.25 foot AC/0.5 foot AB, and the final cap a minimum of 0.10 foot thick.

The pavement structural section was designed in accordance with the requirements of the city of Irvine and the County of Orange Highway Design Manual. Pavement should be placed in accordance with the requirements of Sections 301 and 302 of the Standard Specifications of Public Works Construction (the Greenbook). Prior to construction of pavement sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned as needed, and recompacted in place to a minimum of 90 percent relative compaction (per ASTM D1557). Subgrade should be firm prior to AB placement.

AB materials can be crushed aggregate base or crushed miscellaneous base in accordance with the Greenbook (Section 200-2). The materials should be free of any deleterious materials. Aggregate base materials should be placed in 6- to 8-inch loose lifts, moisture-conditioned as necessary, and compacted to a minimum of 95 percent relative compaction (per ASTM D1557). Asphalt concrete should also be compacted to a minimum relative compaction of 95 percent.

PCC ACCESS DRIVE

We understand that the 8-foot wide PCC walkway along the perimeter of the park site will occasionally be used by maintenance trucks. For the proposed walkway and maintenance access, we recommend that the pavement section consist of 4 inches of PCC placed over 4 inches of aggregate base. Concrete should be reinforced with No. 3 rebar are every 24 inches on-center. Control joints should also be provided at a maximum spacing of 8 feet. The control joints should be 1-inch deep.

Prior to construction of pavement sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned as needed, and recompacted in place to a minimum of 90 percent relative compaction (per ASTM D1557). The upper 12 inches of subgrade should be pre-saturated to 120 percent of optimum moisture content.

AB materials can be crushed aggregate base or crushed miscellaneous base in accordance with the Greenbook (Section 200-2). The materials should be free of any deleterious materials. Aggregate base materials should be placed in 6- to 8-inch loose lifts, moisture-conditioned as necessary, and compacted to a minimum of 95 percent relative compaction (per ASTM D1557).

If you have any questions regarding this report, please contact our office. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.



Reza Saberi, GE 3071
Associate Engineer

RS/grd

Distribution: (1) Addressee (e-mail)
(1) Mr. Oliver Nguyen, Stantec Consulting (e-mail)

NMG
Geotechnical, Inc.

July 6, 2016

Project No. 99070-35

To: Irvine Company Community Development
550 Newport Center Drive
Newport Beach, California 92660

CITY OF IRVINE
APPROVED
BY
DATE 4/27/17

Attention: Mr. Jamie Yoshida

Subject: Geotechnical Review of Precise Grading Plan for Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B, City of Irvine, California

INTRODUCTION

In accordance with your request, NMG Geotechnical, Inc. (NMG) has performed a geotechnical review of the precise grading plan for Portola Springs Community Park, Lot 1 of Tract 17769, Planning Area 6, Neighborhood 4B (N4B), City of Irvine, California. We reviewed Sheets 1 through 20 of 20 sheets of the Precise Grading Plan, PA6 N4B, Portola Springs Community Park, Tract 17769, Lot 1 The plan was prepared by Stantec and was received by NMG on June 16, 2016.

The purpose of our review was to evaluate the proposed precise grading and construction in light of the geotechnical conditions at the site, in order to provide recommendations for design, precise grading, and construction of the proposed park improvements The site is currently being graded by The Irvine Company, under the geotechnical observation and testing of NMG. Approximately two-thirds of the park site is graded at this time. The recommendations in this report are based on our review of the referenced reports and subject plan, our observation and testing during the ongoing preliminary grading, laboratory testing, and geotechnical analysis.

ATTACHMENTS

City of Irvine Geotechnical Checklist – Rear of Text
Figure 1 – Site Location Map – Rear of Text
Figure 2 – Retaining Wall Drainage Detail – Rear of Text
Figure 3 – Pool and Spa Detail – Rear of Text
Figure 4 – Pool Deck Detail – Rear of Text
Appendix A – References
Appendix B – Boring Logs
Appendix C – Laboratory Test Results
Appendix D – Seismicity Data
Appendix E – General Earthwork and Grading Specifications
Plate 1 – Geotechnical Map – In Pocket

00675198-GPRE G2

SITE LOCATION AND ONGOING GRADING

Planning Area 6, Neighborhood 4B (N4B) is located north of Portola Parkway and south of the SR 241 in northeast Irvine, County of Orange, California. The proposed community park is a triangular-shaped parcel located in the eastern most portion of N4B, and will be bounded on the west by Pearblossom, on the southeast by Portola Parkway, and on the northeast by the SR 241 (Figure 1).

The site is currently being graded to the Delta 1 preliminary grading plan, which is the simple precise grading plan for the park finish grades. The grading is being performed by Stice Construction under the geotechnical observation and testing of NMG. The perimeter slopes along the south and east sides are essentially constructed, along with the majority of the remedial removals and overexcavation along the south and east sides of the park. The northwest portion of the park and the perimeter slopes to the northwest are currently being graded. Since the preliminary rough grading is not complete, soil sampling was not conducted at this time and will need to be completed in the future when the pads are completed to finish grades.

In general, the park site will be rough graded to a stepped pad condition that will sheet flow to the southwest. Following completion of the rough grading operations for the park, the pad area will be covered with approximately 5 to 50 feet of compacted fill overlying competent alluvium and bedrock materials Ascending slopes varying in height up to 45 feet will border the park to the north, east, and southeast, with descending slopes up to 40 feet bordering the western portion of the site.

PROPOSED PRECISE GRADING AND IMPROVEMENTS

Based on our review of the community park precise grading plan, elevations across the subject site will range from 616 to 646 feet above mean sea level (msl). The proposed precise grading should consist of relatively minor cuts and fills, generally less than 2 feet thick. However, in some of the landscape berm areas fills will be up to 5 feet above simple precise grades and in the northeast corner of the proposed pickle ball courts there will be cuts up to 5-feet-deep. There are also design cuts of up to 3 feet deep in the southerly softball field.

The precise grading plan reviewed for this report consists of Sheets 1 through 20 of 20 sheets. Sheet 1 is the title sheet and contains vicinity and location maps, grading notes and paving notes. Sheet 2 contains the index maps, legend, and construction notes and quantities. Sheets 3 through 7 are the 20-scale precise grading plans and Sheet 8 is a 10-scale grading plan for the building area. Sheets 9 through 14 are the storm drain plans, showing area drains also. Sheets 15 and 16 are the horizontal control plans. Sheet 17 includes the signing and striping plan, Sheet 18 is the erosion control plan, Sheet 19 are construction details and Sheet 20 will have the landscape details.

The planned improvements at the park site include the following:

- A community center building with court yards and a terrace area;
- Two lighted softball fields with restroom and concession stand buildings;
- A group picnic area and a tot lot play area;

- A sand volleyball court,
- Two lighted soccer fields and one unlighted practice field;
- Three lighted tennis courts;
- Six lighted pickleball courts;
- Asphalt covered parking lot, and access road to a maintenance shed;
- Concrete walkways and landscape berms; and
- Area drains, storm drain, water and sewer lines.

GEOTECHNICAL CONDITIONS

The subject park site is currently being graded with the overall N4B preliminary grading. The Geotechnical Map (Plate 1) includes the as-graded geotechnical conditions over the southern and eastern portions of the park, including the perimeter slope keyway location, as-built subdrains, the remedial removal bottom elevations, and the exposed geologic conditions during grading as mapped by NMG. The fill is not up to finish grade throughout much of the park and the remedial grading has not yet been completed in the northwest portion of the park. Also included on Plate 1 are the boring locations from the borings that were drilled during prior geotechnical investigations at the site. The boring logs are included in Appendix B of this report.

The subject park site pad is underlain by compacted fill overlying alluvium and bedrock The compacted fill at the completion of preliminary grading will vary from 5 feet thick in the northwest corner and east end of the park, up to 50 feet thick in the southwest corner beneath the proposed building. The fill is being compacted to a minimum of 90 percent relative compaction, is derived from onsite sources, and consists generally of silty sand and sandy silt, with some clayey sand and gravelly sandy clay. The alluvium left in-place consists of brown, sandy silt and silty sand, that is generally moist to saturated and medium dense The bedrock units consist of the Capistrano Formation, Oso Member (sandstone) underlying the southern portion of the park and conformably overlies the Puente Formation, Soquel Member (sandstone and siltstone) that underlies the northern and western portions of the park. The Oso Member is typically a whitish to light gray, fine- to medium-grained sandstone that is poorly bedded to massive and dense The Soquel Member typically consists of interbedded sandstone and siltstone with several clay beds throughout the exposed bedrock.

The geologic structure throughout the site consists primarily of a homoclinal structure, with bedding striking northwest and dipping southwest. There were numerous northeast striking high angle faults also encountered in the eastern portion of the site. These faults are seismically inactive and no evidence of recent activity was noted during our mapping.

During grading for the slope stabilization keys along the northeastern portion of the site, there was a small backcut failure below the adjacent SR-241 off-ramp. A kicker fill was place over the lower portion of the failure to reduce the movement. A detailed investigation was performed during grading and separate report was prepared that was reviewed by both the city of Irvine and Caltrans (NMG, 2016b). The failed material and kicker fill were left in place and compacted fill was placed over the area to reduce the potential impact to Caltrans right-of-way. This area is depicted on Plate 1 as a non-structural fill area (only landscape improvements are planned in this

area). The finish slope over this area is designed at a 3H:1V to 4H:1V and slope stability analysis was performed to verify a stable condition in this area.

During grading in the southern and eastern portions of the park, groundwater was found to be generally shallower than anticipated. The backcuts for the slopes and the removal/overexcavation bottom adjacent to Portola Parkway were found to expose alluvium and faulted sandstone of the Oso Member. Groundwater was found within the sandstone bedrock and alluvial removal bottoms and was seeping out of the backcut in the sandstone. Within the bedrock areas, the groundwater seepage was found to be heavier along the faults, which appeared to be conduits for the groundwater flow. Due to the presence of groundwater throughout the area, canyon type subdrains were extended up canyon farther than originally designed and were extended along the overexcavation bottom to the heel of the stabilization fill key on the south side of the park adjacent to Portola Parkway and the northeast portion of the site adjacent to the SR-241 (Plate 1). The groundwater was encountered at higher elevations in the southern portion of the site and lower elevations in the north; therefore, groundwater flow in this area is generally to the north. Groundwater is deeper than the removal bottom in the western portion of the site and should be deeper than 50 feet below the proposed community building.

CONCLUSION AND RECOMMENDATIONS

Based on our review of the subject plan and referenced reports, the proposed park development, as described herein, is considered geotechnically feasible. The following recommendations should be implemented during structural design, grading and construction Our recommendations are considered minimum and may be superseded by more stringent requirements of others (i.e., governing agency, architect and/or structural engineer). Additional laboratory testing will need to be performed at the completion of precise grading in order to confirm/update the geotechnical recommendations presented in this report. The geotechnical recommendations provided herein should be reviewed and revised as needed.

1. Site Preparation/Remedial Removals/Overexcavation

If construction of the park begins in the near future, and considering that the site is currently being graded, we do not anticipate the need for additional removal and recompaction. However, at minimum, we recommend that the upper 6 inches across the site be scarified, moisture-conditioned, and compacted to a minimum of 90 percent relative compaction with adequate moisture prior to placement of additional fill. The geotechnical consultant should review the conditions of the site prior to construction and provide recommendations accordingly.

2. General Earthwork and Grading

Grading and excavations should be performed in accordance with the City of Irvine Grading Code and the General Earthwork and Grading Specifications, which is included in Appendix E of this report. Miscellaneous trash, debris, vegetation, and stockpiled fill should be removed prior to remedial grading operations. Prior to placement of additional fill, the bottom should be scarified, moisture-conditioned and recompacted.

Fill materials should be compacted to at least 90 percent of maximum dry density, as determined by ASTM Test Method D1557. Fill materials should be placed in loose lifts, no thicker than 8 inches. Materials should be moisture-conditioned and processed as necessary to achieve uniform moisture content that is within moisture limits required to assure adequate bonding and compaction. We recommend that moisture contents of the fill be placed at above optimum moisture content as a result of the expansive nature of the materials and in order to facilitate the time required for presaturation of subgrades for foundation and concrete improvements.

3. Groundwater and Subdrains

The groundwater table is generally deeper than 50 feet below the design grades in the western portion of the site. It is anticipated that groundwater will remain deep below the footings of the building structure. There are several canyon-type subdrains that were placed on the removal bottom underlying the building area which outlets into the storm drain system in Pearblossom Street. No additional subdrainage measures are necessary at the site during precise grading.

Based on our observations during grading, shallow perched groundwater was encountered in the eastern portion of the site and subdrains were extended up canyon. These subdrains are relatively shallow (7 to 10 feet below preliminary grades) in the eastern portion of the site and if improvements or trenches encounter the subdrains, they will need to be repaired.

4. Settlement

Based on our assessment of the site grading and soil conditions and given the light loading of the proposed structures and fill, we anticipate that the total and differential settlement will be on the order of 1 inch and ½ inch over a span of 30 feet, respectively. The non-structural fill area within the slope in the eastern portion of the site may be subject to more settlement.

5. Seismic Design Parameters

The following table summarizes the seismic design criteria for the subject site. The seismic design parameters are developed in accordance with ASCE 7-10 and 2013 CBC.

Selected Seismic Design Parameters from 2013 CBC/ASCE 7-10	*Seismic Design Values*	*Reference*
Latitude	33.6977 North	
Longitude	117.7043 West	
Nearest Seismic Source	San Joaquin Hills Blind Thrust Fault	USGS 2013
Distance to Nearest Seismic Source	4.2 Miles (6.7 km)	USGS 2013
Site Class per Table 20 3-1 of ASCE 7-10	D	USGS, 2014
Spectral Acceleration for Short Periods (Ss)	1.49 g	USGS, 2014
Spectral Accelerations for 1-Second Periods (S1)	0.55 g	USGS, 2014
Site Coefficient F_a, Table 11 4-1 of ASCE 7-10	1.0	USGS, 2014
Site Coefficient F_v, Table 11.4-2 of ASCE 7-10	1.5	USGS, 2014
Design Spectral Response Acceleration at Short Periods (S_{DS}) from Equation 11.4-3 of ASCE 7-10	0.99 g	USGS, 2014
Design Spectral Response Acceleration at 1-Second Period (S_{D1}) from Equation 11.4-4 of ASCE 7-10	0.55 g	USGS, 2014
Peak Ground Acceleration (MCE_R) Corrected for Site Class Effects from Equation 11.8-1 of ASCE 7-10	0.54 g	USGS, 2014
Seismic Design Category, Section 11.6 of ASCE 7-10	D	USGS, 2014

6. Foundation and Slab Design

For preliminary design, a net allowable bearing capacity of 1,800 psf may be assumed for a 12-inch-wide footing embedded 12 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by 300 psf (400 psf for pad footings) for every additional foot of width and/or embedment depth up to a maximum of 3,000 psf (4,000 psf for pad footings). The allowable bearing pressure may be increased by one-third for wind and seismic loading. We recommend that strip and isolated footings have a minimum embedment depth of 18 inches. The allowable bearing pressure may also be applied to post-tensioned slabs if needed for design. For lateral resistance against sliding, a friction coefficient of 0 38 may be used at the soil-foundation interface. Also, a soil unit weight of 120 pcf may be assumed for onsite soils.
The footings of free-standing structures (including walls and pilasters) should have a minimum embedment depth of 24 inches into approved soils.

The following table provides our general guidelines and recommendations for design of post-tensioned foundations and slabs on expansive soil in accordance with the 2013 California Building Code (CBC) and Post-Tension Institute (PTI) 3rd Edition provisions

GEOTECHNICAL GUIDELINES FOR DESIGN OF POST-TENSIONED SLABS*

Parameter	*Recommendation*
Center Lift	
* Edge Moisture Variation Distance, e_m	9.00 feet
* Center Lift, y_m	0 60 inches
Edge Lift	
* Edge Moisture Variation Distance, e_m	4.80 feet
* Edge Lift, y_m	0.70 inch
Subgrade Modulus, k	100 pci
Modulus of Elasticity of Soils, Es	2,000 psi
Presaturation, as needed, to obtain the minimum moisture down to the minimum depth	1.2 x optimum down to 12 inches
Based on method in CBC 2013	

In addition, as indicated in the 3rd Edition of PTI, shape factor calculations should be performed by the project structural engineer in order to determine if strengthening/modification of foundations are necessary. Per PTI guidelines, the modifications to the foundations design should be considered if the shape factor (ratio of square of foundation perimeter over foundation area) exceeds 24.

For uniform thickness, post-tensioned slabs, we recommend that the slabs have a thickened edge such that the slab is embedded a minimum of 12 inches below the lowest adjacent grade. The thickened edge should be tapered and have a minimum width of 12 inches. If non-uniform thickness (ribbed) post-tensioned slabs are used, we recommend minimum embedment of 18 inches below adjacent grades for the perimeter footings.

If non-post-tension slabs-on-grade and foundations are considered at the site in accordance with Wire Reinforcement Institute (WRI) method (per the 2013 California Building Code), an effective Plasticity Index of 20 is considered appropriate for the upper 15 feet of soil materials. For non-post-tension slabs, we recommend a minimum embedment of 18 inches below the lowest adjacent grade for the perimeter footings.

Based on our understanding of the future site grading and soil conditions and given the light loading of the proposed residential buildings, we anticipate that the total and differential settlement will be on the order of 1 inch and ½ inch over a span of 30 feet, respectively.

7. Slab Design Related to Moisture Mitigation

In addition to geotechnical and structural considerations, the project owner should also consider moisture mitigation when designing and constructing slabs-on-grade. Ever present moisture emissions from the concrete itself, as well as subgrade moisture potentially passing through the slab, can affect flooring and items in contact with the floor.

The intended use of the interior space, type of flooring, and the type of goods in contact with the floor may dictate the need for and design of measures to mitigate potential effects of concrete moisture emission from and/or moisture vapor transmission through the slab. Typically for habitable structures, a vapor retarder or barrier has been recommended under the slab to help mitigate moisture transmission through slabs. The most recent guidelines by the American Concrete Institute (ACI 302 1R-96) recommend that the vapor retarder be placed directly under the slab (no sand layer). However, the location of the vapor retarder may also be subject to the builder's past successful practice. Placement of 1 or 2 inches of sand over the moisture retarder has been common practice in southern California. Specifying the strength of the retarder to resist puncture and its permeance rating is very important. These qualities are not necessarily a function of the retarder thickness. A minimum of 10-mil is typical but some materials, such as 10-mil polyethylene ("Visqueen") may not meet the desired standards for toughness and permeance.

The vapor retarder, when used, should be installed in accordance with standards such as ASTM E 1643-98 and/or those specified by the manufacturer.

Concrete mix design and curing are also significant factors in mitigating slab moisture problems. Concrete with lower water/cement ratios results in denser, less permeable slabs. They also "dry" faster with regard to when flooring can be installed (reduced moisture emissions quantities and rates). Rewetting of the slab following curing should be avoided since this can result in additional drying time required prior to flooring installation. Proper concrete slab testing prior to flooring installation is also important.

8. Lateral Earth Pressures

Lateral earth pressures for retaining walls and structures with approved onsite drained soils are as follows:

Lateral Earth Pressures		
Equivalent Fluid Pressure (psf/ft.)		
Conditions	***Level***	***2:1 Slope***
Active	40	65
At Rest	60	85
Passive	360	180 (if sloping in front of wall)

Where practical, onsite soils with high expansion potential should not be used for backfill materials. The above parameters may not apply for backfill that is highly expansive.

To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, such as a vault or at restrained wall corners, the at-rest pressure should be used Passive pressure is used to compute lateral soils resistance developed against lateral structural movement. Future landscaping/planting and improvements adjacent to the retaining walls should also be taken into account in the design of the retaining walls. Excessive soil disturbance, trenches (excavation and backfill), future landscaping adjacent to footings and over-saturation can adversely impact retaining structures and result in reduced lateral resistance. For walls with narrow trench footings (10 inches or less) that are located in areas likely to be landscaped, we recommend neglecting the passive resistance in the upper 2 feet.

For sliding resistance, the friction coefficient of 0.38 may be used at the concrete and soil interface. This value may be increased to 0.55 if there is a keyway below the wall base. The passive resistance is taken into account only if it is ensured that the soil against embedded structure will remain intact with time. The retaining walls may also need to be designed for additional lateral loads if other structures or walls are planned within a 1H·1V projection.

The seismic lateral earth pressure for level backfill for walls retaining greater than 6 feet of soils may be estimated to be an additional 15 pcf for active and at-rest conditions The earthquake soil pressure has a triangular distribution and is added to the static pressures. For the active and at-rest conditions, the additional earthquake loading is zero at the top and maximum at the base Per the requirements of the 2013 CBC (Section 1803 5.12), seismic earth pressures do not apply to walls retaining less than 6 feet of soils

Drainage behind retaining walls should also be provided in accordance with the attached Figure 2. Specific drainage connections, outlets and avoiding open joints should be considered for the retaining wall design.

9. Light Pole Foundations

For light pole foundations, an allowable side skin friction of 250 psf may be used. For lateral resistance, a passive pressure of 360 psf/ft for level conditions and 180 psf/ft for 2H:1V sloping ground conditions (sloping down in front of the caissons) may be used. The passive earth pressure may be increased by a factor of 2.4 if caissons are three or more diameters apart. For caissons that are fewer than three diameters apart, the factor may be linearly interpolated from 1 9 at three-diameter spacing to one at zero spacing. The end bearing should be neglected.

10. Swimming Pool and Spa

Although the proposed park site does not include pool or spa improvements, typical design parameters and recommendations for construction of pools, spas, and pool decks are provided on Figures 3 and 4 at the rear of text. For design, the subgrade soils for the pool and spa decks should be considered as having "Medium" expansion potential. The depth of the cutoff wall adjacent to the pool deck should be a minimum of 18 inches below the top of the pool deck. If the thickness of the sand layer is increased, the depth of the cut-off wall should also be increased to bottom of the sand layer. An additional subdrain system for the cutoff walls adjacent to landscaped areas should also be provided. Presaturation of the pool and spa deck subgrade soils should be performed.

11. Sport Courts

We anticipate that a post-tensioned slab will be utilized for the sport courts in order to reduce the potential for cracking. Design of the sports court is the purview of the structural engineer/court designer. The Post-Tensioning Institute's recommendations for design and construction of post-tensioned sport courts may be utilized. We also recommend that the upper 6 inches of subgrade soil for the courts be presaturated to 110 percent of optimum moisture content.

Installation of a subdrain system around the outside perimeter of the court slabs is recommended if the adjacent area will be irrigated and/or landscaped. The subdrain should consist of a 4-inch-diameter perforated pipe inserted into a minimum of one cubic foot per lineal foot of crushed rock wrapped in filter fabric and outlet to an appropriate drainage device (i.e., area drain or storm drain system).

12. Play Area

In general, the play surface area should be designed and constructed in accordance with the manufacturers specifications.

If a sandbox is planned for the play areas, we recommend that a layer of geofabric (Mirafi 140N or equivalent) be provided at the bottom and along the edges to provide a barrier between the native soils and sand. The sandbox and the concrete sub-slab for play area should be provided with appropriate drainage. The subgrade soils should have a minimum of 90 percent relative compaction, be properly moisture-conditioned and approved by the geotechnical consultant prior to placement of aggregate base (if any).

Positive drainage should be provided to direct water away from the playground area, and ponding of water should not be allowed Installation of additional drainage devices should be considered in order to minimize the adverse impact of water on aggregate base (if any) and subgrade soils.

13. Foundation Setbacks

The footings of structures located above descending slopes should be set back from the slope face in accordance with the minimum requirements of the City of Irvine and CBC criteria, whichever is greater. The setback distance is measured from the outside edge of the footing bottom along a horizontal line to the face of the slope.

The tables below summarize the minimum setback criteria for structures above descending slopes:

Structural Setback Requirements

Case A – Building and Retaining Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
20 to 30	10
More than 30	⅓ * H (maximum of 40')
Case B – Freestanding Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
More than 20	Maximum of 10

For freestanding walls and other structures that are sensitive to lateral movement (e.g. smooth stucco finish, glass screens, etc.), NMG recommends that the structural setback requirements in accordance with Case A above be followed or that additional design measures be used to help control the potential for cracking and displacements. Otherwise, typical freestanding walls may have a setback in accordance with Case B.

14. Cement Type

We anticipate negligible levels of soluble sulfates in the onsite soils. Structural concrete elements in contact with soil include footings and building slabs-on-grade. Concrete mix for these elements may be based on the "negligible" soluble sulfate category of Tables 4.2.1 and 4.3 1 in ACI-318. Other ACI guidelines for structural concrete are recommended.

15. Exterior Non-structural Concrete

Based on laboratory testing on the near-surface soil samples taken at the subject site, the expansion potential of onsite soils is anticipated to vary between "very low" and "low" Exterior concrete elements such as curb and gutter, driveways, sidewalks and patios are susceptible to lifting and cracking when constructed over expansive soils. With expansive soils, the impacts to flatwork/hardscape can be significant, generally requiring removal and replacement of the affected improvements. Please also note that reducing concrete problems is often a function of proper slab design; concrete mix design, placement, and curing/finishing practices. Adherence to guidelines of the American Concrete Institute (ACI) is recommended Also, the amount of post-construction watering, or lack thereof, can have a very significant impact on the adjacent concrete flatwork.

For reducing the potential effects of expansive soils, we recommend a combination of presaturation of subgrade soils, reinforcement, moisture barriers/drains, and a sub layer of

granular material. Though these types of measures may not completely eliminate adverse impacts, application of these measures can significantly reduce the impacts from post-construction expansion of soil. The degrees and combinations of these measures will depend upon

- The expansion potential of the subgrade soils;
- The potential for moisture migration to the subgrade;
- The feasibility of the measures (especially presaturation); and
- The economics of these measures versus the benefits.

These factors should be weighed by the project owner determining the measures to be applied on a project-by-project basis, subject to the requirements of the local building/grading department.

The following table provides our recommendations for varying expansion characteristics of subgrade soils. Additional considerations are also provided after the table. We recommend that the "**Medium**" category be used during the preliminary design of the project site. Additional laboratory testing following completion of grading operations should be performed to verify our preliminary recommendations.

TYPICAL RECOMMENDATIONS FOR CONCRETE FLATWORK/HARDSCAPE

Recommendations	Expansion Potential (Index)				
	Very Low (< 20)	*Low (20 – 50)*	***Medium (51 – 90)***	*High (91 – 130)*	*Very High (> 130)*
Slab Thickness (Min.) Nominal thickness except where noted.	4"	4"	**4"**	4"	4" Full
Subbase: Thickness of sand or gravel layer below concrete	N/A	N/A	**Optional**	2" – 4"	2" – 4"
Presaturation: Degree of optimum moisture content (opt) and depth of saturation	Pre-wet Only	1 1 x opt. to 6"	**1.2 x opt. to 12"**	1 3 x opt. to 18"	1 4 x opt to 24"
Joints: Maximum spacing of control joints Joint should be ¼ of total thickness	10'	10'	**8'**	6'	6'
Reinforcement: Rebar or equivalent welded wire mesh placed near mid-height of slab	N/A	N/A	**Optional (WWF 6 x 6 – W1.4xW1.4)**	No 3 rebar, 24" O.C. both ways or equivalent wire mesh	No 3 rebar, 24" O.C both ways
Restraint: Slip dowels across cold joints, between sidewalk and curb	N/A	N/A	**Optional**	Across cold joints	Across cold joints (and into curb)

The more expansive soils, because they are clayey, can take significantly longer to achieve recommended presaturation levels. Therefore, the procedure and timing should be carefully

planned in advance of construction. For exterior slabs, the use of a granular sublayer is primarily intended to facilitate presaturation and subsequent construction by providing a better working surface over the saturated soil. It also helps retain the added moisture in the native soil in the event that the slab is not placed immediately. Where these factors are not significant, the layer may be omitted.
On projects with highly expansive soils, additional measures such as thickened concrete edges/footings, subdrains and/or moisture barriers should be considered where planter or natural areas with irrigation are located adjacent to the concrete improvements. Design and maintenance of proper surface drainage is also very important. If the concrete will be subject to heavy loading from cars/trucks or other heavy objects, thicker slabs should be used.

The above recommendations typically are not applied to curb and gutter, but should be considered in areas with highly expansive soils.

16. Interlocking Concrete Paver Section

It is our understanding that interlocking pavers may be used for the pedestrian walkways. Our recommendation for the concrete paver section is a minimum of 60-millimeter-thick concrete paver over approximately 1 inch of sand over 6 inches of aggregate base, over compacted subgrade.

A concrete band along the perimeter of the pavers should be provided for lateral restraint. The concrete band should, at minimum, be 12 inches deep and deepened to below the depth of disturbed soil if adjacent to landscape/planter areas. The geotechnical consultant should confirm the concrete band is excavated into firm and competent soil.

Prior to construction of the paver sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned as needed, and recompacted in place to a minimum of 90 percent relative compaction per ASTM Test Method D1557.

17. Pavement Design

The following pavement structural sections have been designed in accordance with the Orange County Highway Design Manual. Based on prior laboratory testing, the near-surface subgrade soils for the park site will likely have an R-Value of 20. We are providing the following pavement sections based on traffic indices (TI) provided by Pirzadeh and Associates for Pear Blossom (TI = 6.9) and Tomato Springs Road (TI = 6.3).

Location	*Traffic Index*	*Pavement Section*
Pearblossom	TI – 6.9	0.35' AC over 1.0' AB
Tomato Springs Road	TI – 6.3	0.35' AC over 0.83' AB

The pavement section for temporary access roads and permanent maintenance/access roads may consist of 4 inches of asphalt concrete over 6 inches of aggregate base.

The pavement sections should be based on actual R-values of the street subgrade soils after completion of grading.
If a two-stage paving is planned, we recommend that the initial AC lift be a minimum of 0 25 foot thick and the final cap be a minimum of 0.10 foot thick.

Street pavement should be placed in accordance with the requirements of Section 301 and 302 of the Standard Specifications of Public Works Construction (the Greenbook). Prior to construction of pavement sections, the subgrade soils should be scarified to a minimum depth of 6 inches, moisture-conditioned to slightly over optimum moisture content, and recompacted in place to a minimum of 90 percent relative compaction per ASTM D1557.

AB materials should be crushed aggregate base in accordance with the Greenbook The materials should be free of any deleterious materials. AB materials should be placed in 6- to 8-inch loose lifts, moisture-conditioned as necessary and compacted to a minimum of 95 percent relative compaction per ASTM D1557.

18. Surface Drainage

Inadequate control of surface runoff or heavy irrigation after development of the site may result in nuisance seepage conditions and/or erosion. Maintaining adequate surface drainage, proper disposal of runoff water and control of irrigation will help reduce the potential for future moisture-related problems.

Surface drainage should be carefully taken into consideration during grading, landscaping and building construction. Positive surface drainage should be provided to direct runoff away from hardscape, walls and slopes and collected in suitable drainage devices.

It is also important to maintain a consistent level of soil moisture, not allowing the subgrade soils to become overly dry or overly wet Properly designed landscaping and irrigation systems can help in that regard.

19. Slope Maintenance, Surface Drainage and Erosion Control

To reduce the erosion and slumping potential of graded slopes (if any), permanent manufactured slopes within the development should be protected or planted with groundcover vegetation (e.g., grasses) and deep-rooted vegetation (e.g., trees and shrubs) as soon as practical. Oversteepening of slopes should be avoided during final grading and landscaping improvements

Maintenance of proper pad drainage, the design and construction of property improvements in accordance with sound engineering practices and proper maintenance of landscaping, including regular pad and slope irrigation, should be performed. Irrigation should not be excessive or sporadic; maintaining a relatively constant level of soil moisture around structures and improvements is important. Planters and landscape areas immediately adjacent to structures and walls should be avoided or provided with measures to mitigate the potential for water adversely

impacting the foundations and slabs. Water should not be allowed to pond and drainage should be maintained away from structures, walls and tops of slopes. Considering the climatic conditions in southern California and the expansive soil mitigation measures provided herein, a two-percent slope away from structures should be provided and is in substantial compliance with the 2013 CBC.

20. Utility Installation and Trench Backfill

Utility trench excavations should encounter compacted fill materials and/or competent alluvium after grading. In general, soils across most of the site are anticipated to be classified as Type B for CalOSHA trench excavation requirements. The exception will be the deeper trenches that may extend into saturated bedrock with adverse bedding conditions, which may be classified as Type C soils for CalOSHA. Excavations should conform to the applicable safety requirements. Trenches should be shored or the sides sloped in accordance with the CalOSHA excavation requirements. Additional measures (i.e., shoring, etc.) may be required to protect existing improvements.
Native soils should be suitable for use as trench backfill. Native backfill materials should be compacted to a minimum of 90 percent relative compaction, as indicated in Section 2, General Earthwork and Grading. Select granular backfill may be used in lieu of native soils, but should also be compacted.

21. Additional Laboratory Testing

Additional laboratory testing will need to be performed at the completion of precise grading in order to confirm/update the geotechnical recommendations presented in this report.

22. Geotechnical Review of Future Plans

Future revisions/changes to the precise grading plan should be reviewed and accepted by the geotechnical consultant.

23. Geotechnical Observation and Testing during Grading and Construction

The findings, conclusions and recommendations in this report are based upon interpretation of data and data points having limited spatial extent. Verification and refinement of recommendations based on actual geotechnical conditions encountered during grading is very important.

At minimum, geotechnical observation and testing should be conducted during grading at the following stages:

- During site preparation and clearing, prior to site processing;
- During precise grading and placement of compacted fill;
- Upon completion of any foundation and footing excavations prior to pouring of the concrete;
- During subgrade preparation for buildings, pool and spa decks, parking lot pavement, and hardscape;

- Upon completion of presaturation of subgrade for sidewalk, pools and spa decks, and hardscape;
- During construction of subdrains and deck drains,
- During excavations for light pole standards,
- During backfill for utility trenches; and
- When any unusual or unexpected soil and/or geotechnical conditions are encountered during grading and construction.

LIMITATIONS

This report has been prepared for the exclusive use of our client, Irvine Company, within the specific scope of services requested by our client for the design and construction of the subject improvements. This report or its contents should not be used or relied upon for other projects or purposes or by other parties without the written consent of NMG Our methodology for this study is based on local geotechnical standards of practice, care, and requirements of governing agencies. No warranty or guarantee, express or implied is given.

The findings, conclusions, and recommendations are professional opinions based on interpretations and inferences made from geologic and engineering data from specific locations and depths, observed or collected at a given time. By nature, geologic conditions can be very different in between points, and can also change over time. Our conclusions and recommendations are subject to verification and/or modification with more exploration and/or during grading and construction when more subsurface conditions are exposed.

NMG's expertise and scope of services did not include assessment of potential subsurface environmental contaminants or environmental health hazards

If you have any questions regarding this report, please contact our office. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.

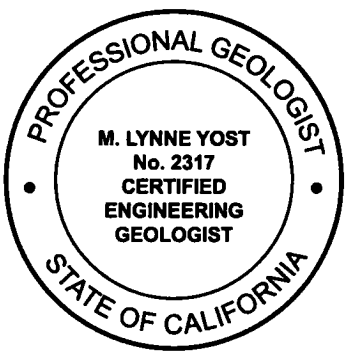
Shahrooz "Bob" Karimi, RCE 54250
Principal Engineer

Lynne Yost, CEG 2317
Associate Geologist

SBK/LY/grd

Distribution: (1) Addressee (E-Mail)
(2) Mr. Kevin Brandt, Stantec Consulting (includes copies for submittal to the City of Irvine)
(1) Mr. Scott Jones, ICDC (E-Mail)





JN: 16-055
June 10, 2016

STRUCTURAL CALCULATIONS
FOR
PA6 PORTOLA SPRINGS COMMUNITY PARK

CITY OF IRVINE, CA

CLIENT: EPT DESIGN

WELSH STRUCTURES, INC.

12722 Barrett Lane
Santa Ana, CA 92705
PH. 714 352-6297
FAX 714 352-6947
swelsh@welshstructures.com



STEPHANIE WELSH S.E.

PROJECT MEMORANDUM

NMG GEOTECHNICAL, INC.
17991 Fitch • Irvine, CA 92614 • (949) 442-2442 • Fax: (949) 476-8322

To: Mr. Merv Boyd
Irvine Community Development Company
550 Newport Center Drive
Newport Beach, California 92660

May 6, 2016
Project No. 99070-35

From: Shahrooz "Bob" Karimi, Principal Engineer, RCE 54250

Subject: Preliminary Geotechnical Recommendations for Lateral Earth Pressures, Foundation Design, and Seismic Design, Planning Area 6, Neighborhood 4B Park Site, Portola Springs, City of Irvine, California

References: U.S. Geological Survey, 2013, 2008 Interactive Deaggregations Program; web site address: https://geohazards.usgs.gov/deaggint/2008/.

U.S. Geological Survey, 2014, U.S. Seismic Design Maps, web site address: http://earthquake.usgs.gov/designmaps/us/application.php.

In accordance with your request, NMG Geotechnical, Inc. (NMG) has prepared this memorandum to provide preliminary geotechnical recommendations for the design of foundations, post-tensioned slabs and retaining structures based on the requirements of the 2013 California Building Code (CBC) for the subject site. The site is currently being mass-graded to a superpad by The Irvine Company under the geotechnical observation and testing of NMG. We understand that the site will be re-graded in the future to the simple precise grades by The Irvine Company prior to construction.

Our recommendations are based on our knowledge of the soil conditions and the anticipated grading operations at the site. Final foundation recommendations should be provided upon completion of the project grading and based on our final evaluation of the foundation soil conditions.

Anticipated Soil Conditions

The expansion potential of the onsite soils is generally anticipated to range from low to medium as classified by ASTM D4829. Although some relatively thin clayey siltstone and claystone beds will probably be of high expansion potential and some sandstone beds are likely to be of very low expansion potential, grading and lot capping are likely to blend the near-surface soils so that at the completion of grading most of the near-surface subgrade soils should fall within the medium range.

The soluble sulfate content for the onsite alluvial soils is generally anticipated to be within the range of negligible sulfate exposure for concrete as classified in the ACI 318-08, Table 4.2.1.

Soil samples should be collected, at the completion of grading operations, and tested to verify the anticipated soil conditions.

Lateral Earth Pressures

Preliminary recommendations for lateral earth pressures for retaining walls and structures (if any) with approved onsite drained soils are as follows:

Lateral Earth Pressures Equivalent Fluid Pressure (psf/ft.)		
Conditions	***Level***	***2:1 Slope***
Active	40	65
At Rest	60	85
Passive	360	180 (if sloping in front of wall)

These parameters are based on a soil internal friction angle of 30 degrees and soil unit weight of 120 pcf. The above parameters do not apply for backfill that is highly expansive.

To design an unrestrained retaining wall, such as a cantilever wall, the active earth pressure may be used. For a restrained retaining wall, the at-rest pressure should be used. Passive pressure is used to compute lateral soils resistance developed against lateral structural movement. The passive resistance is taken into account only if it is ensured that the soil against embedded structure will remain intact with time. Future landscaping/planting and improvements adjacent to the retaining walls should also be taken into account in the design of the retaining walls. Excessive soil disturbance, trenches (excavation and backfill), future landscaping adjacent to footings and over-saturation can adversely impact retaining structures and result in reduced lateral resistance.

For sliding resistance, the friction coefficient of 0.38 may be used at the concrete and soil interface. This value may be increased to 0.55 for the keyway below the wall base. The retaining walls may also need to be designed for additional lateral loads if other structures or walls are planned within a 1H:1V projection.

The seismic lateral earth pressure for walls retaining more than 6 feet of soil and level backfill conditions may be estimated to be an additional 15 pcf for active and at-rest conditions. The earthquake soil pressure has a triangular distribution and is added to the static pressures. For the active and at-rest conditions, the additional earthquake loading is zero at the top and maximum at the base. The seismic lateral earth pressure does not apply to walls retaining less than, or equal to, 6 feet of soil (2013 CBC Section 1803.5.12).

Drainage behind retaining walls should also be provided in accordance with the attached figure. The waterproofing and drainage systems for the retaining walls that are located between the future lots may require additional measures to reduce the potential for nuisance seepage. Specific drainage connections, outlets and avoiding open joints should be considered for the retaining wall design.

Foundation Design Parameters

For preliminary design of the future slab-on-grade residential structures, retaining structures and other foundations, a net allowable bearing capacity of 1,800 psf may be assumed for a 12-inch-wide footing embedded 12 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by 300 psf for every additional foot of width and/or embedment depth up to a maximum of 3,000 psf. The allowable bearing pressure may be increased by one-third for wind and seismic loading. We recommend that strip and isolated footings have a minimum embedment depth of 18 inches. The allowable bearing pressure may also be applied to post-tensioned slabs, if needed for design.

For lateral resistance against sliding, a friction coefficient of 0.38 may be used at the soil-foundation interface. Also, a soil unit weight of 120 pcf may be assumed for onsite soils.

The footings of free-standing structures (including walls and pilasters) should have a minimum embedment depth of 24 inches into approved soils.

The following table provides our general guidelines and recommendations for design of post-tensioned foundations and slabs on expansive soil in accordance with the 2013 California Building Code (CBC) and Post-Tension Institute (PTI) 3rd Edition provisions.

GEOTECHNICAL GUIDELINES FOR DESIGN OF POST-TENSIONED SLABS*

Parameter	*Recommendation*
Center Lift	
* Edge Moisture Variation Distance, e_m	9.00 feet
* Center Lift, y_m	0.60 inches
Edge Lift	
* Edge Moisture Variation Distance, e_m	4.80 feet
* Edge Lift, y_m	0.70 inch
Subgrade Modulus, k	100 pci
Modulus of Elasticity of Soils, Es	2,000 psi
Presaturation, as needed, to obtain the minimum moisture down to the minimum depth	1.2 x optimum down to 12 inches
***Based on method in CBC 2013**	

In addition, as indicated in the 3rd Edition of PTI, shape factor calculations should be performed by the project structural engineer in order to determine if strengthening/modification of foundations are necessary. Per PTI guidelines, the modifications to the foundations design should be considered if the shape factor (ratio of square of foundation perimeter over foundation area) exceeds 24.

For uniform-thickness post-tensioned slabs, we recommend that the slabs have a thickened edge such that the slab is embedded a minimum of 12 inches below the lowest adjacent grade. The thickened edge should be tapered and have a minimum width of 12 inches. If non-uniform (ribbed) post-tensioned slabs are used, we recommend minimum embedment of 18 inches below adjacent grades for the thickened edges.

If non-post-tensioned slabs-on-grade and foundations are considered at the site in accordance with Wire Reinforcement Institute (WRI) method (per the 2013 California Building Code), an effective Plasticity Index of 20 is considered appropriate for the upper 15 feet of soil materials.

For non-post-tensioned slabs, we recommend a minimum embedment of 18 inches below the lowest adjacent grade for the perimeter footings.

Based on our assessment of the site grading and soil conditions and given the light loading of the proposed residential buildings, we anticipate that the total and differential settlement will be on the order of 1 inch and ½ inch over a span of 30 feet, respectively.

Foundation Setbacks

The footings of structures located above descending slopes should be set back from the slope face in accordance with the minimum requirements of the City of Irvine and CBC criteria, whichever is greater. The setback distance is measured from the outside edge of the footing bottom along a horizontal line to the face of the slope.

The tables below summarize the minimum setback criteria for structures above descending slopes:

Structural Setback Requirements

Case A – Building and Retaining Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
20 to 30	10
More than 30	⅓ * H (maximum of 40')

Case B – Freestanding Wall Footings Above Descending Slopes	
Slope Height [H] (feet)	*Minimum Setback from Slope face (feet)*
Less than 10	5
10 to 20	½ * H
More than 20	Maximum of 10

For freestanding walls and other structures that are sensitive to lateral movement (e.g. smooth stucco finish, glass screens, etc.), NMG recommends that the structural setback requirements in accordance with Case A above be followed or that additional design measures be used to help control the potential for cracking and displacements. Otherwise, typical freestanding walls may have a setback in accordance with Case B.

Seismic Design Parameters

The following table summarizes the seismic design criteria for the subject site. The seismic design parameters are developed in accordance with ASCE 7-10 and 2013 CBC.

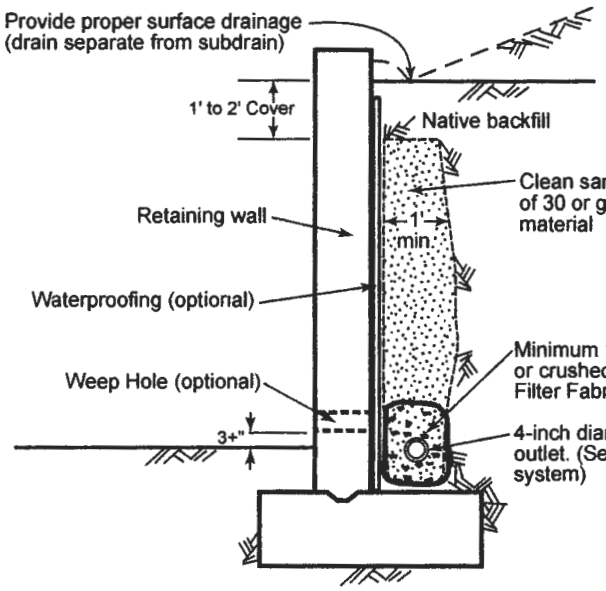
Selected Seismic Design Parameters from 2013 CBC/ASCE 7-10	*Seismic Design Values*	*Reference*
Latitude	33.6977 North	
Longitude	117.7043 West	
Nearest Seismic Source	San Joaquin Hills Blind Thrust Fault	USGS 2013
Distance to Nearest Seismic Source	4.2 Miles (6.7 km)	USGS 2013
Site Class per Table 20.3-1 of ASCE 7-10	D	USGS, 2014
Spectral Acceleration for Short Periods (Ss)	1.49 g	USGS, 2014
Spectral Accelerations for 1-Second Periods (S1)	0.55 g	USGS, 2014
Site Coefficient F_a, Table 11.4-1 of ASCE 7-10	1.0	USGS, 2014
Site Coefficient F_v, Table 11.4-2 of ASCE 7-10	1.5	USGS, 2014
Design Spectral Response Acceleration at Short Periods (S_{DS}) from Equation 11.4-3 of ASCE 7-10	0.99 g	USGS, 2014
Design Spectral Response Acceleration at 1-Second Period (S_{D1}) from Equation 11.4-4 of ASCE 7-10	0.55 g	USGS, 2014
Peak Ground Acceleration (MCE_R) Corrected for Site Class Effects from Equation 11.8-1 of ASCE 7-10	0.54 g	USGS, 2014
Seismic Design Category, Section 11.6 of ASCE 7-10	D	USGS, 2014

Cement Type

Based on our laboratory testing of onsite soils, onsite soils have "negligible" levels of soluble sulfates. Structural concrete elements in contact with soil include footings and building slabs-on-grade. Concrete mix for these elements may be based on the "negligible" soluble sulfate category of Table 4.3.1 in ACI-318. Other ACI guidelines for structural concrete are recommended. Also, onsite soils are corrosive to metals.

If you have any questions regarding this project memorandum, please contact our office. We appreciate the opportunity to provide our services.

Attachment: Retaining Wall Drainage Detail



OPTION 1:

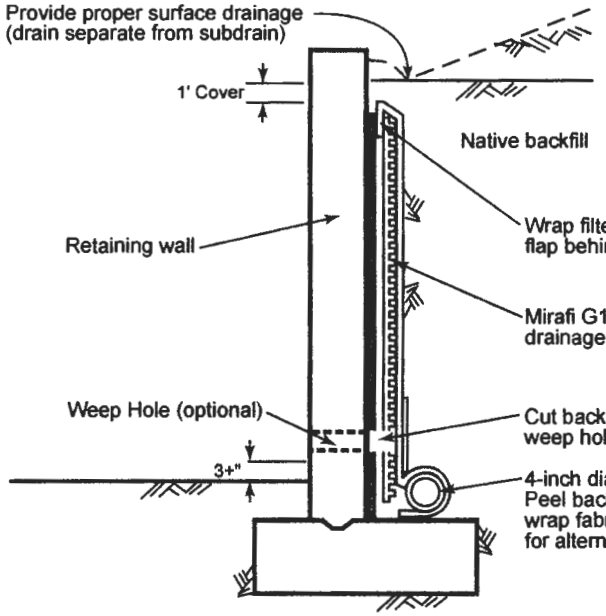
AGGREGATE SYSTEM DRAIN

Clean sand vertical drain having sand equivalent of 30 or greater or other free-draining granular material

Minimum 1 ft.^{3}/ft. of 1/4 to 1 1/2" size gravel or crushed rock encased in approved Filter Fabric

4-inch diameter perforated pipe with proper outlet. (See Notes below for alternate discharge system)

Alternative: Class 2 permeable filter material (Per Caltrans specifications) may be used for vertical drain and around perforated pipe (without filter fabric)



OPTION 2:

COMPOSITE DRAINAGE SYSTEM

Wrap filter fabric flap behind core

Mirafi G100N, Contech C-Drain 15K, or equivalent drainage composite.

Cut back of core to match size of weep hole. Do not cut fabric.

4-inch diameter perforated pipe with proper outlet. Peel back the bottom fabric flap,place pipe next to core, wrap fabric around pipe and tuck behind core. (See Notes for alternate weep hole discharge system)

NOTES:

1. **PIPE TYPE SHOULD BE PVC OR ABS, SCHEDULE 40 OR SDR35 SATISFYING THE REQUIREMENTS OF ASTM TEST STANDARD D1527, D1785, D2751 , OR D3034.**
2. **FILTER FABRIC SHALL BE APPROVED PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL.**
3. **DRAIN PIPE SHOULD HAVE A GRADIENT OF 1 PERCENT MINIMUM.**
4. **WATERPROOFING MEMBRANE MAY BE REQUIRED FOR A SPECIFIC RETAINING WALL (SUCH AS A STUCCO OR BASEMENT WALL).**
5. **WEEP HOLES MAY BE PROVIDED FOR LOW RETAINING WALLS (LESS THAN 3 FEET IN HEIGHT) IN LIEU OF A VERTICAL DRAIN AND PIPE AND WHERE POTENTIAL WATER FROM BEHIND THE RETAINING WALL WILL NOT CREATE A NUISANCE WATER CONDITION. IF EXPOSURE IS NOT PERMITTED, A PROPER SUBDRAIN OUTLET SYSTEM SHOULD BE PROVIDED.**
6. **IF EXPOSURE IS PERMITTED, WEEP HOLES SHOULD BE 2-INCH MINIMUM DIAMETER AND PROVIDED AT 25-FOOT MAXIMUM SPACING ALONG WALL. WEEP HOLES SHOULD BE LOCATED 3+ INCHES ABOVE FINISHED GRADE.**
7. **SCREENING SUCH AS WITH A FILTER FABRIC SHOULD BE PROVIDED FOR WEEP HOLES/OPEN JOINTS TO PREVENT EARTH MATERIALS FROM ENTERING THE HOLES/JOINTS.**
8. **OPEN VERTICAL MASONRY JOINTS (I.E., OMIT MORTAR FROM JOINTS OF FIRST COURSE ABOVE FINISHED GRADE) AT 32-INCH MAXIMUM INTERVALS MAY BE SUBSTITUTED FOR WEEP HOLES.**
9. **THE GEOTECHNICAL CONSULTANT MAY PROVIDE ADDITIONAL RECOMMENDATIONS FOR RETAINING WALLS DESIGNED FOR SELECT SAND BACKFILL.**

RETAINING WALL DRAINAGE DETAIL

NMG Geotechnical, Inc.

FIGURE 1

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk**

Sht: _____ of _____

By: _____

Checked By: _____

Date: **6/3/2016**

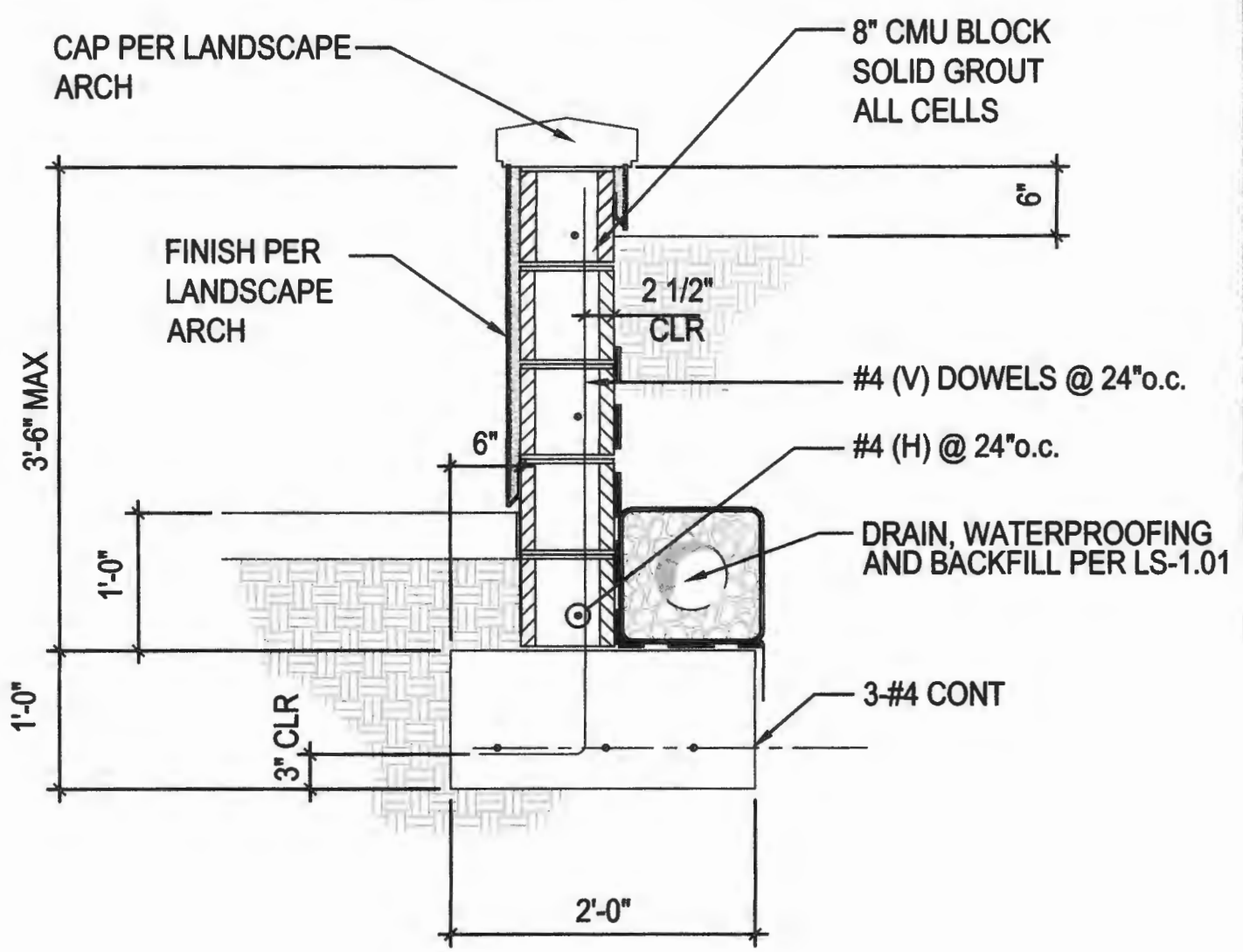
JOB#: **16-055**

Drawing #: _____

Subject: _____

PER GEOTECHNICAL REPORT BY NMG GEOTECHNICAL DATED MAY 6, 2016, PROJ # 2015-0-35

BEARING	1800 PSF (+ 720 PSF/ADD'L WIDTH / DEPTH, 7200 MAX)
PASSIVE (LEVEL)	360 PCF
(DOWNHILL)	180 PCF
ACTIVE (LEVEL)	40 PCF
(2:1)	65 PCF
FRICTION	0.38
	0.55 (BLW KEYWAY)
SEISMIC ACTIVE	15 PCF (TRIANGULAR PRESSURE) FOR WALL RETAINING 6'+
SOIL WT.	120 PCF



LOW PLANTER RETAINING WALL

N/S	11

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

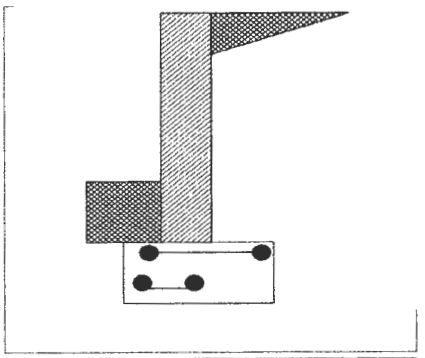
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	3.75 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	1.62 OK
Sliding	=	2.03 OK
Total Bearing Load	=	990 lbs
...resultant ecc.	=	6.65 in
Soil Pressure @ Toe	=	1,479 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,775 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	5.3 psi OK
Footing Shear @ Heel	=	5.1 psi OK
Allowable	=	82.2 psi

Sliding Calcs

Lateral Sliding Force	=	451.3 lbs
less 100% Passive Force	= -	540.0 lbs
less 100% Friction Force	= -	376.2 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 Stability	=	0.0 lbs OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	24.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.249**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	450.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	562.5
Moment.....Allowable	=	2,258.3
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	7.1
Shear.....Allowable	psi =	69.7
Wall Weight	psf =	84.0
Rebar Depth 'd'	in =	5.25
Masonry Data		
f'm	psi =	1,500
Fy	psi =	60,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD
Concrete Data		
f'c	psi =	
Fy	psi =	

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	0.50 ft
Heel Width	=	1.50
Total Footing Width	=	2.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,775	0 psf
Mu' : Upward	=	194	1 ft-#
Mu' : Downward	=	68	350 ft-#
Mu: Design	=	127	349 ft-#
Actual 1-Way Shear	=	5.25	5.09 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	451.3	1.58	714.5	Soil Over Heel	=	375.0	1.58	593.8
Surcharge over Heel	=				Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=			
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=			
	=				Soil Over Toe	=		0.25	
					Surcharge Over Toe	=			
Total		451.3	**O.T.M.**	714.5	Stem Weight(s)	=	315.0	0.83	262.5
	=		=		Earth @ Stem Transitions	=			
Resisting/Overturning Ratio		= **1.62**			Footing Weight	=	300.0	1.00	300.0
Vertical Loads used for Soil Pressure		= 990.0 lbs			Key Weight	=			
					Vert. Component	=			
					Total	=	990.0 lbs	**R.M.=**	1,156.3

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.077	in

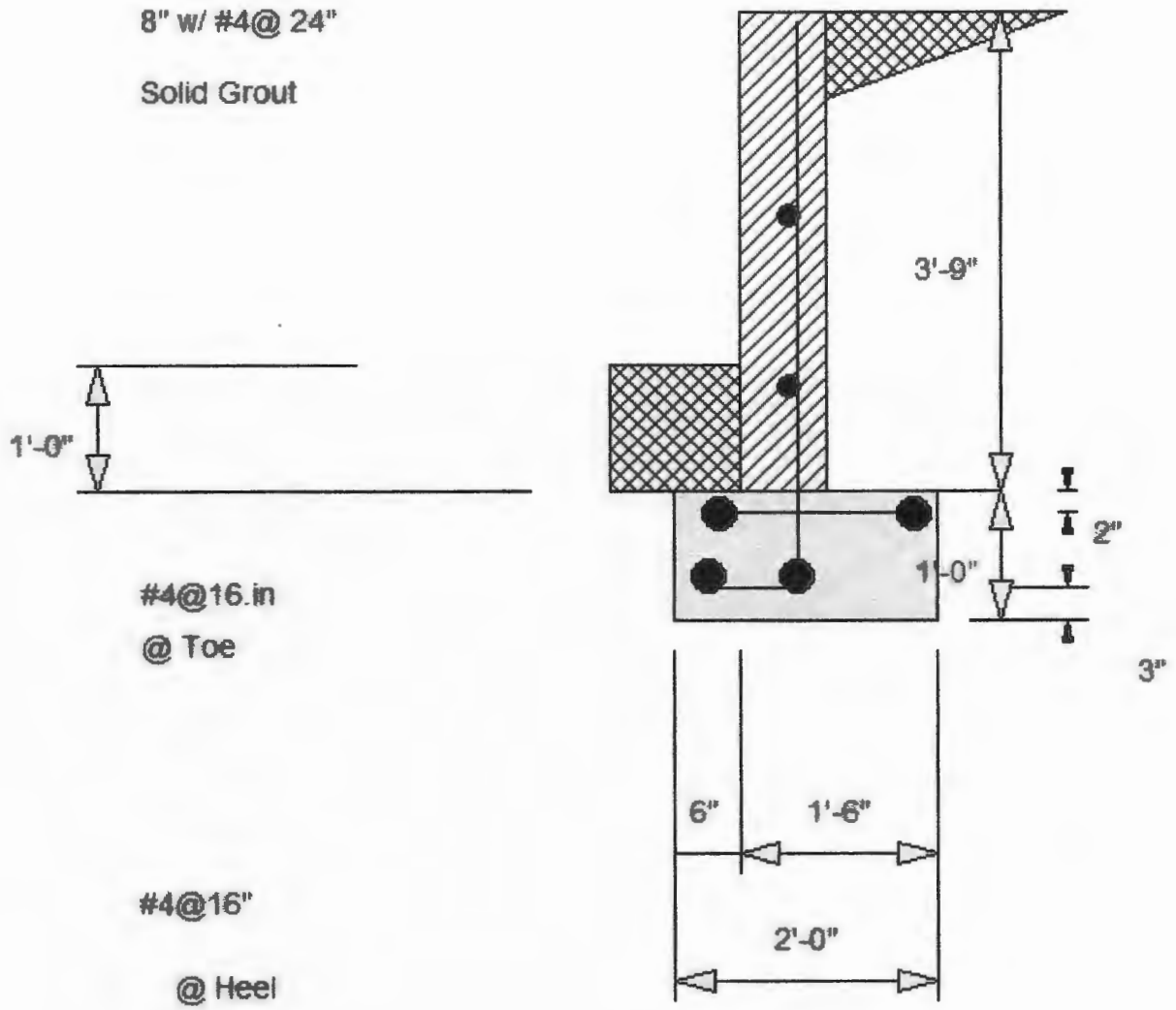
The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.1000 in2/ft
As Required =	0.0742 in2/ft

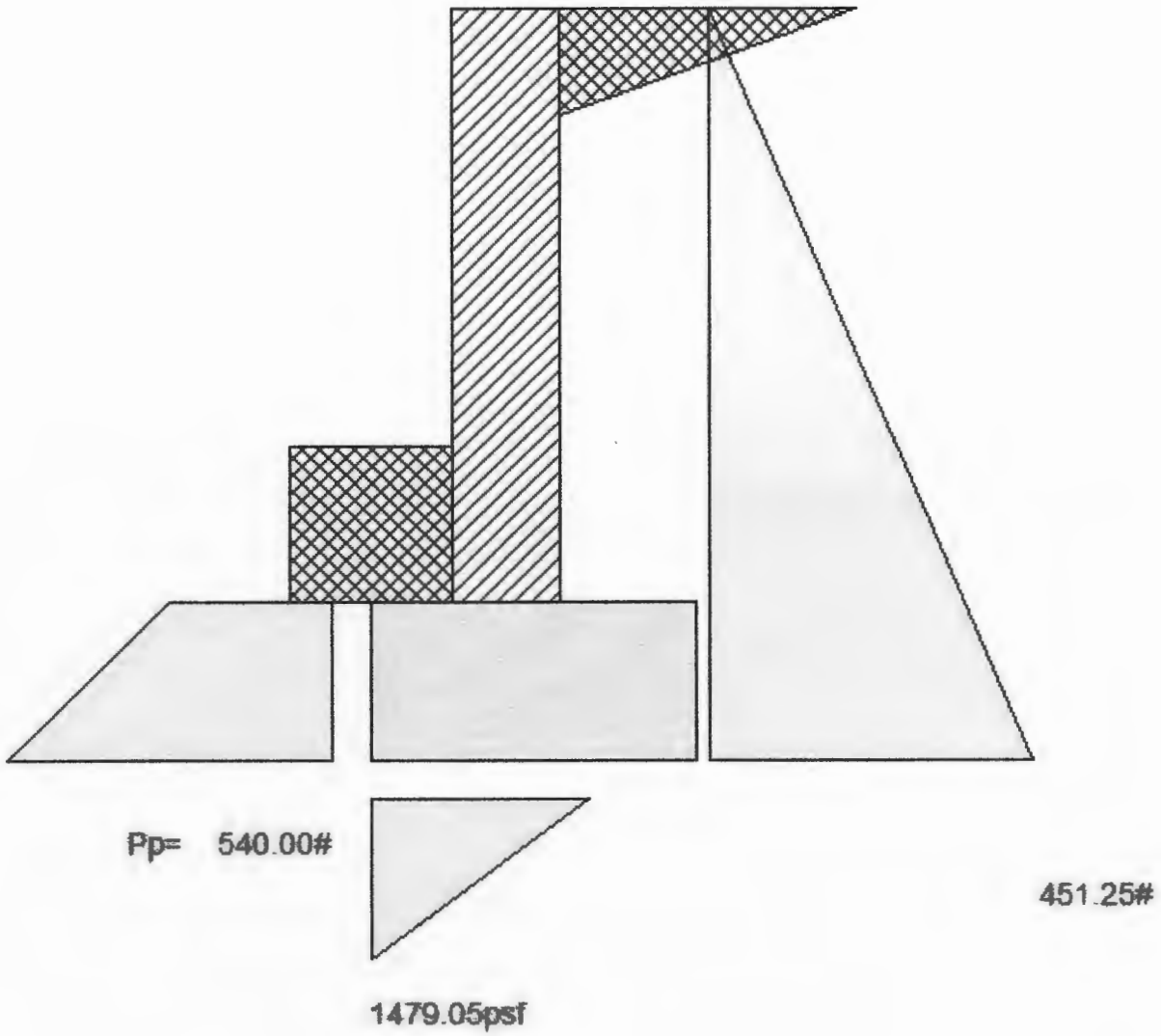

8" w/ #4@ 24"
Solid Grout
3'-9"
1'-0"
2"
1'-0"
3"
#4@16.in
@ Toe
6"
1'-6"
#4@16"
2'-0"
@ Heel

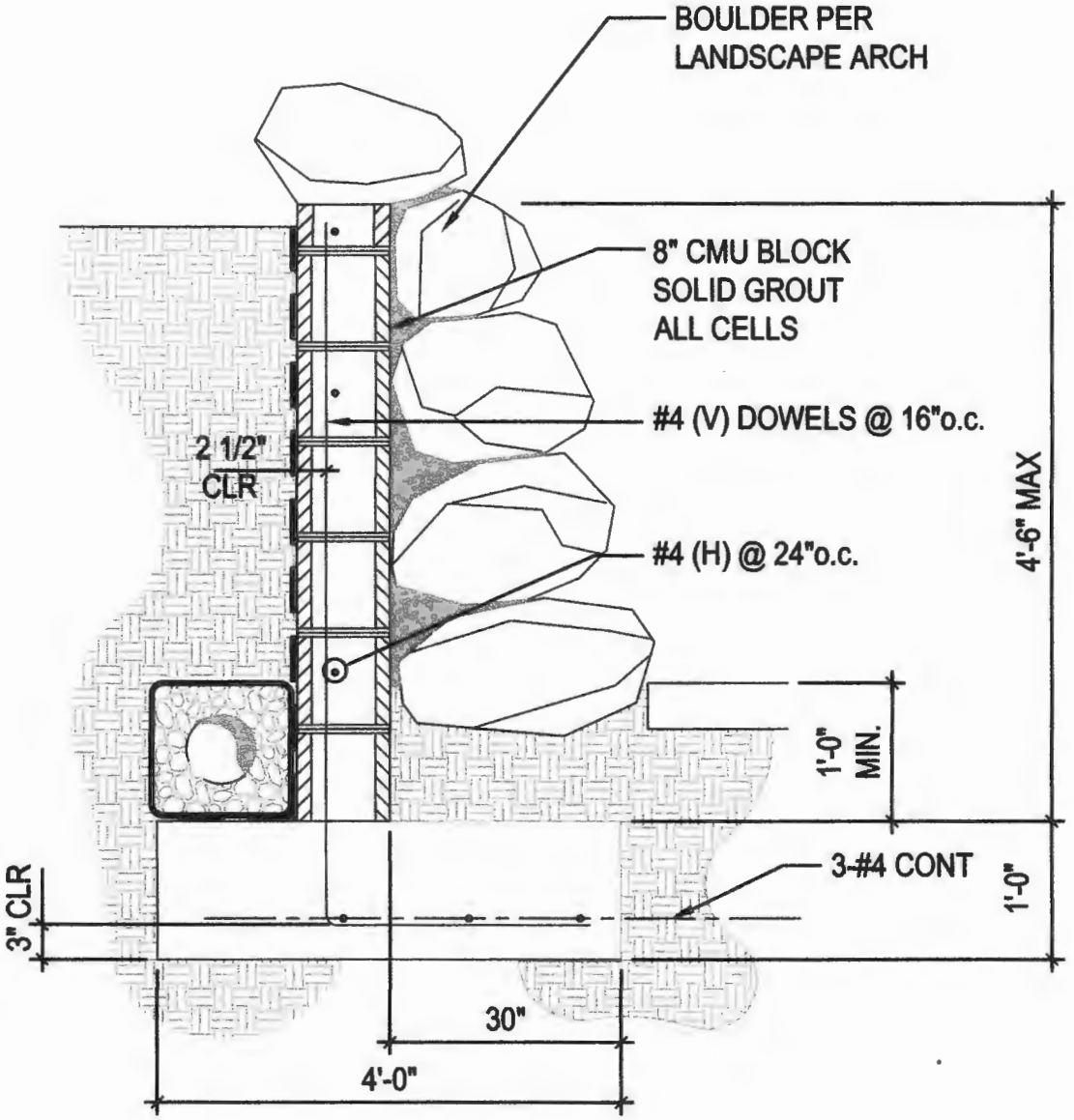
This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11




BOULDER PER
LANDSCAPE ARCH
8" CMU BLOCK
SOLID GROUT
ALL CELLS
#4 (V) DOWELS @ 16"o.c.
2 1/2"
CLR
#4 (H) @ 24"o.c.
4'-6" MAX
1'-0"
MIN.
3-#4 CONT
1'-0"
3" CLR
30"
4'-0"

1c
4/CS1.02

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk**

Sht: _____ of _____

By: _____

Checked By: _____

Date: **6/3/2016**

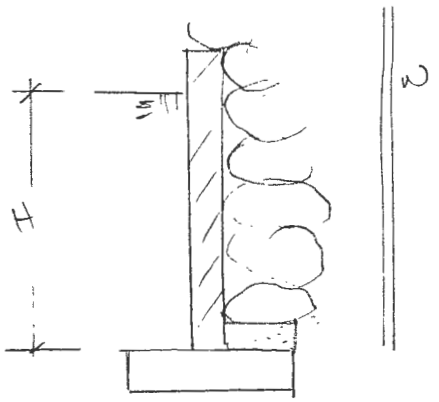
JOB#: **16-055**

Drawing #: 16/LS1.02

Subject: _____

BOULDER RET WALL

H_{MAX} = 4'-6"



AVG BOULDER WIDTH
= (1' + 2')/2 = 1'-6"

$W_{BOULDER}$ = 150 PCF (1.5' WIDE)
= 225 #/'

$w = .3\,(225) = 67.5$ #/'

$w_u = 1.4 \times 67.5 = 94.5$ #/'

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

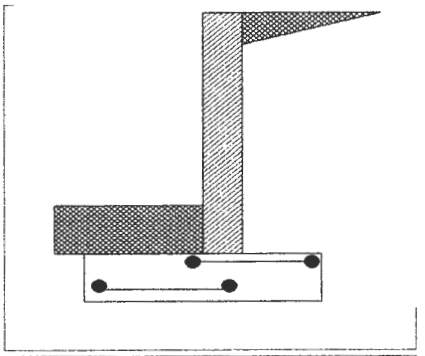
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	94.5 #/ft
...Height to Top	=	5.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	1.87	OK
Sliding	=	1.17	Ratio < 1.5!
Total Bearing Load	=	1,820 lbs	
...resultant ecc.	=	9.17 in	
Soil Pressure @ Toe	=	982 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,800 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,178 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	9.6 psi	OK
Footing Shear @ Heel	=	9.0 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	1,050.8 lbs	
less 100% Passive Force	= -	540.0 lbs	
less 100% Friction Force	= -	691.6 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	344.5 lbs	NG

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	16.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.760
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	1,272.5
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	2,514.6
Moment.....Allowable	=	3,309.4
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	20.2
Shear.....Allowable	psi =	69.7
Wall Weight	psf =	84.0
Rebar Depth 'd'	in =	5.25
Masonry Data		
f'm	psi =	1,500
Fy	psi =	60,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD
Concrete Data		
f'c	psi =	
Fy	psi =	

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	2.00
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,178	0 psf
Mu' : Upward	=	1,933	60 ft-#
Mu' : Downward	=	756	1,000 ft-#
Mu: Design	=	1,177	940 ft-#
Actual 1-Way Shear	=	9.58	9.02 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Item									
Heel Active Pressure	=	720.0	2.00	1,440.0	Soil Over Heel	=	800.0	3.33	2,666.7
Surcharge over Heel	=				Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=	330.8	3.50	1,157.6	Axial Dead Load on Stem	=			
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=			
	=				Soil Over Toe	=		1.00	
					Surcharge Over Toe	=			
Total		1,050.8	O.T.M.	2,597.6	Stem Weight(s)	=	420.0	2.33	980.0
	=		=		Earth @ Stem Transitions	=			
					Footing Weight	=	600.0	2.00	1,200.0
					Key Weight	=			
					Vert. Component	=			
					Total =		1,820.0 lbs	R.M.=	4,846.7

Resisting/Overturning Ratio = 1.87
Vertical Loads used for Soil Pressure = 1,820.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.034	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

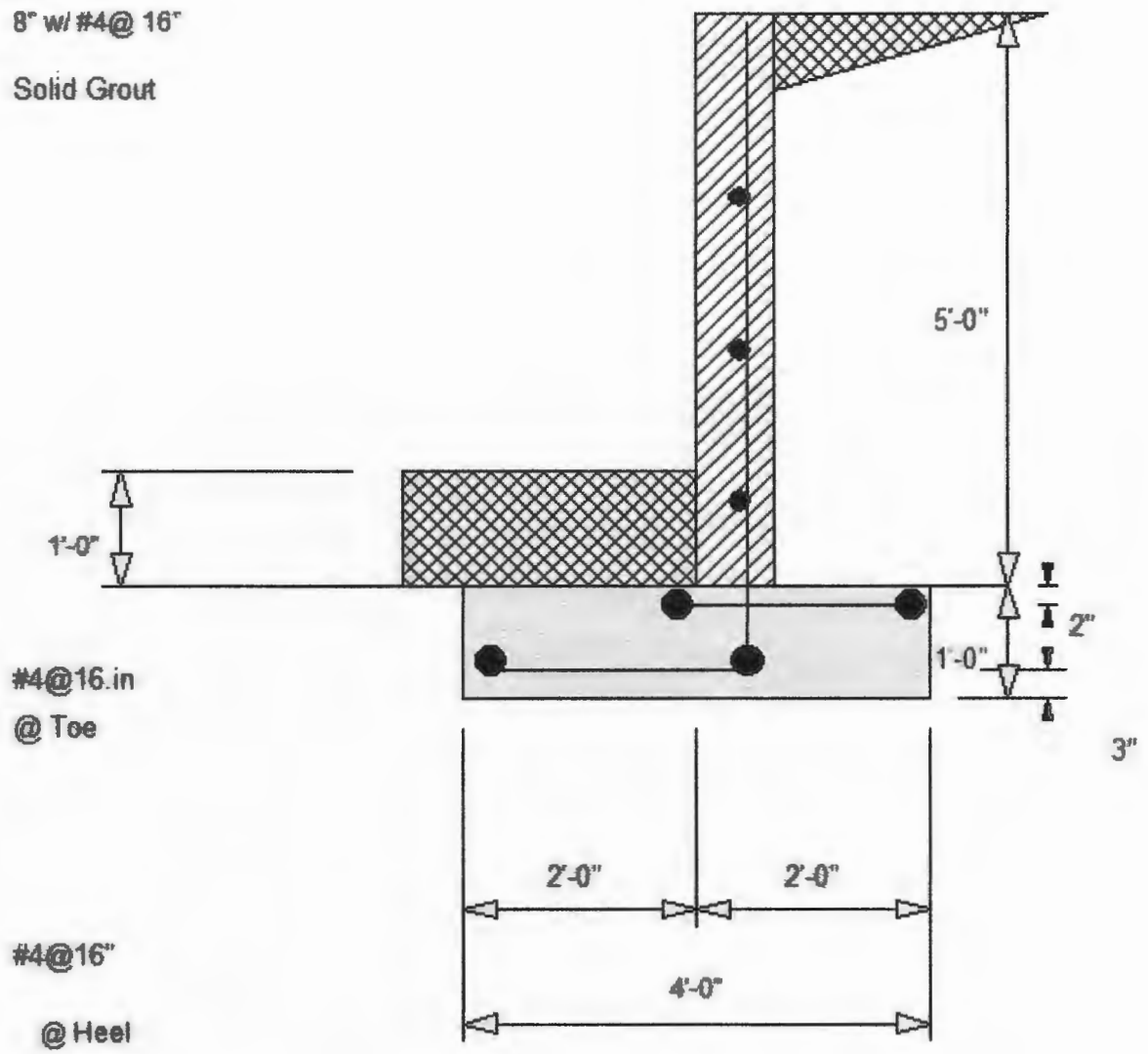
Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.1500 in2/ft
As Required =	0.3315 in2/ft

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

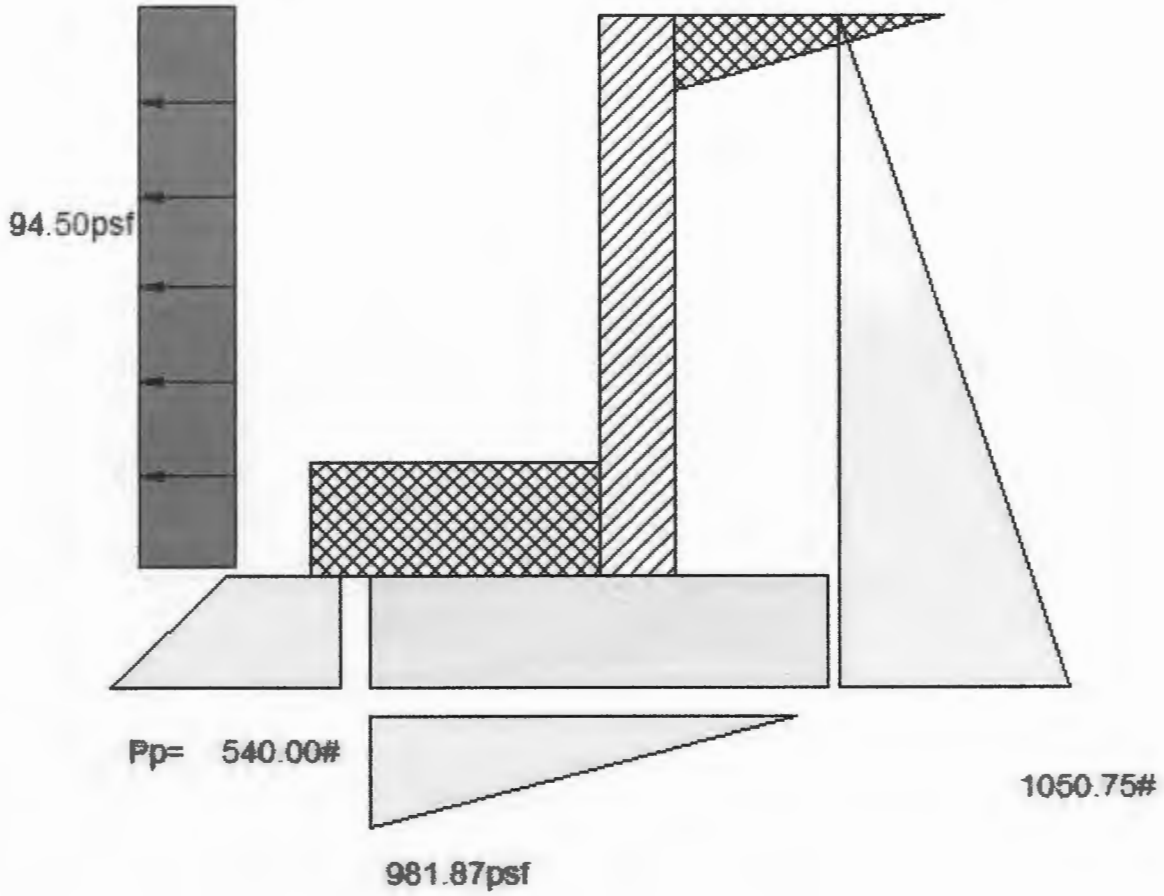


This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11



Welsh Structures, Inc.

Title **16/LS-1.02** Page : 1
Job # : Dsgnr: **AYD** Date: 10 JUN 2016
Description....

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

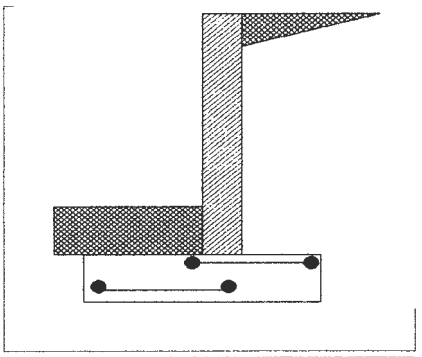
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	3.37 OK
Sliding	=	1.71 OK
Total Bearing Load	=	1,820 lbs
...resultant ecc.	=	1.54 in
Soil Pressure @ Toe	=	543 psf OK
Soil Pressure @ Heel	=	368 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	651 psf
ACI Factored @ Heel	=	441 psf
Footing Shear @ Toe	=	4.4 psi OK
Footing Shear @ Heel	=	5.0 psi OK
Allowable	=	82.2 psi

Sliding Calcs

Lateral Sliding Force	=	720.0 lbs
less 100% Passive Force	= -	540.0 lbs
less 100% Friction Force	= -	691.6 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 Stability	=	0.0 lbs OK

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	16.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.403
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	800.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	1,333.3
Moment.....Allowable	=	3,309.4
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	12.7
Shear.....Allowable	psi =	69.7
Wall Weight	psf =	84.0
Rebar Depth 'd'	in =	5.25
Masonry Data		
f'm	psi =	1,500
Fy	psi =	60,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD
Concrete Data		
f'c	psi =	
Fy	psi =	

This Wall in File: Z:\Projects\16-055 Portola Springs Community Park EPT\Calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	2.00
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	651	441 psf
Mu' : Upward	=	1,232	413 ft-#
Mu' : Downward	=	756	1,000 ft-#
Mu: Design	=	476	587 ft-#
Actual 1-Way Shear	=	4.44	4.96 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Item									
Heel Active Pressure	=	720.0	2.00	1,440.0	Soil Over Heel	=	800.0	3.33	2,666.7
Surcharge over Heel	=				Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=				Axial Dead Load on Stem	=			
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=			
	=				Soil Over Toe	=		1.00	
					Surcharge Over Toe	=			
Total		720.0	O.T.M.	1,440.0	Stem Weight(s)	=	420.0	2.33	980.0
	=		=		Earth @ Stem Transitions	=			
					Footing Weight	=	600.0	2.00	1,200.0
Resisting/Overturning Ratio	=	3.37			Key Weight	=			
Vertical Loads used for Soil Pressure	=	1,820.0 lbs			Vert. Component	=			
					Total =		1,820.0 lbs	R.M.=	4,846.7

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.019	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

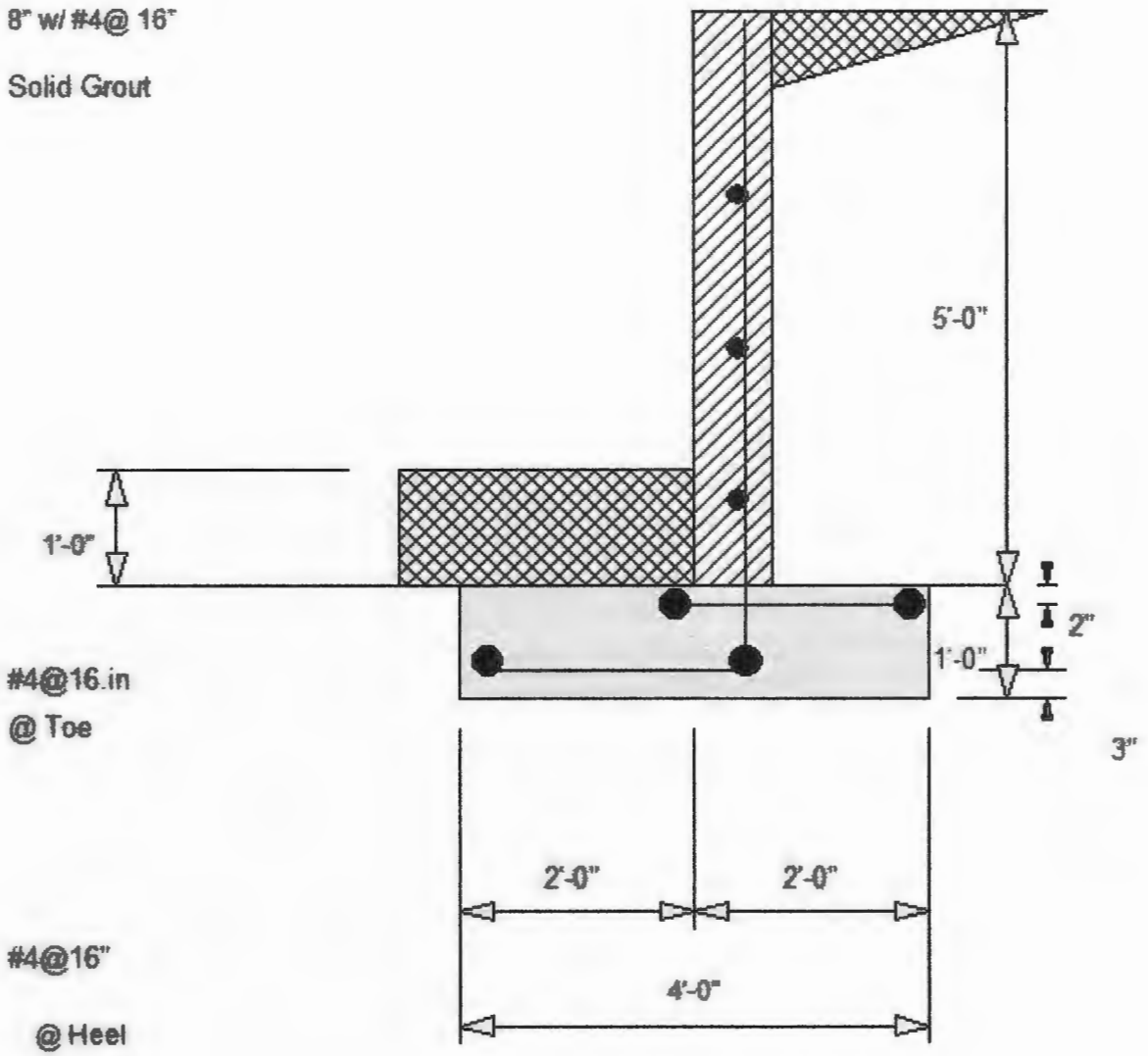
Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.1500 in2/ft
As Required =	0.1758 in2/ft

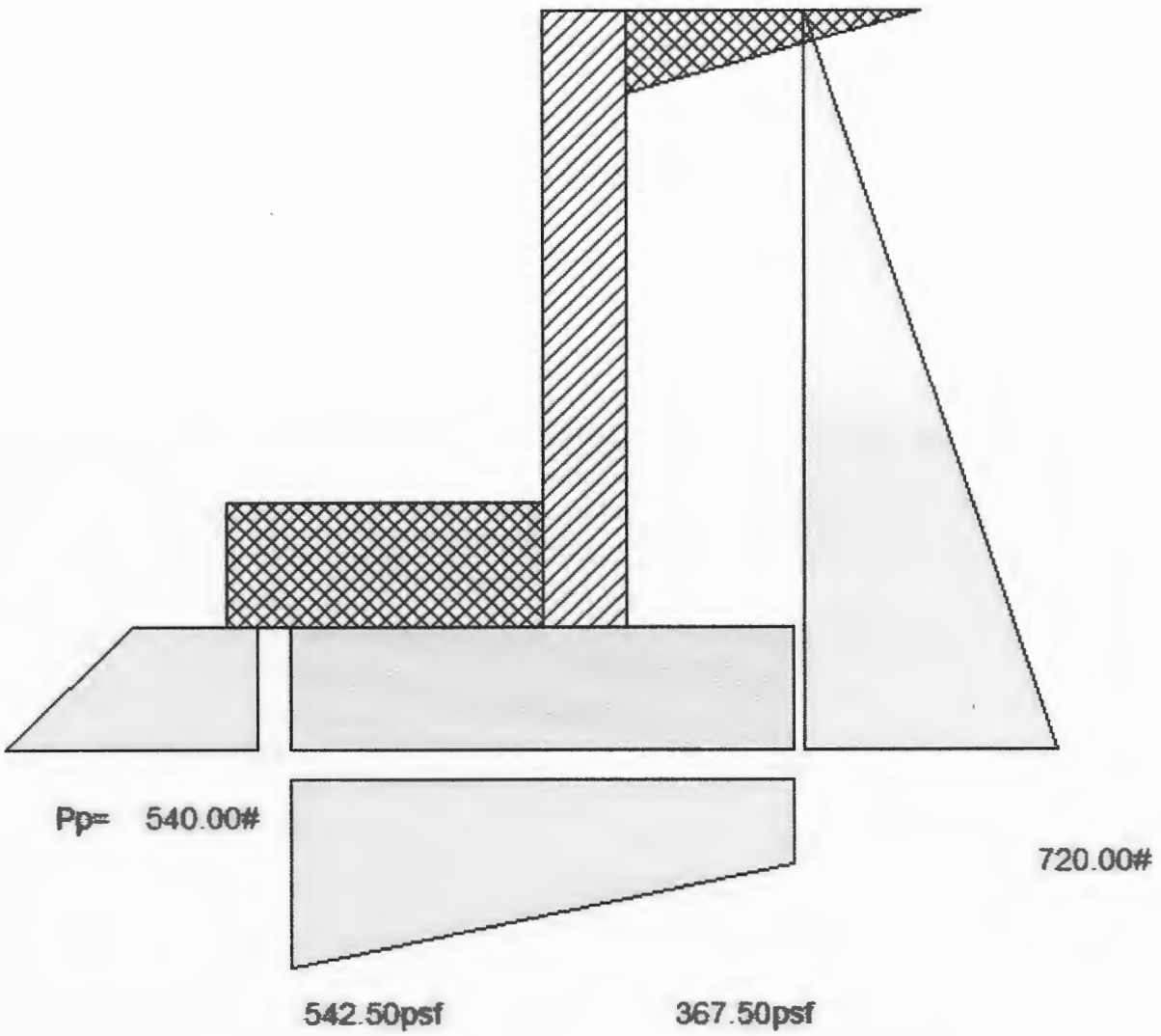
Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

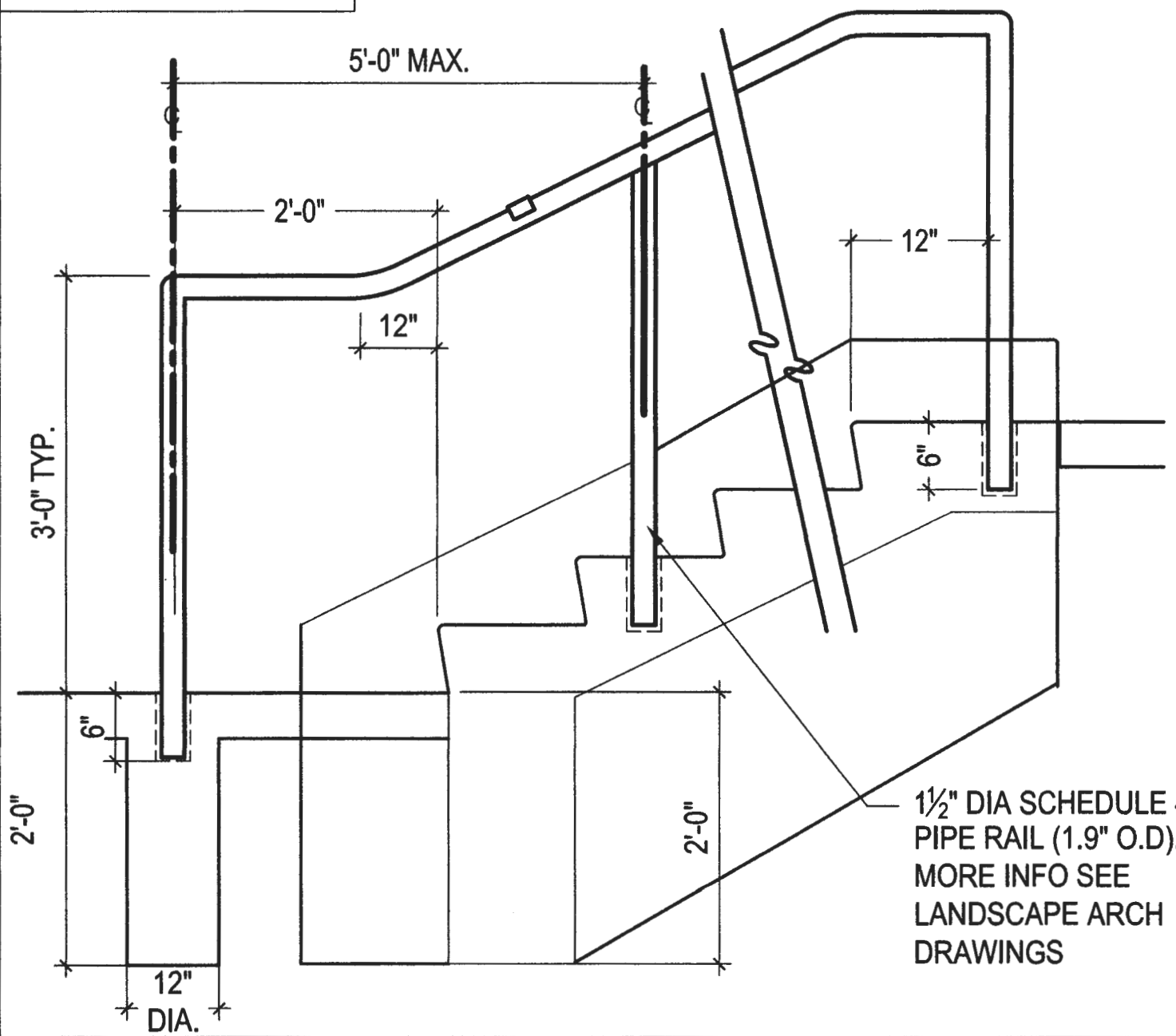


Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11



FOR STAIR ON GRADE
SEE 5/-



STAIR HANDRAILS

N/S

8

WELSH STRUCTURES, INC.

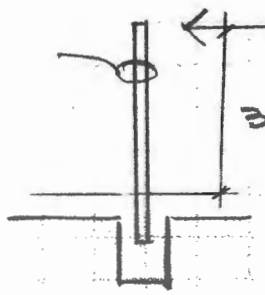
Project: _____ Sht: ____ of ____ Date: 6/3/2016

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 8/16 1.01

1½"ϕ STD PIPE (O.D. = 1.9")



$M_u = 1.7(.2)3 \times 12 = 12.24''^{k} < \phi M_n$

$\phi M_n = .9(.85)(.424) = 13.26''^{k}$

THUS 1½"ϕ SCH. 40 PIPE OKAY FOR HANDRAIL

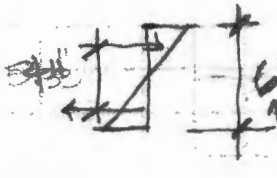
POLE TYPE FTG. 12"ϕ × 2'-0" CONSTRAINED BY CONC. SLAB AT TOP

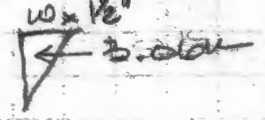
SEE FOLLOWING PAGE FOR CALC.

PIPE EMBEDMT IN FTG.

$M_u = 12.24''^{k}$

$T = C = 12.24/4 = 3.06^{k}$





$R = \frac{W}{2}$

$W = \frac{2(3.06)}{4(1.5")} = 1.02^{k/in} < \phi(.85 \times f'c)A_1$

$= .65(.85)3 = 1.66^{k/in}$

THUS 6" EMBEDMT OKAY

Pole Footing Embedded in Soil

File = z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06008584
Licensee : WELSH STRUCTURES

Description : 8/SL-1.01 Handrail

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

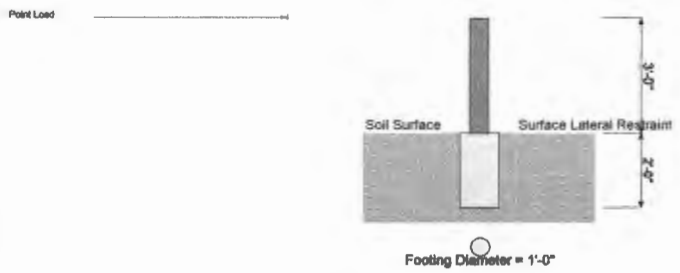
General Information

Pole Footing Shape	Circular
Pole Footing Diameter	12.0 in
Calculate Min. Depth for Allowable Pressures	
Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf

Controlling Values

Governing Load Combination : +D+L+H

Lateral Load	0.20 k
Moment	0.60 k-ft
Restraint @ Ground Surface	
Pressure at Depth	
Actual	**637.50** psf
Allowable	**720.0** psf
Surface Retraint Force	837.50 lbs
Minimum Required Depth	**2.0 ft**
Footing Base Area	0.7854 ft^2
Maximum Soil Pressure	0.0 ksf



Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (klf)		Applied Moment (kft)	Vertical Load (k)
D : Dead Load	k		k/ft	k-ft	k
Lr : Roof Live	k		k/ft	k-ft	k
L : Live	0.20 k		k/ft	k-ft	k
S : Snow	k		k/ft	k-ft	k
W : Wind	k		k/ft	k-ft	k
E : Earthquake	k		k/ft	k-ft	k
H : Lateral Earth	k		k/ft	k-ft	k
Load distance above ground surface	3.0 ft	TOP of Load above ground surface	ft		
		BOTTOM of Load above ground surface	ft		

Load Combination Results

Load Combination	Forces @ Ground Surface		Required	Pressure at Depth		Soil Increase
	Loads - (k)	Moments - (ft-k)	Depth - (ft)	Actual - (psf)	Allow - (psf)	Factor
+D+L+H	0.200	0.600	2.00	637.5	720.0	1.000

WELSH STRUCTURES, INC.

Project: _____ Sht: ____ of ____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: LATERAL LOADS

WIND:

Exposure C

$q_h = .00256(K_z \cdot K_{zt} \cdot K_d)V^2$

$= .00256(.85 \cdot 1.0 \cdot .85)110^2$

$= 22.38$

V = 110 mph

$K_z = .85$

$K_{zt} = 1.0$

$K_d = .85$

G = .85

$C_f = 1.4$

$F = q_h G C_f$

$= 22.38(.85)1.4 = 26.6 \rightarrow$ 27 psf (LRFD)

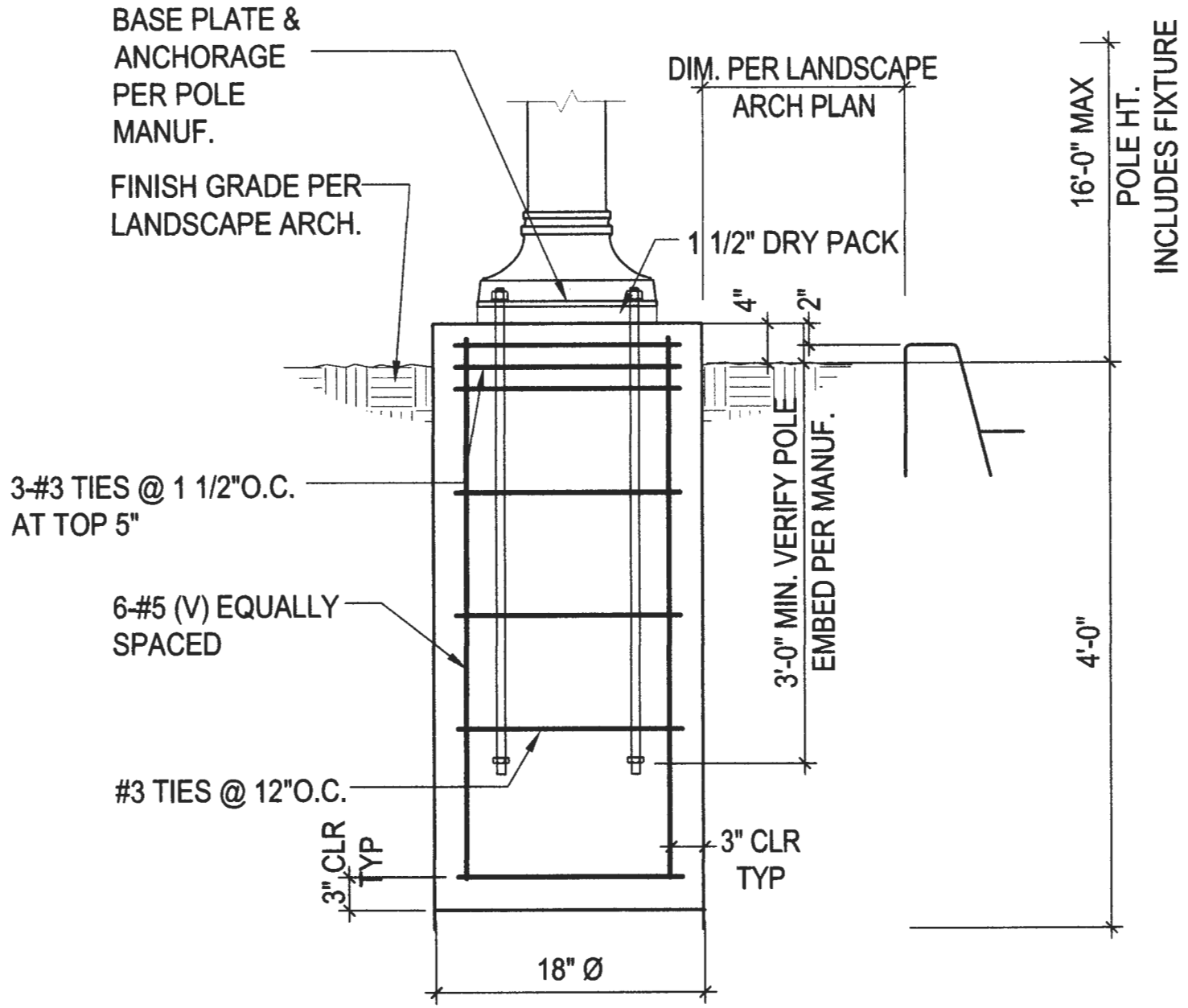
17 psf (ASD)

SEISMIC:

$V = .3(S_{DS})W$

$= .3(.99)W = .3W$ (LRFD)

$.3/1.4\,W = .214\,W$ (ASD)



LIGHT POLE FOOTING

N/S | 6

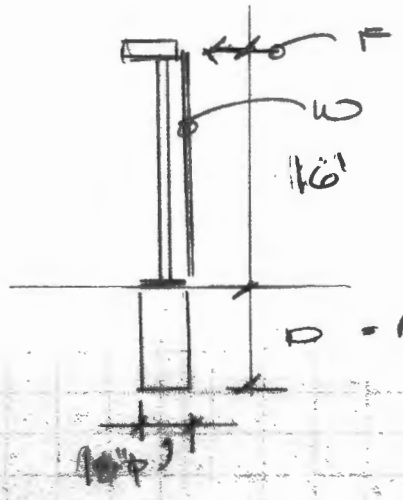
WELSH STRUCTURES, INC.

Project: _____ Sht: ____ of ____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 6/L31.01



$W = 6'' / 12 \left(27^{\#}/_{CF}\right) = 13.5^{\#}/_{LF}$ (6 LEVELS)

$F = 2.5 \times 1.5' \times 27^{\#}/_{CF} = 101^{\#}$

PER MANUFACTURER

ALLOWABLE PASSIVE = $340^{\#}/_{CF}$ W/ DURATION FACTOR PER CBC 1806.3.4

FOLLOWING ON PAGE FOR FOOTING DEPTH CALC.

Pole Footing Embedded in Soil

File = z:\Projects\1TBZ00~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06008584
Licensee : WELSH STRUCTURES

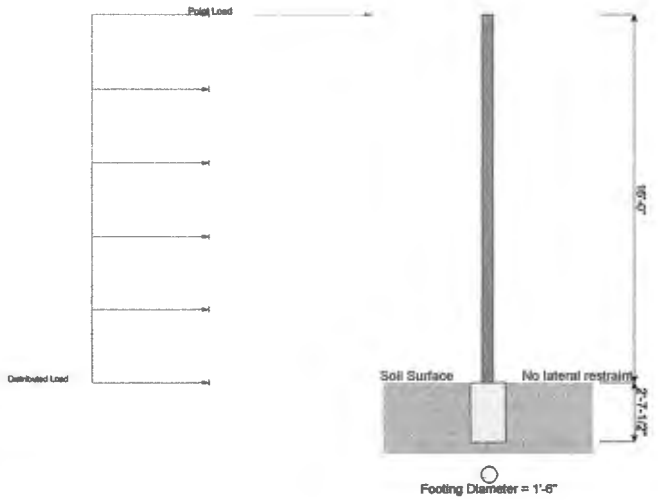
Description : LIGHT POLE 6/LS-1.01

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf



Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	0.1902 k
Moment	2.006 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**619.04** psf
Allowable	**623.87** psf

Minimum Required Depth	**2.625 ft**

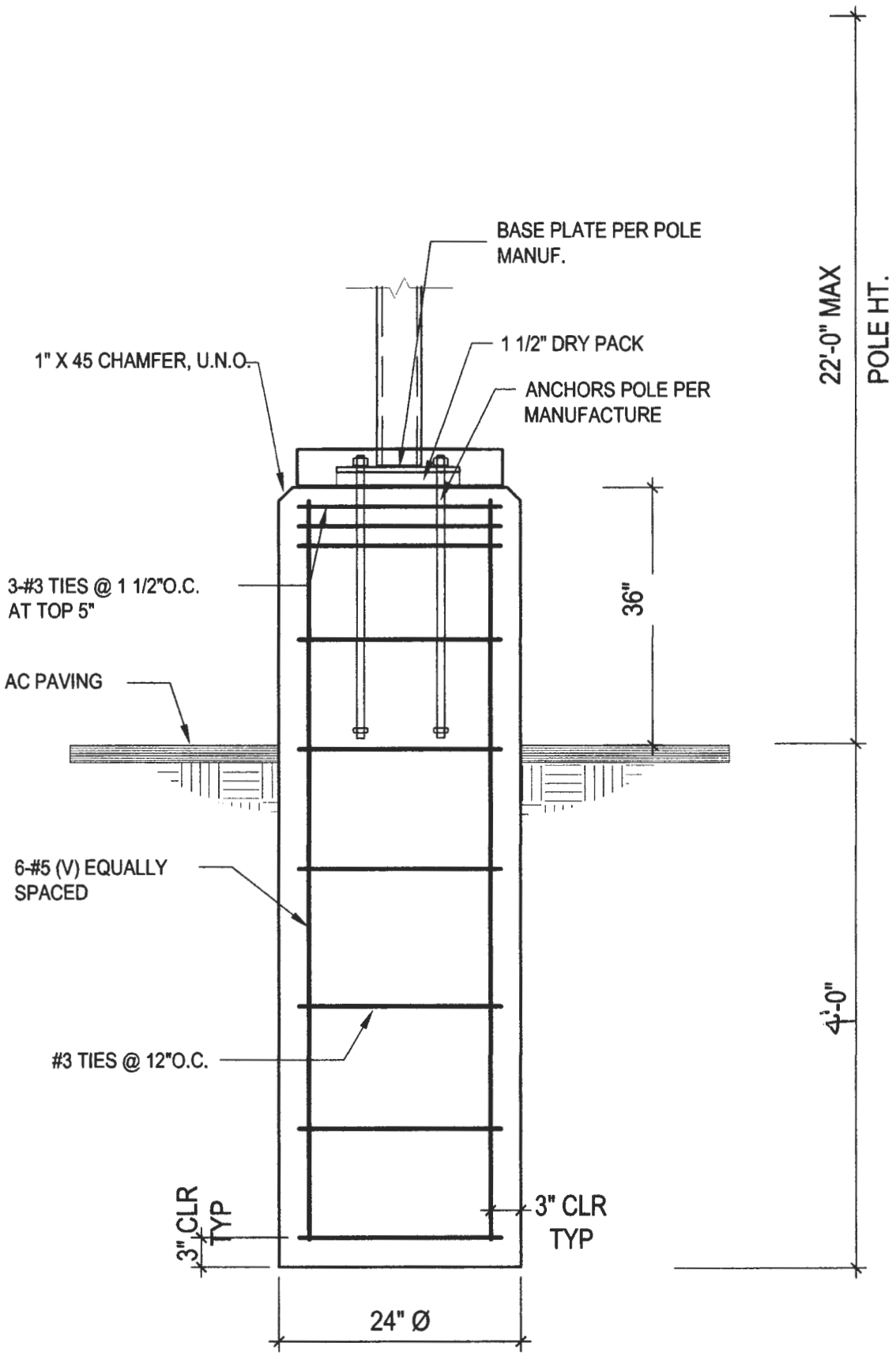
Footing Base Area	1.767 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)		Vertical Load (k)
D : Dead Load	k		k/ft	k
Lr : Roof Live	k		k/ft	k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	0.1010 k	0.01350	k/ft	k
E : Earthquake	k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	16.0 ft	TOP of Load above ground surface 16.0	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	0.190	2.006	2.63	619.0	623.9	2.000



PARKING LOT LIGHT POLE FOOTING

N/S

9

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06008584
Licensee : WELSH STRUCTURES

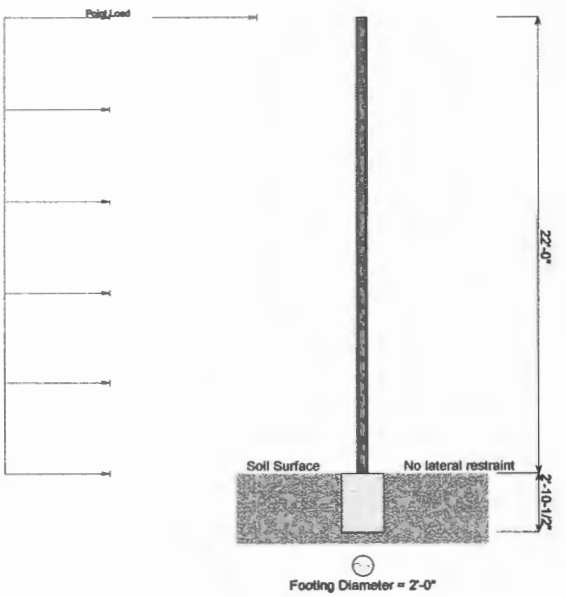
Description : LIGHT POLE 9/LS-1.02

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf



Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	0.2388 k
Moment	3.293 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**655.58** psf
Allowable	**660.76** psf
Minimum Required Depth	**2.875** ft
Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

NEGLECT TOP 1'

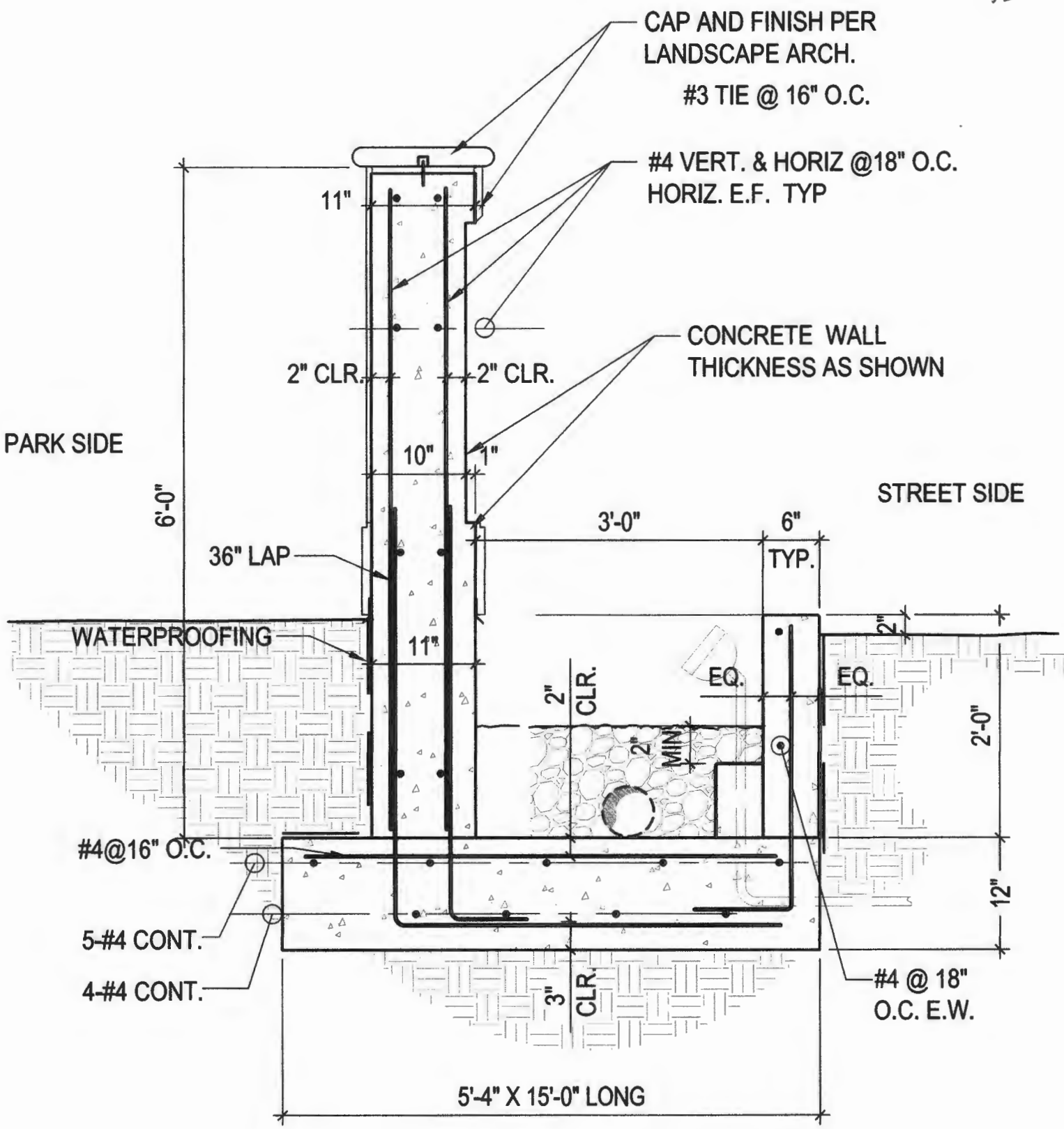
+1' = 3.875'

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)			Vertical Load (k)
D : Dead Load	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Lr : Roof Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
L : Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
S : Snow	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
W : Wind	0.1010 k	0.01350	0.0	0.0 k/ft	0.0 k
E : Earthquake	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
H : Lateral Earth	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Load distance above ground surface	22.0 ft	TOP of Load above ground surface: 22.0	0.0	0.0 ft	
		BOTTOM of Load above ground surface: 0.0	0.0	0.0 ft	

Load Combination Results

Load Combination	Forces @ Ground Surface: Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth: Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	0.239	3.293	2.88	655.6	660.8	2.000



PARK ENTRY MONUMENT

N/S | 7

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk**

Sht: _____ of _____

By: _____

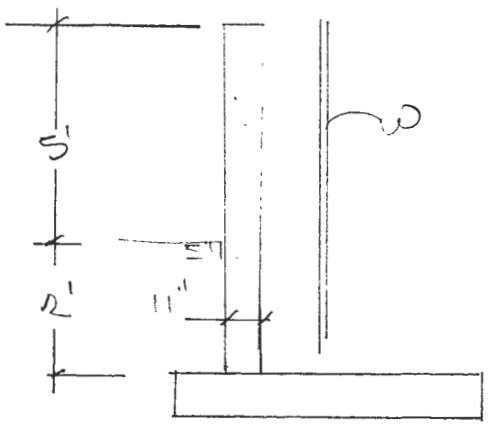
Checked By: _____

Date: **6/3/2016**

JOB#: **16-055**

Drawing #: 7/LS1.01

Subject: _____



11" MAX CONC WALL

$V = .3 S_{DS} I w$

$= .3 \times 1.0 \times 1.0 w$

$= .3 w$ (LRFD)

$w = .3\,(1' \text{ WIDE})(.15)$

$= .045$ K/'

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

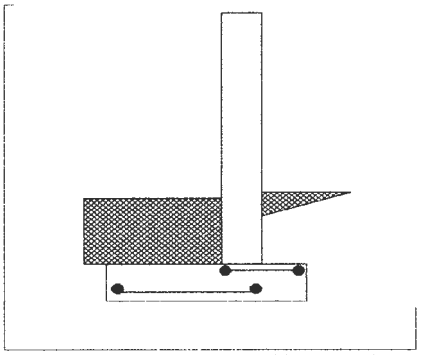
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	2.00 ft
Wall height above soil	=	5.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	22.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	45.0 #/ft
...Height to Top	=	7.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	4.61 OK
Sliding	=	4.94 OK
Total Bearing Load	=	1,876 lbs
...resultant ecc.	=	0.09 in
Soil Pressure @ Toe	=	413 psf OK
Soil Pressure @ Heel	=	421 psf OK
Allowable	=	3,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	495 psf
ACI Factored @ Heel	=	505 psf
Footing Shear @ Toe	=	0.6 psi OK
Footing Shear @ Heel	=	0.3 psi OK
Allowable	=	82.2 psi

Sliding Calcs

Lateral Sliding Force	=	400.5 lbs
less 100% Passive Force	= -	1,265.0 lbs
less 100% Friction Force	= -	712.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 Stability	=	0.0 lbs OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	LRFD
Thickness	=	11.00
Rebar Size	=	# 4
Rebar Spacing	=	10.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	0.122
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	443.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	1,187.8
Moment.....Allowable	=	9,735.1
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	4.0
Shear.....Allowable	psi =	82.2
Wall Weight	psf =	137.5
Rebar Depth 'd'	in =	9.25

MIN. STEEL GOVERNS
OR #4@18"O.C.@ EA FACE
As = .2 x 2 FACE (12/18) = .26 IN²
#4@10 = .2(12/10) = .24 IN² OK
USE #4@18"O.C. E.F.

Masonry Data

f'm	psi =	
Fy	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD

Concrete Data

f'c	psi =	3,000.0
Fy	psi =	60,000.0

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	2.59 ft
Heel Width	=	1.91
Total Footing Width	=	4.50
Footing Thickness	=	12.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	495	505 psf
Mu' : Upward	=	1,667	250 ft-#
Mu' : Downward	=	1,489	231 ft-#
Mu: Design	=	178	-19 ft-#
Actual 1-Way Shear	=	0.64	0.32 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 10.00 in
Heel Reinforcing = # 4 @ 10.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm

Summary of Overturning & Resisting Forces & Moments

		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#			.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	180.0	1.00	180.0	Soil Over Heel	=	238.4	4.00	954.4
Surcharge over Heel	=				Sloped Soil Over Heel	=			
Surcharge Over Toe	=				Surcharge Over Heel	=			
Adjacent Footing Load	=				Adjacent Footing Load	=			
Added Lateral Load	=	220.5	4.50	992.3	Axial Dead Load on Stem	=			
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=			
	=				Soil Over Toe	=		1.30	
					Surcharge Over Toe	=			
Total		400.5	O.T.M.	1,172.3	Stem Weight(s)	=	962.5	3.05	2,934.0
	=		=		Earth @ Stem Transitions	=			
					Footing Weight	=	675.0	2.25	1,518.8
					Key Weight	=		2.50	
					Vert. Component	=			
					Total =		1,875.9 lbs	R.M.=	5,407.2

Resisting/Overturning Ratio = 4.61
Vertical Loads used for Soil Pressure = 1,875.9 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.019	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

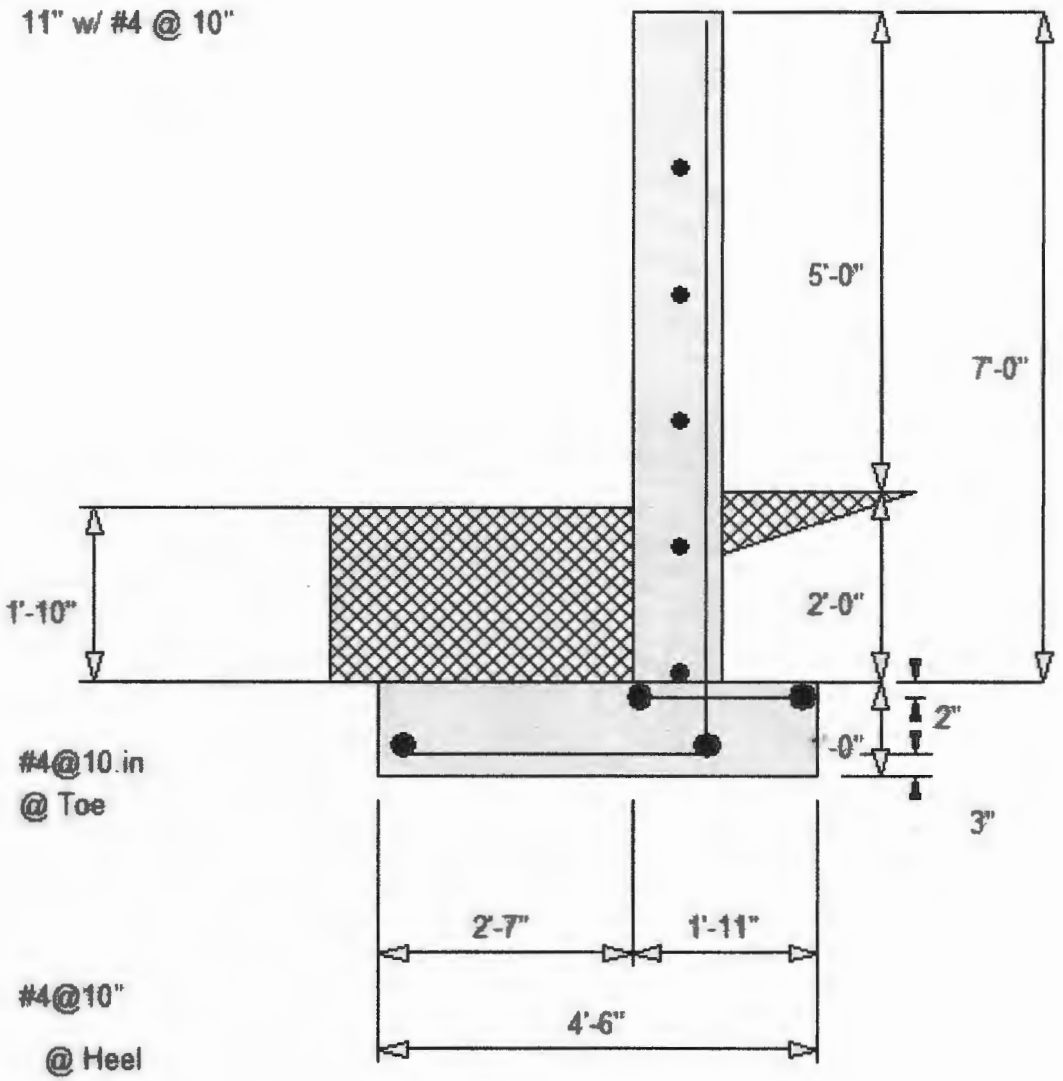
Lap Splice length for #4 bar specified in this stem design segment =	17.09 in
Development length for #4 bar specified in this stem design segment =	13.15 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.2400 in2/ft
As Required =	0.2376 in2/ft

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

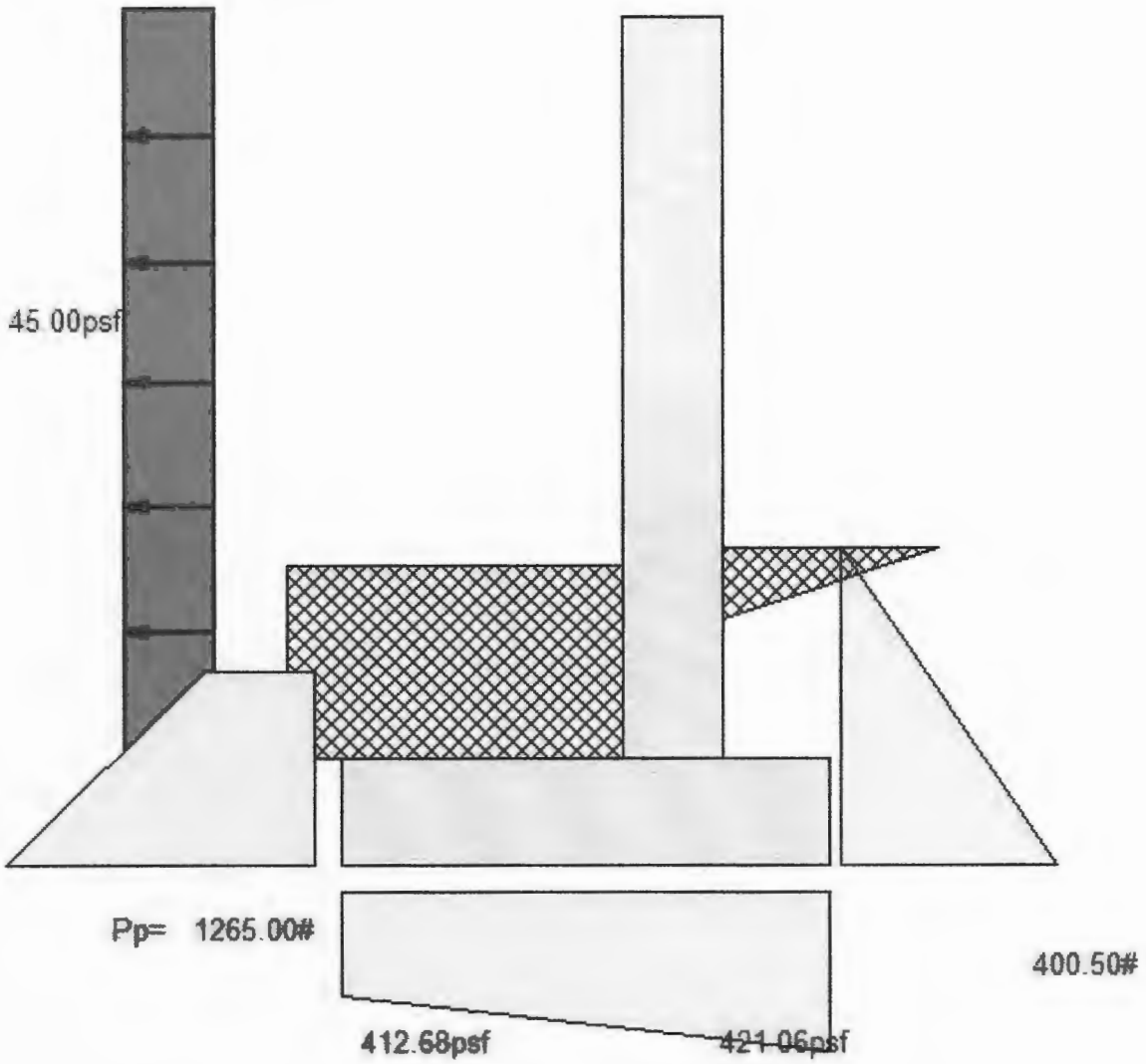


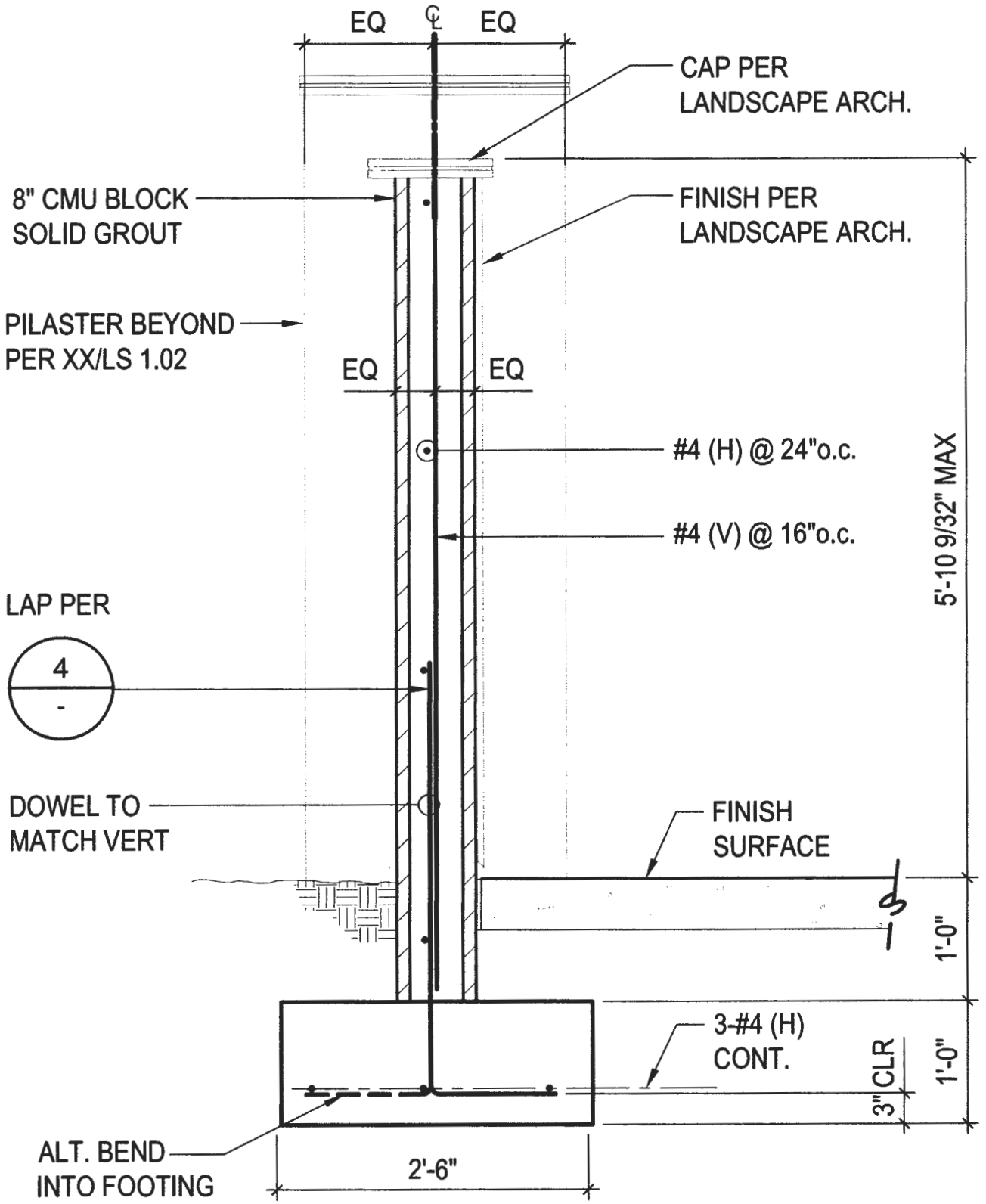
This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11





LS1.01

ENCLOSURE WALL

N/S | 9

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk** Sht: _____ of _____ Date: **6/3/2016**

By: _____ JOB#: **16-055**

Checked By: _____ Drawing #: 9/S1.01

Subject: _____

ENCLOSURE WALL, 8" CMU

$H_{MAX} = 7'$

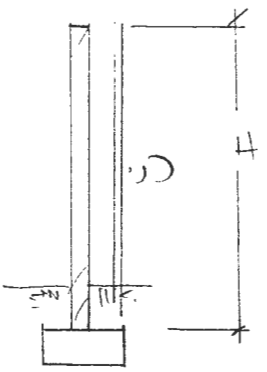
$V = .2W/1.4 = .22W$

↑ ASD

STUCCO

$W_{EQ} = .22\,(85 + 10''(25\text{ SIDES}))$

$= 20.1^{k}$



This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

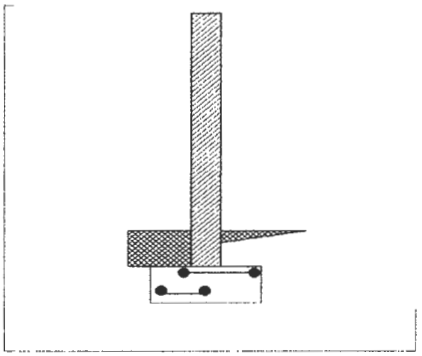
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	1.00 ft
Wall height above soil	=	6.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	31.5 #/ft
...Height to Top	=	7.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	1.91 OK
Sliding	=	4.04 OK
Total Bearing Load	=	1,073 lbs
...resultant ecc.	=	7.39 in
Soil Pressure @ Toe	=	1,128 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,354 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	5.9 psi OK
Footing Shear @ Heel	=	2.3 psi OK
Allowable	=	82.2 psi

Sliding Calcs

Lateral Sliding Force	=	234.4 lbs
less 100% Passive Force	= -	540.0 lbs
less 100% Friction Force	= -	407.7 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 Stability	=	0.0 lbs OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	16.00
Rebar Placed at	=	Center
Design Data		
fb/FB + fa/Fa	=	0.341
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	252.5
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	782.4
Moment.....Allowable	=	2,296.9
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	5.6
Shear.....Allowable	psi =	69.7
Wall Weight	psf =	84.0
Rebar Depth 'd'	in =	3.75
Masonry Data		
f'm	psi =	1,500
Fy	psi =	60,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD
Concrete Data		
f'c	psi =	
Fy	psi =	

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	0.92 ft
Heel Width	=	1.58
Total Footing Width	=	2.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,354	0 psf
Mu' : Upward	=	477	4 ft-#
Mu' : Downward	=	186	186 ft-#
Mu: Design	=	292	182 ft-#
Actual 1-Way Shear	=	5.89	2.29 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	80.0	0.67	53.3	Soil Over Heel	= 110.0	2.04	224.6
Surcharge over Heel	=				Sloped Soil Over Heel	=		
Surcharge Over Toe	=				Surcharge Over Heel	=		
Adjacent Footing Load	=				Adjacent Footing Load	=		
Added Lateral Load	=	154.4	4.50	694.6	Axial Dead Load on Stem	=		
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=		
	=				Soil Over Toe	=	0.46	
					Surcharge Over Toe	=		
Total		234.4	O.T.M.	747.9	Stem Weight(s)	= 588.0	1.25	735.0
	=		=		Earth @ Stem Transitions	=		
					Footing Weight	= 375.0	1.25	468.8
					Key Weight	=		
					Vert. Component	=		
					Total =	1,073.0 lbs	R.M.=	1,428.3

Resisting/Overturning Ratio = 1.91
Vertical Loads used for Soil Pressure = 1,073.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.088	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

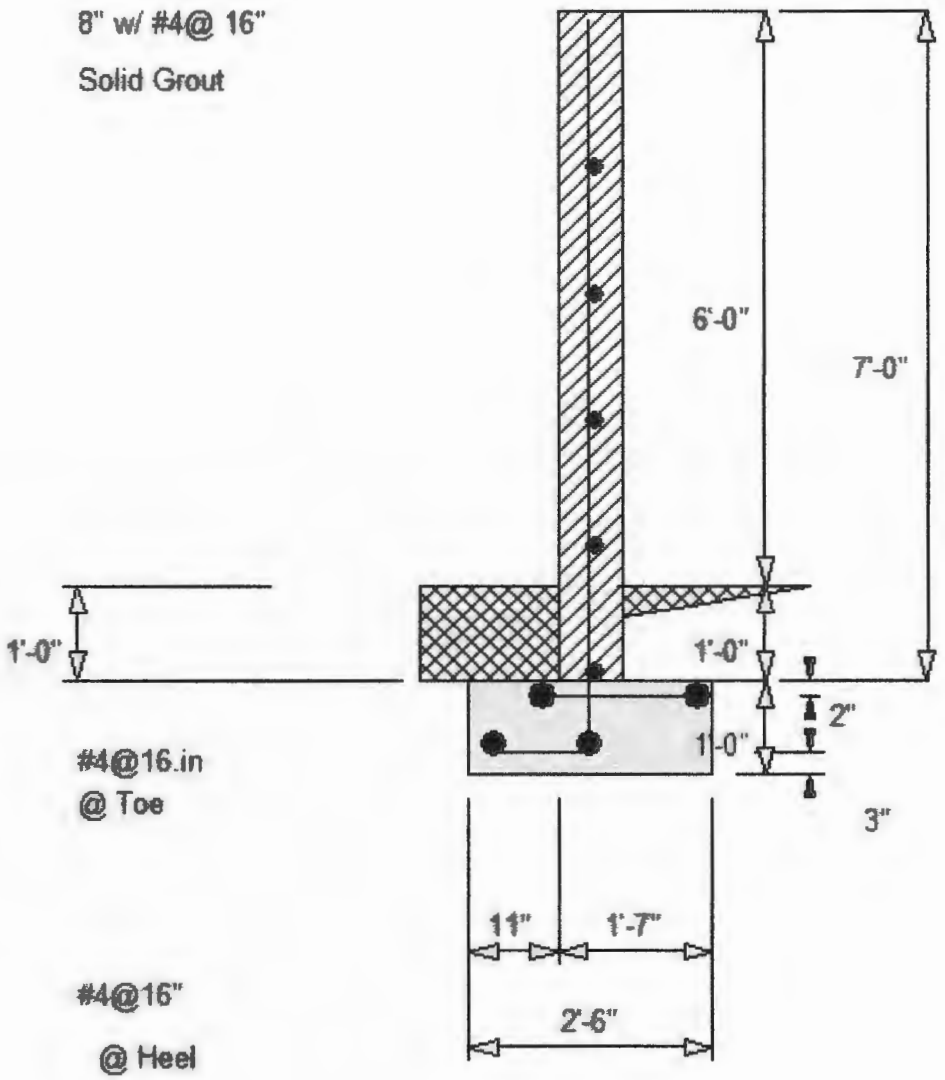
Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.1500 in2/ft
As Required =	0.1467 in2/ft

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

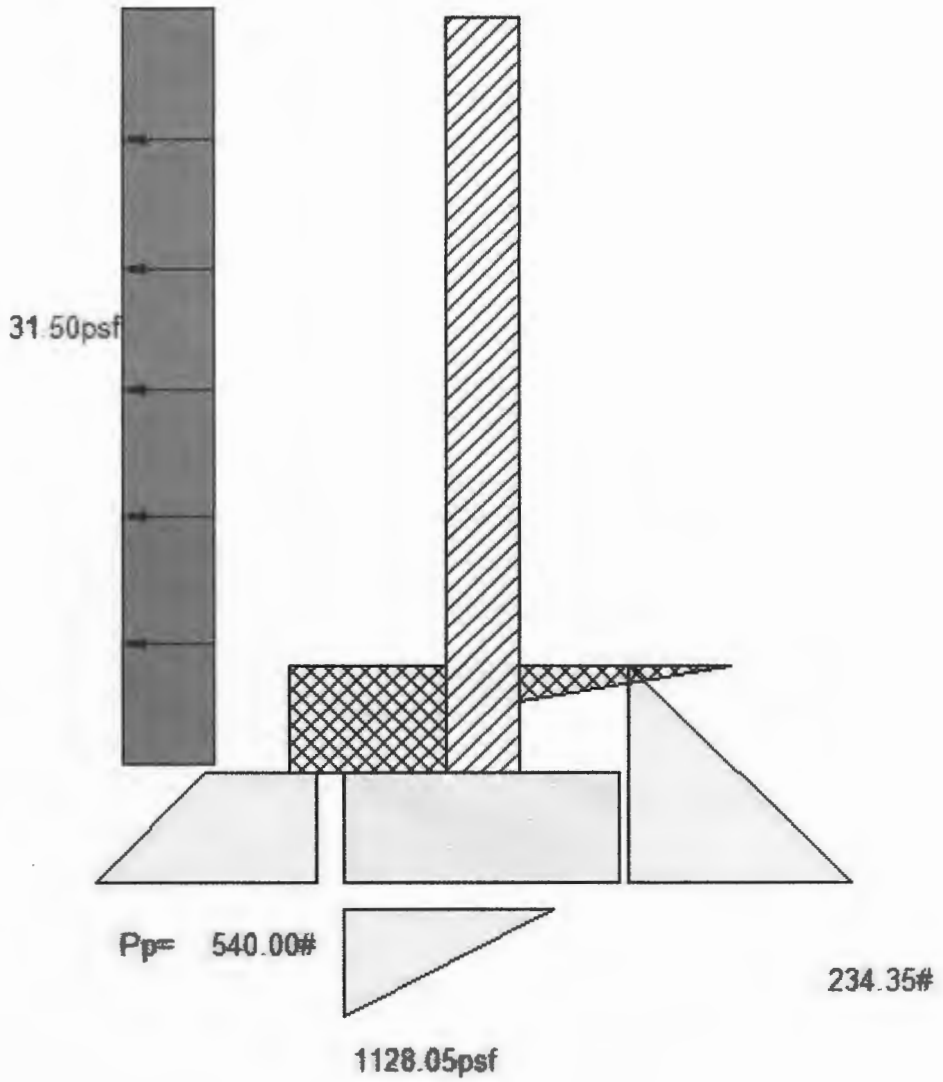
Code: CBC 2013,ACI 318-11,ACI 530-11

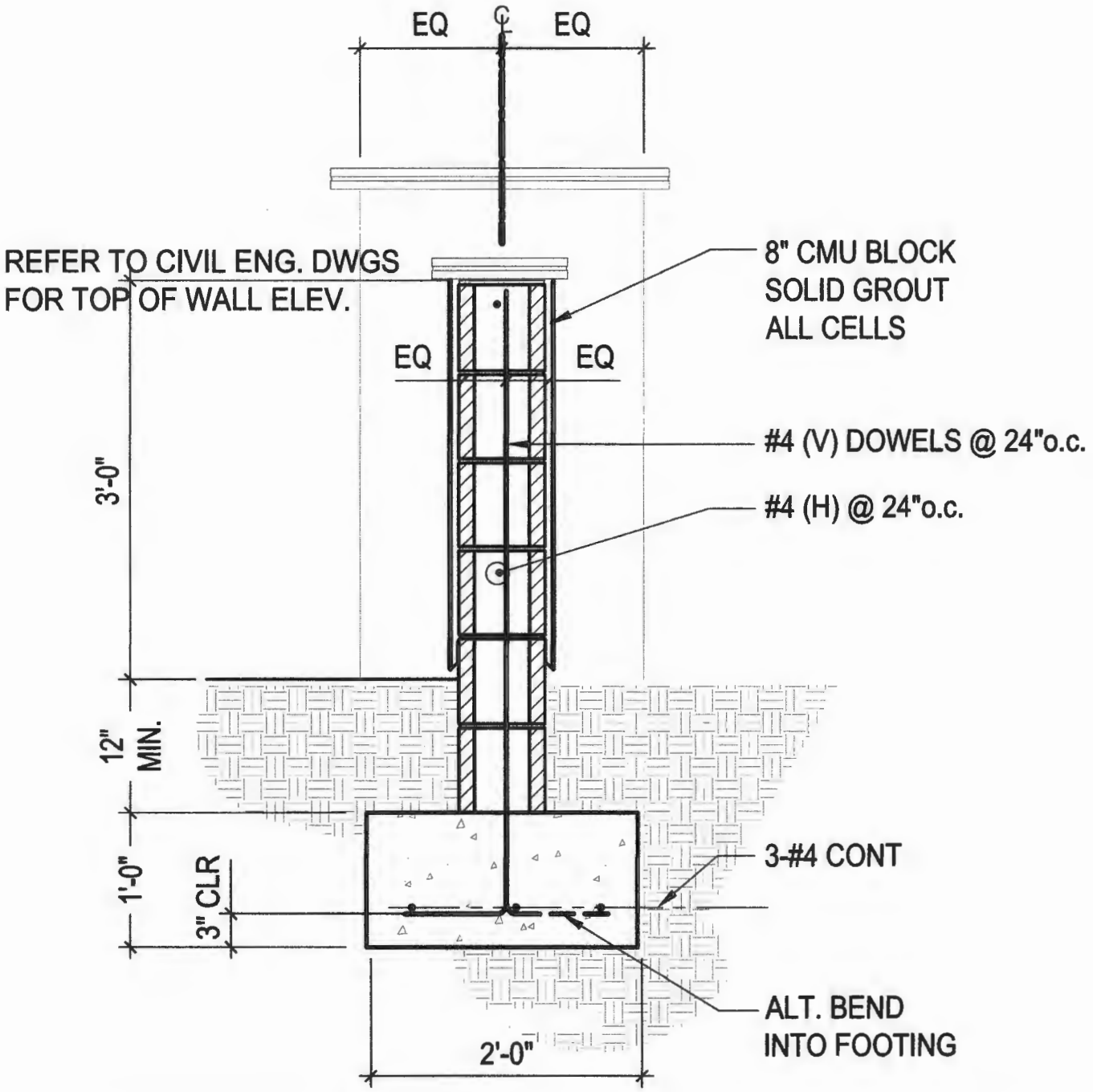


RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11





LOW PLASTER WALL

N/S 1

LS1.02

Welsh Structures, Inc.

Title 1/LS-1.02
Job # :
Description....

Dsgnr: SW

Page : 1
Date: 3 JUN 2016

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

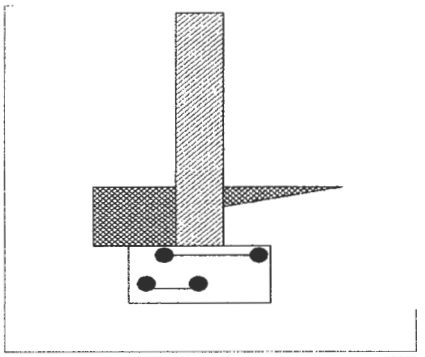
Code: CBC 2013,ACI 318-11,ACI 530-11

Criteria

Retained Height	=	1.00 ft
Wall height above soil	=	3.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,800.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	360.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	0.00 pcf
Footing||Soil Friction	=	0.380
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	31.5 #/ft
...Height to Top	=	4.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Design Summary

Wall Stability Ratios

Overturning	=	2.42 OK
Sliding	=	4.83 OK
Total Bearing Load	=	716 lbs
...resultant ecc.	=	4.44 in
Soil Pressure @ Toe	=	757 psf OK
Soil Pressure @ Heel	=	0 psf OK
Allowable	=	1,800 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	909 psf
ACI Factored @ Heel	=	0 psf
Footing Shear @ Toe	=	2.5 psi OK
Footing Shear @ Heel	=	1.2 psi OK
Allowable	=	82.2 psi

Sliding Calcs

Lateral Sliding Force	=	168.2 lbs
less 100% Passive Force	= -	540.0 lbs
less 100% Friction Force	= -	272.1 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 Stability	=	0.0 lbs OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	CBC 2013,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Masonry
Design Method	=	LRFD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	24.00
Rebar Placed at	=	Center
Design Data		
fb/FB + fa/Fa	=	0.166
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	158.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	262.7
Moment.....Allowable	=	1,583.3
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	3.5
Shear.....Allowable	psi =	69.7
Wall Weight	psf =	84.0
Rebar Depth 'd'	in =	3.75
Masonry Data		
f'm	psi =	1,500
Fy	psi =	60,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	7.60
Masonry Block Type	=	Normal Weight
Masonry Design Method	=	LRFD
Concrete Data		
f'c	psi =	
Fy	psi =	

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

Footing Dimensions & Strengths

Toe Width	=	0.67 ft
Heel Width	=	1.33
Total Footing Width	=	2.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	909	0 psf
Mu' : Upward	=	178	14 ft-#
Mu' : Downward	=	108	108 ft-#
Mu: Design	=	70	94 ft-#
Actual 1-Way Shear	=	2.46	1.24 psi
Allow 1-Way Shear	=	82.16	82.16 psi

Toe Reinforcing = # 4 @ 16.00 in
Heel Reinforcing = # 4 @ 16.00 in
Key Reinforcing = # 4 @ 0.00 in

Other Acceptable Sizes & Spacings

Toe: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	80.0	0.67	53.3	Soil Over Heel	= 80.0	1.67	133.3
Surcharge over Heel	=				Sloped Soil Over Heel	=		
Surcharge Over Toe	=				Surcharge Over Heel	=		
Adjacent Footing Load	=				Adjacent Footing Load	=		
Added Lateral Load	=	88.2	3.00	264.6	Axial Dead Load on Stem	=		
Load @ Stem Above Soil	=				* Axial Live Load on Stem	=		
	=				Soil Over Toe	=	0.33	
					Surcharge Over Toe	=		
Total		168.2	O.T.M.	317.9	Stem Weight(s)	= 336.0	1.00	335.9
	=		=		Earth @ Stem Transitions	=		
					Footing Weight	= 300.0	1.00	299.9
					Key Weight	=		
					Vert. Component	=		
					Total =	715.9 lbs	R.M.=	769.1

Resisting/Overturning Ratio = 2.42
Vertical Loads used for Soil Pressure = 715.9 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.042	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

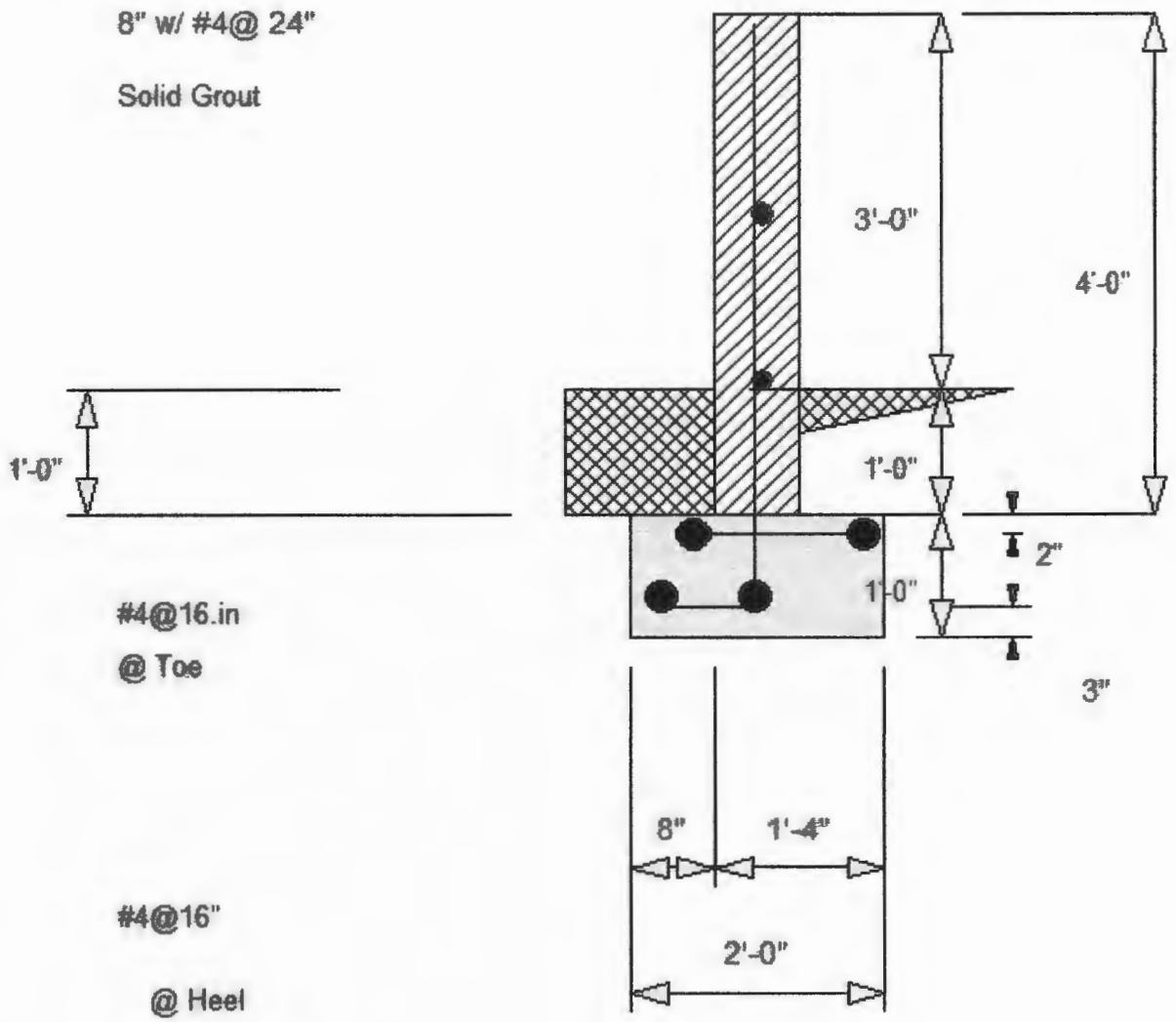
Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.1000 in2/ft
As Required =	0.0492 in2/ft

This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11

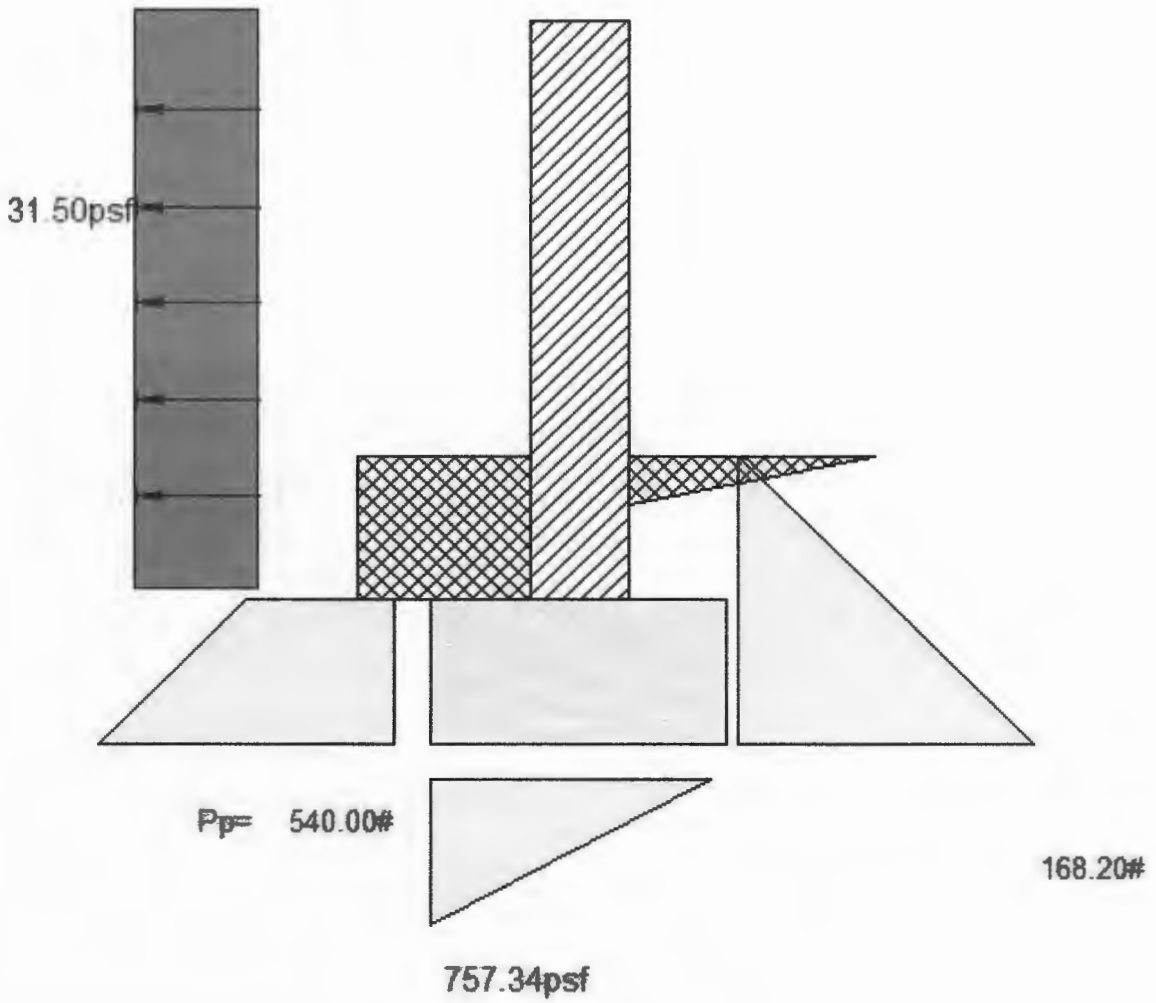


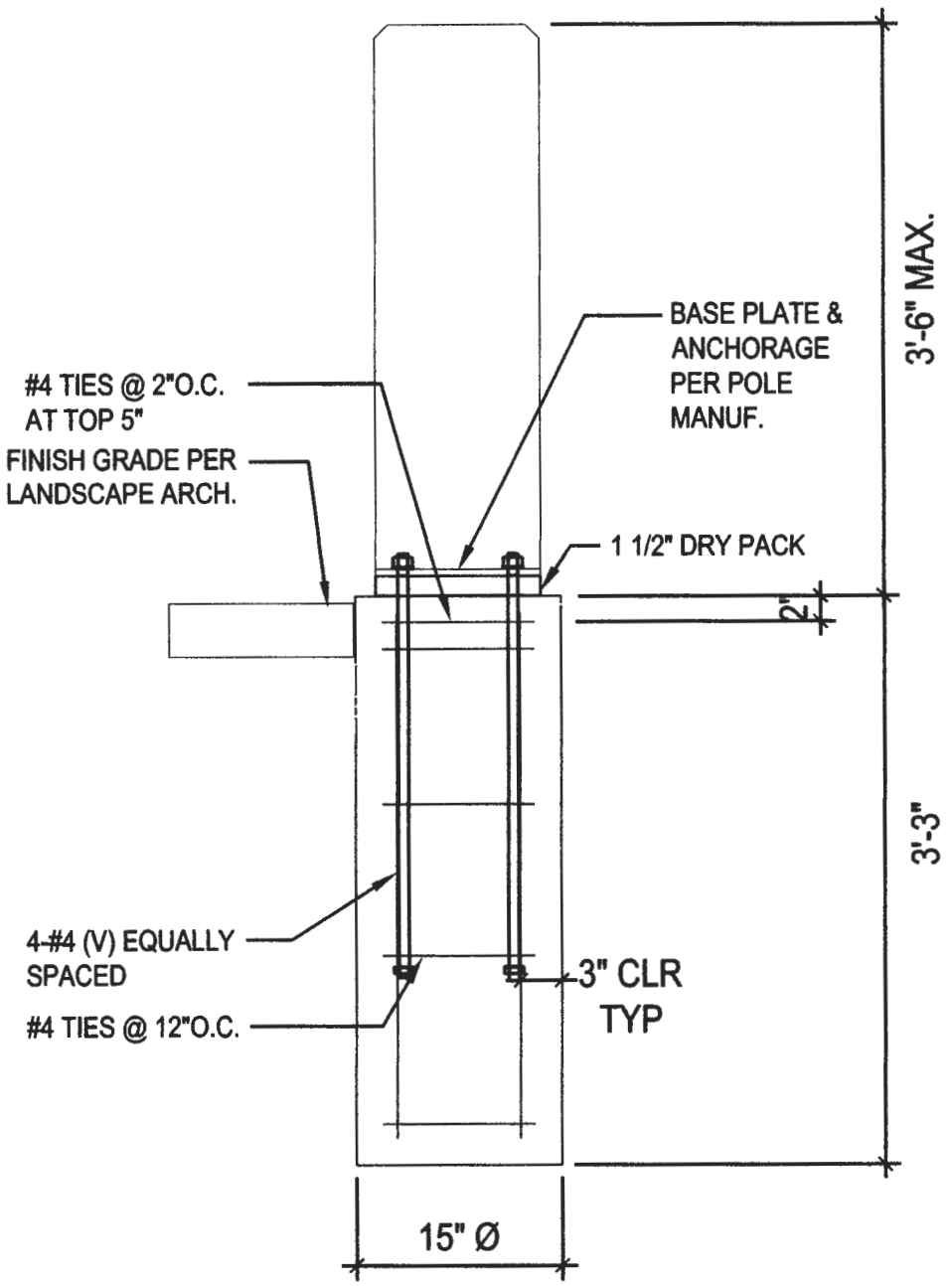
This Wall in File: z:\projects\16-055 portola springs community park ept\calculations\16-055.RPX

RetainPro (c) 1987-2015, Build 11.15.12.22
License : KW-06058836
License To : WELSH STRUCTURES

Cantilevered Retaining Wall

Code: CBC 2013,ACI 318-11,ACI 530-11





BOLLARD FOOTING

N/S	4

LS1.02

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID:

SC0

Printed: 3 JUN 2016, 2:18PM

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11

Lic. # : KW-06008584 — Licensee : WELSH STRUCTURES

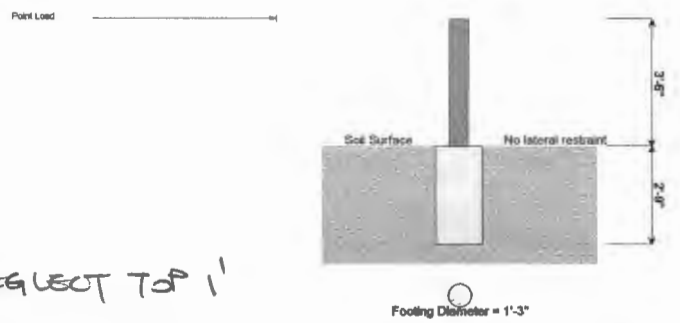
Description : 4/SL-1.02 Bollard Footing

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	15.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf



Controlling Values

Governing Load Combination : +D+L+H

Lateral Load	0.20 k
Moment	0.70 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	326.201 psf
Allowable	329.242 psf

NEGLECT TOP 1'

1' + 1'-9" = 2'-9"

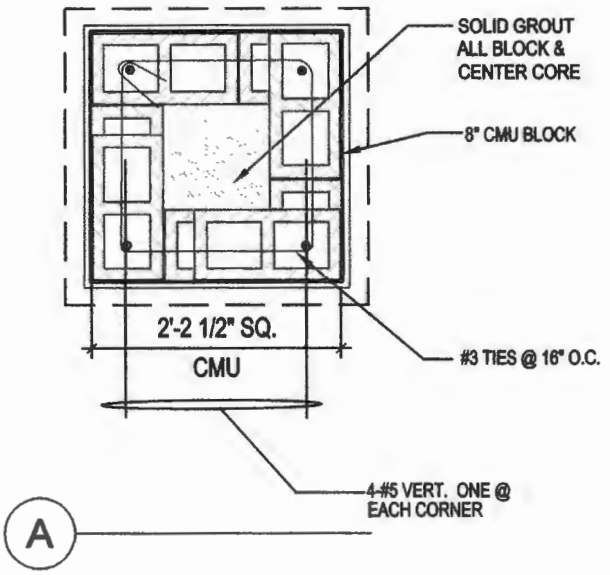
Minimum Required Depth	**2.750 ft**
Footing Base Area	1.227 ft^2
Maximum Soil Pressure	0.0 ksf

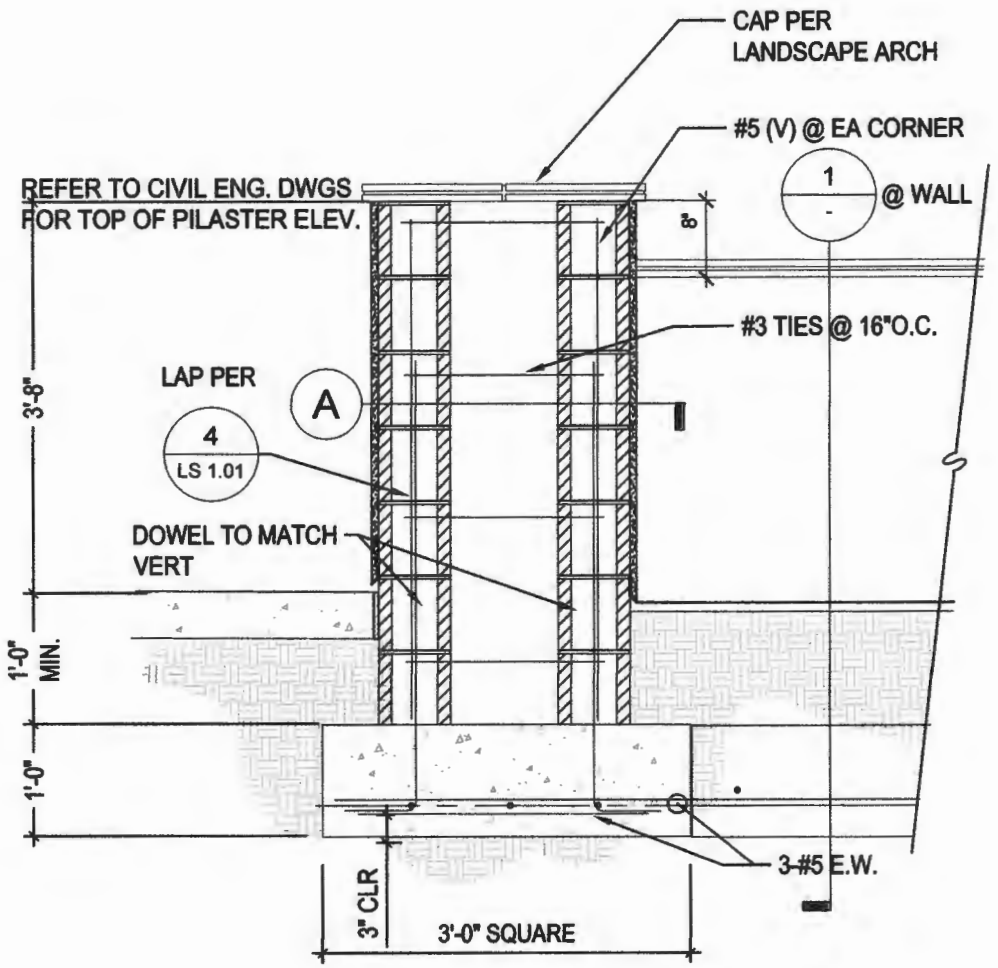
Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)			Vertical Load (k)
D : Dead Load	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Lr : Roof Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
L : Live	0.20 k	0.0	0.0	0.0 k/ft	0.0 k
S : Snow	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
W : Wind	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
E : Earthquake	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
H : Lateral Earth	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Load distance above ground surface	3.50 ft	TOP of Load above ground surface			
		0.0	0.0	0.0 ft	
		BOTTOM of Load above ground surface			
		0.0	0.0	0.0 ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+L+H	0.200	0.700	2.75	326.2	329.2	1.000





COURTYARD LOW PLASTER PILASTER | N/S | 3

/LS1.02

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk** Sht: ____ of ____ Date: **6/3/2016**

By: ____ JOB#: **16-055**

Checked By: ____ Drawing #: S/LS1.02

Subject: LOW PILASTER

$H_{MAX} = 5'$

$W = 135\,(27"/12)^2 + 10^{\#}/_{SF}\,(27/12)(4\ SIDES)$ (STUCCO)

$= 773.4^{\#}$

$w_{ASD} = .22(773.4) = 170.2^{\#}/_{'}$

$M_{MAX} = 170.2(5^2/2) = 2127^{'\#}$

#5(V) @ EA CORNER $A_s = .31 \times 2 = .62$ in² $\rho = .62/27 \times 24 = .00919$

$n = 29$ $k = .2$ $j = .93$ $z/d = 10.7$

$f_b = \frac{2127(12)}{27(24)^2} \times 10.7 = 41.3$ psi $< F_b = 500$ psi OK

$f_s = \frac{2.13(12)}{.62(24)(.92)} = 1.8$ ksi $< F_s = 20$ ksi OK

$V_{PILASTER} = 773.4\,(5') = 3867^{\#}$

$W_{CMU} = 150(1)(3)^2 = 1350^{\#}$

$5217^{\#}$

$M_{OT} = 170.2(5)(5/2 + 1) = 2978.5^{'\#}$

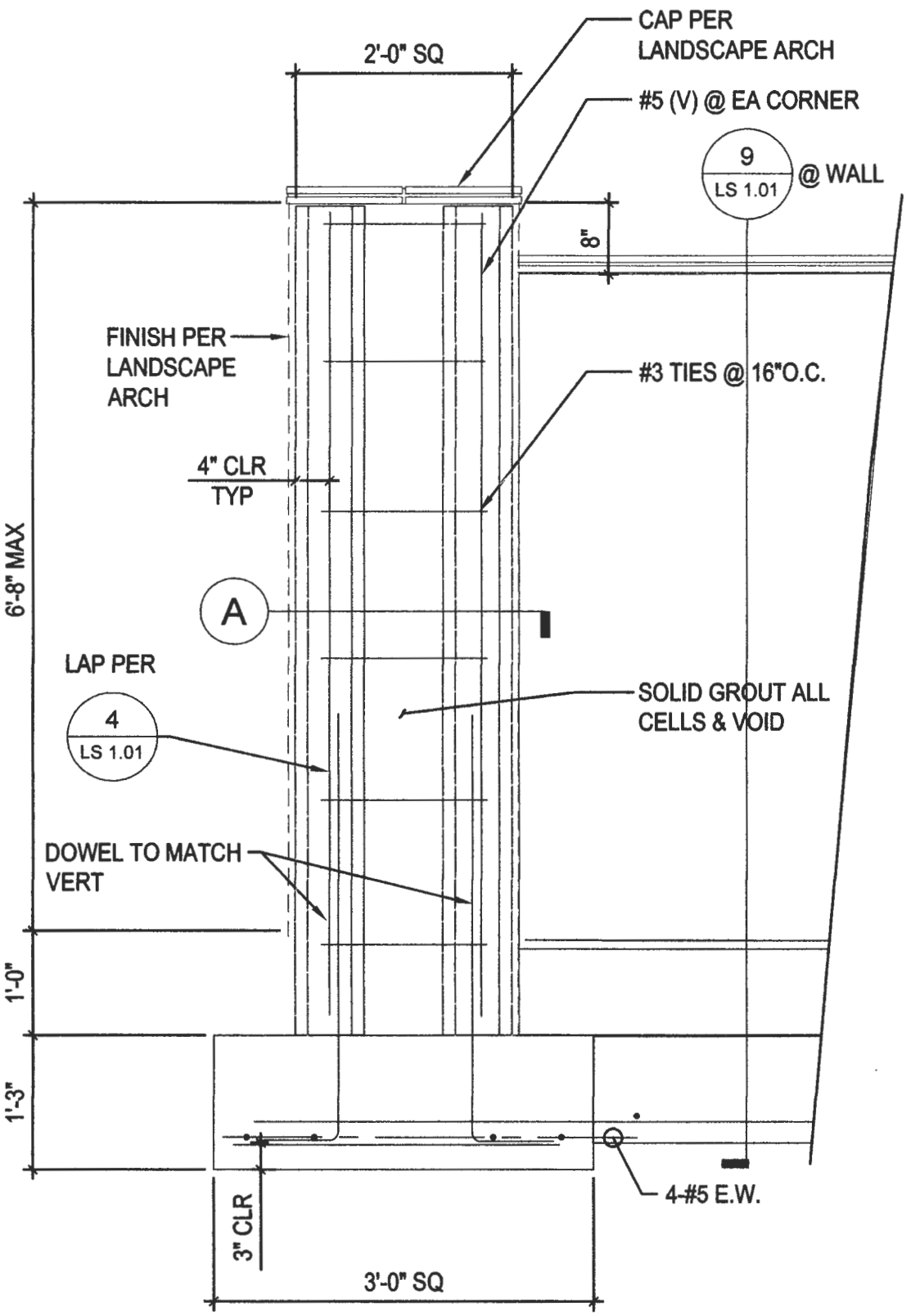
$M_R = 5217 \times 1.5 = 7825.5^{'\#} \rightarrow M_R/M_{OT} = 2.6 > 1.5$ OK

$\bar{y} = \frac{7825.5 - 2978.5}{5217} = .92' < 4/2$

$v_j = \frac{2(5217)}{2(.92)(24)} = 124.8^{\#}/_{in} <$ ALLOWABLE $= 180^{\#}/_{in}$ OK

USE #5(V) @ EA CORNER

V @ 24" O.C. MIN



ENCOLSURE PILASTER | N/S | 7 / LS1.02

WELSH STRUCTURES, INC.

Project: **Portola Spring Community Pk** Sht: ____ of ____ Date: **6/3/2016**

By: ____ JOB#: **16-055**

Checked By: ____ Drawing #: 7/LS1.02

Subject: ENCLOSURE PILASTER

H_{MAX} = 7'-6"

$w = 135(L^2) + 10^{\#}/_{FT}\ (2')(4\ SIDES)$ STUCCO

$= 620^{\#}/_{FT}$

$w = .22(620) = 136.4^{\#}/_{FT}$

$M_{MAX} = 136.4\ (7.5)^2/2 = 3836.2^{FT\text{-}\#}$

#5(V) @ EA CORNER $A_s = .62$ IN $\rho = .62/22(18) = .0016$

$n\rho = .04$ $k = .25$ $j = .92$ $2/fk = 8.71$

$f_c = \frac{3836.2(12)}{22(18)^2} \times 8.71 = 56.2$ PSI $< F_c = 500$ PSI OK

$f_s = \frac{3.84(12)}{.62(18)(.92)} = 4.5$ KSI $< F_s = 24$ KSI OK

$M_{DL} = 136.4\ (7.5)(7.5/2 + 1.25) = 5115^{FT\text{-}\#}$

$W_{PIL} = 620 \times 7.5 = 4650$

$W_{FTG} = 150\ (1.25)(2)^2 = 1687.5$ $\Big\}\ W_T = 6337.5^{\#}$

$M_R = 6337.5 \times 1.5 = 9506.2^{FT\text{-}\#} \rightarrow \frac{M_R}{M_{DL}} = 1.86$

$\bar{x} = \frac{9506.2 - 5115}{6337.5} = .69' < 4$ IN

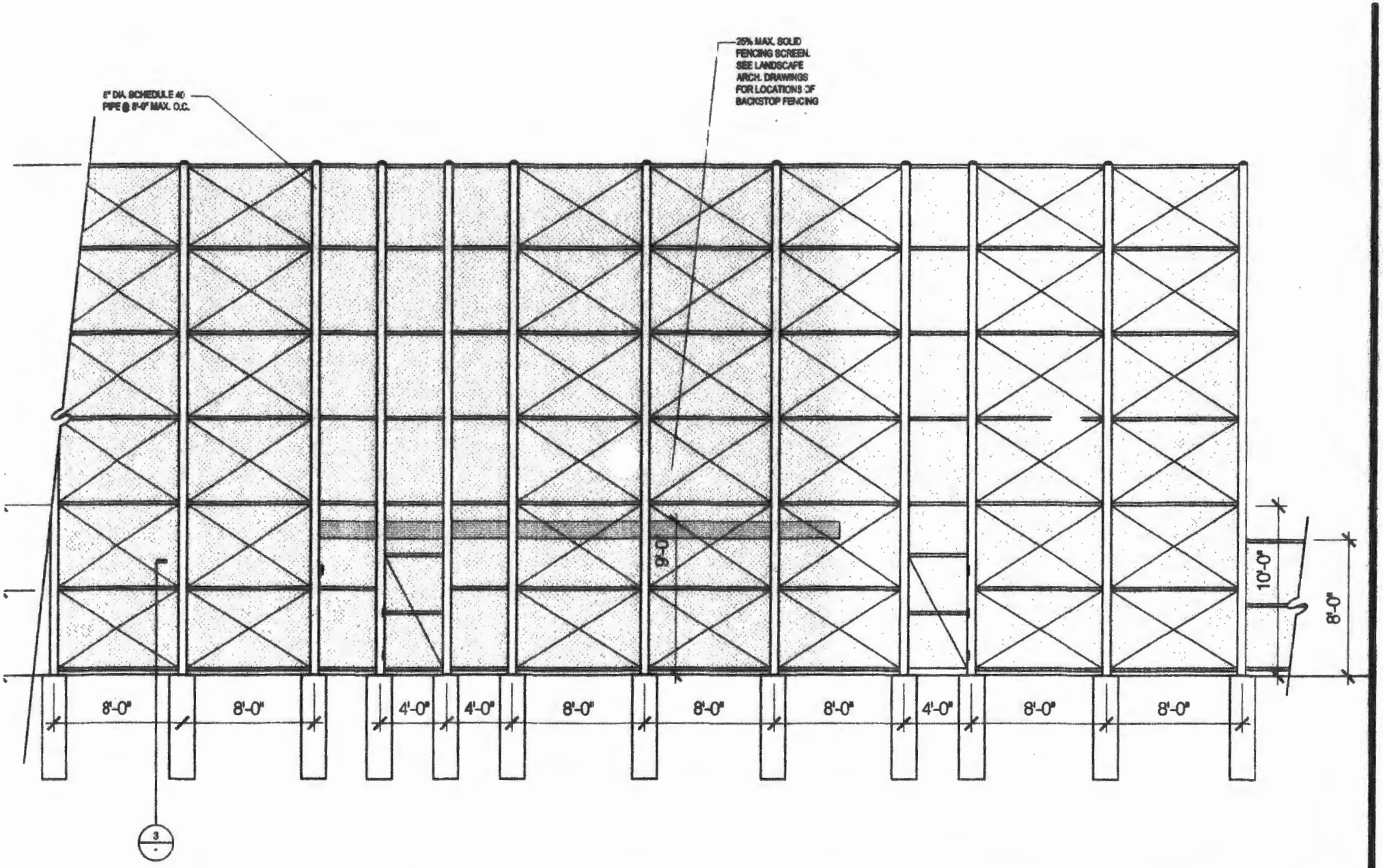
$w = \frac{2(6337.5)}{\pi(.69)(\pi)} = 2032.5^{\#}/_{FT} <$ ALLOWABLE

$= 1800 + 300$

$= 2100^{\#}/_{FT}$ OK

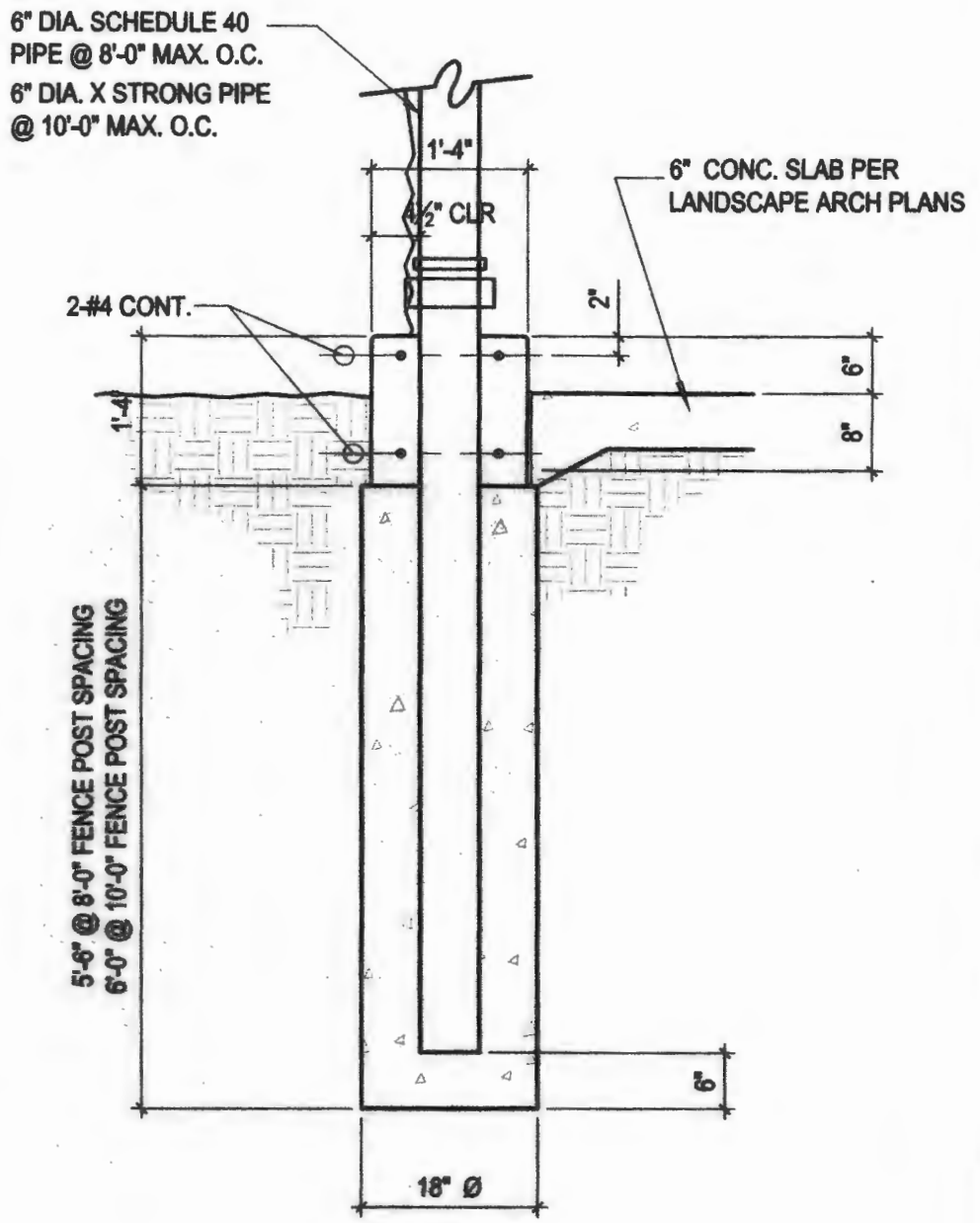
USE #5(V) @ EA CORNER

W/ 2'-0" SQ x 15" FOOTING



BACKSTOP FENCING ELEVATION | N/S | 2

L51.05



LS1.05

BACKSTOP FOOTING	N/S	3	B

WELSH STRUCTURES, INC.

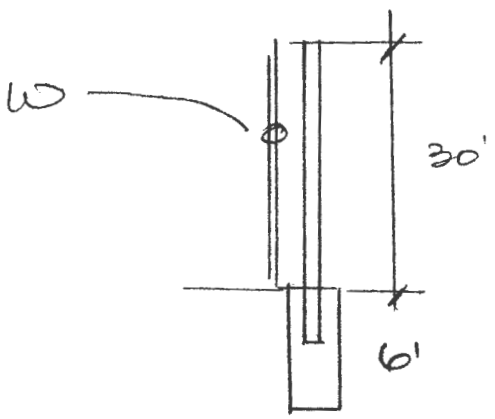
Project: _____ Sht: ____ of ____ Date: 6/13/2016

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 213/151.05

BACKSTOP FENCING: 10' O.C. SPACING @ HOME PL



SCREENING 25% CLOSED

$w_u = 27(.25) \times 10/1000 = .0675^{k/'}$

$M_u = .0675(30)^2/2 \times 12 = 364.5^{'-k}$

6" ϕ SCH 40 PIPE

$\phi M_n = .9(35)10.6 = 333.9^{'-k}$

N.G.

TRY 6" ϕ x STRONG

$\phi M_n = .9(35)15.6 = 491.4$

USE 6" ϕ x STRONG PIPE @ TRIB OF 9 TO 10'

Title Block Line 1
You can change this area using the "Settings" menu item and then using the "Printing & Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID: 64

Printed: 6 JUN 2016, 10:58AM

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11

Lic. # : KW-06008584 Licensee : WELSH STRUCTURES

Description : 3/SL-1.05 Trib 10ft.

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

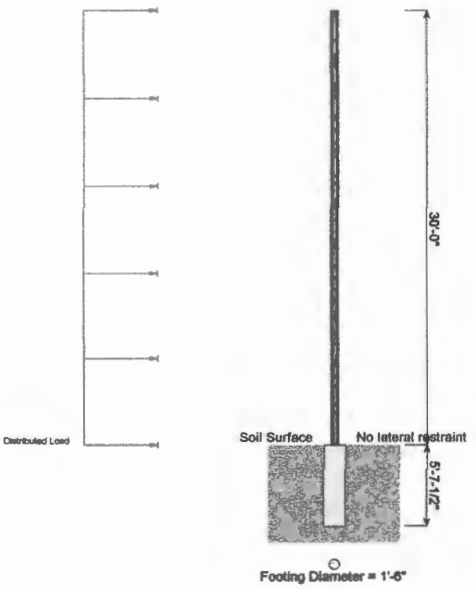
Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf

Controlling Values

Governing Load Combination : +D+0.60W+H	
Lateral Load	1.215 k
Moment	18.225 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**1,337.04** psf
Allowable	**1,338.01** psf

Minimum Required Depth **5.625** ft

Footing Base Area	1.767 ft^2
Maximum Soil Pressure	0.0 ksf



Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)	Vertical Load (k)
D : Dead Load	k	k/ft	k
Lr : Roof Live	k	k/ft	k
L : Live	k	k/ft	k
S : Snow	k	k/ft	k
W : Wind	k	0.06750 k/ft	k
E : Earthquake	k	k/ft	k
H : Lateral Earth	k	k/ft	k
Load distance above ground surface	ft	TOP of Load above ground surface 30.0 ft	
		BOTTOM of Load above ground surface ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	1.215	18.225	5.63	1,337.0	1,338.0	2.000

Pole Footing Embedded in Soil

Description : 3/SL-1.05(8' Trib)

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

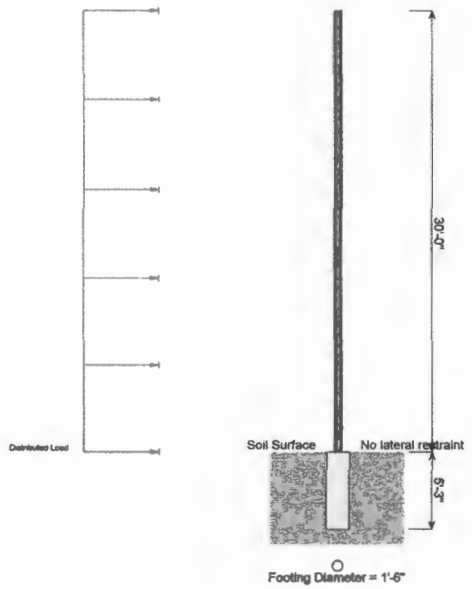
General Information

Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf

Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	0.9720 k
Moment	14.580 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	1,229.97 psf
Allowable	1,235.55 psf
Minimum Required Depth	**5.250 ft**
Footing Base Area	1.767 ft^2
Maximum Soil Pressure	0.0 ksf

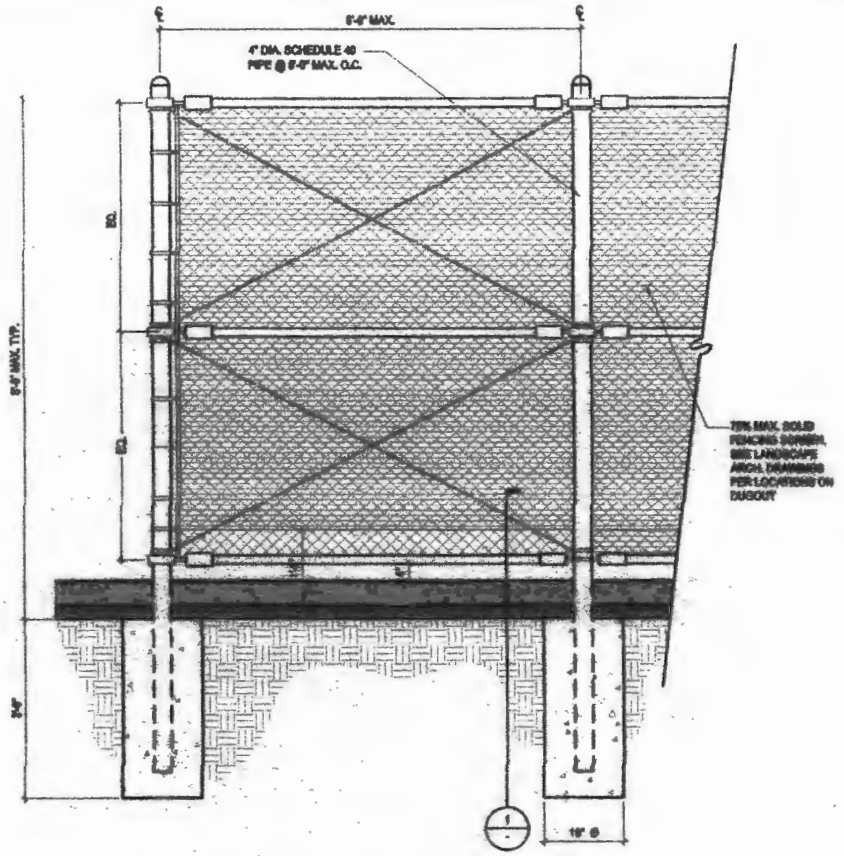


Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (klf)		Vertical Load (k)
D : Dead Load	k		k/ft	k
Lr : Roof Live	k		k/ft	k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	k	0.0540	k/ft	k
E : Earthquake	k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	ft	TOP of Load above ground surface 30.0	ft	
		BOTTOM of Load above ground surface	ft	

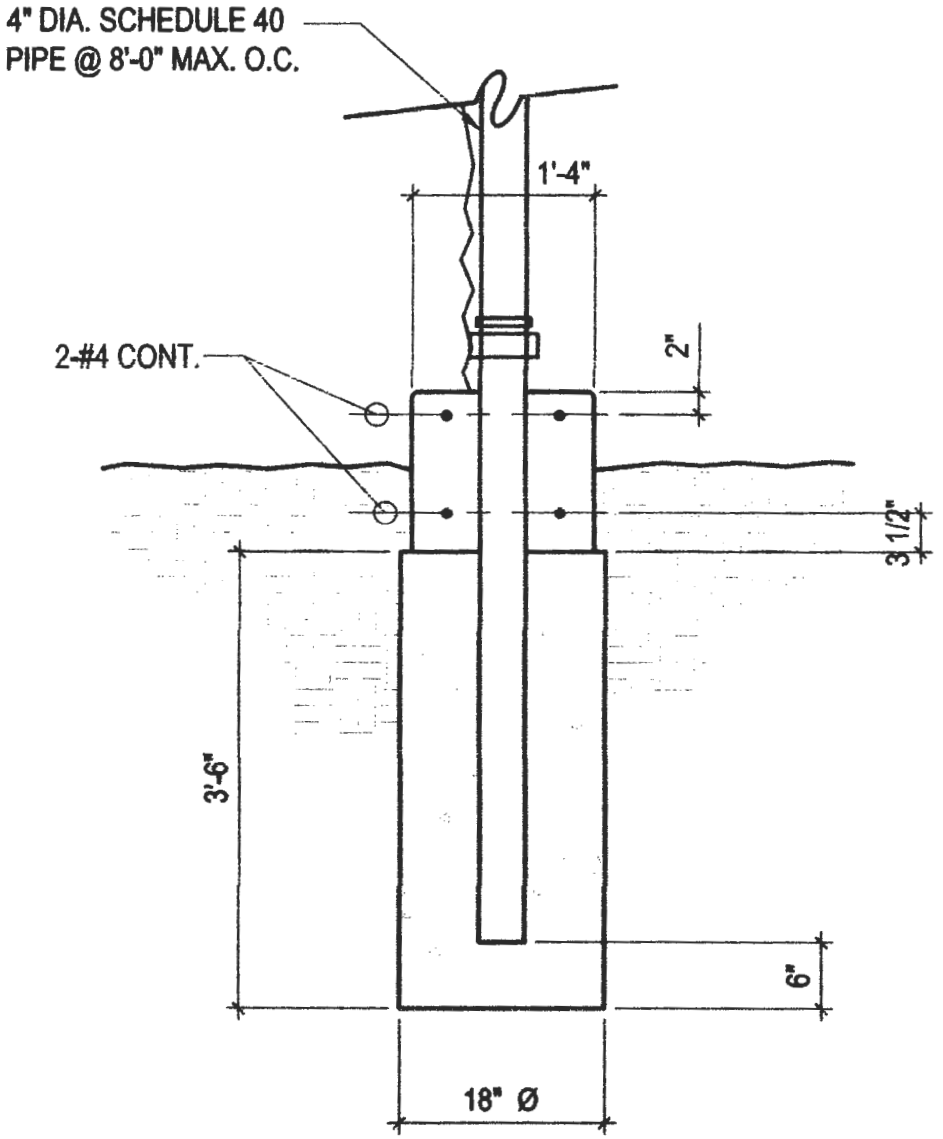
Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	0.972	14.580	5.25	1,230.0	1,235.5	2.000



DUGOUT FENCING ELEVATION | N/S | 4

L51.05



LS1.05.

BALL FIELD DUGOUT FENCING FOOTING	N/S	1

Site A-

Park Desig
Approved
Playgrounc

Client

Irvin
Deve
550 N
Newp
T 94
F 94

WELSH STRUCTURES, INC.

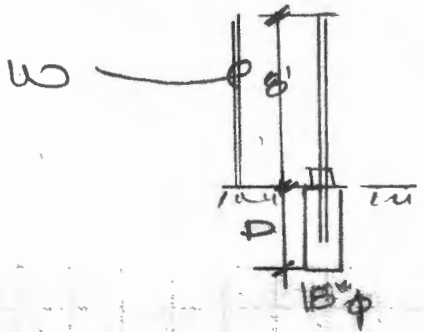
Project: _____ Sht: ____ of ____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: RAKING WALL 1 / LS1.05

DUGOUT 8' FENCING. 4"ϕ PIPE @ 8' o.c.
SCREENING FABRIC ON FENCE.



$WD = 27\frac{\#}{sf} \times (.75) \times 8' = 162\frac{\#}{'}$

↑ 75% OFF. WIND PRESS

PASSIVE = 340 #/CF
NEGLECT TOP 6"
ONLY - NO PAVING ON LY FIELD OR PAVING.
USE 2x DURATION FACTOR FOR FENCE & LIGHT POST TYP.

CHECK 4"ϕ PIPE (SCH 40)

Z = 4.05

Fy = 35 ksi

$M_u = .162(8)^2/2 = 5.18^{k-ft} = 62.2^{in-k}$

$\phi M_n = .9(35 \times 4.05) = 127.5^{in-k}$

THIS PIPE OKAY !

FTG:

D = 4.125 + .5 = 4.625 → 9" Dist. Cord = 3.87'

USE 12"ϕ x 4' FTG.

Pole Footing Embedded in Soil

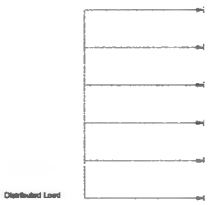
Description : 1/SL-1.0S

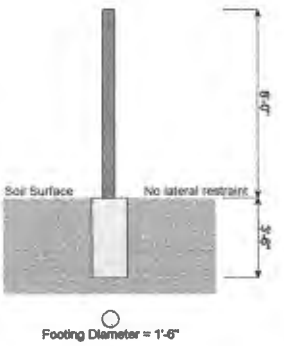
Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	18.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf





Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	0.7776 k
Moment	3.110 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**813.13 psf**
Allowable	**816.75 psf**

Minimum Required Depth	**3.50 ft**

Footing Base Area	1.767 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

	Lateral Concentrated Load (k)		Lateral Distributed Loads (klf)		Vertical Load (k)
D : Dead Load	k			k/ft	k
Lr : Roof Live	k			k/ft	k
L : Live	k			k/ft	k
S : Snow	k			k/ft	k
W : Wind	k		0.1620	k/ft	k
E : Earthquake	k			k/ft	k
H : Lateral Earth	k			k/ft	k
Load distance above ground surface	ft	TOP of Load above ground surface	8.0	ft	
		BOTTOM of Load above ground surface		ft	

Load Combination Results

Load Combination	Forces @ Ground Surface Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	0.778	3.110	3.50	813.1	816.8	2.000

CONCRETE

1. ALL CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH AT 28 DAYS AS FOLLOWS:
   POST TENSION SLAB : PER TENNIS COURT NOTE BELOW.
   LIGHT & FENCE POST FOOTING : 3000 PSI MIN. SPECIAL INSPECTION IS REQUIRED FOR TENNIS COURT CONCRETE
2. ALL CONCRETE SHALL HAVE A MAXIMUM SLUMP NO GREATER THAN 4".
3. CEMENT SHALL CONFORM TO ASTM C150 AND AGGREGATE SHALL CONFORM TO ASTM C33. USE TYPE II CEMENT W/ WATER CEMENT RATIO OF 0.5 USE 1" MAX NOMINAL AGGREGATE.
4. MIX DESIGNS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO USE, AND SHALL BE PREPARED IN ACCORDANCE WITH CBC.
5. CONSTRUCTION JOINTS FOR SLABS ON GRADE SHALL BE AS SHOWN ON DRAWINGS OR AS APPROVED BY THE STRUCTURAL ENGINEER.
6. REFER TO THE ARCHITECTURAL PLANS FOR MOULDS, GROOVES, ORNAMENTS, CLIPS, OR TEXTURES REQUIRED TO BE CAST INTO THE CONCRETE AND FOR THE LOCATION OF DEPRESSIONS, CURBS AND RAMPS.
7. CORNERS OF SLABS, BEAMS WALLS, COLUMNS, ETC. SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS NOTED OTHERWISE.

REINFORCING STEEL

1. REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60, U.N.O. ALL REINFORCING SHALL BE FROM IDENTIFIED STOCK WITH MILL ANALYSIS SUPPLIED. ALL WELDED REINFORCING SHALL CONFORM TO ASTM A706.
2. ALL REINFORCING STEEL, DOWELS, ANCHOR BOLTS, ETC., SHALL BE WELL SECURED IN PLACE PRIOR TO PLACING CONCRETE. CONTRACTOR SHALL USE TEMPLATES TO INSURE ACCURATE PLACEMENT OF ANCHOR BOLTS, DOWELS, ETC.
3. DOWELS SHALL BE PROVIDED AT POUR AND CONSTRUCTION JOINTS AND SHALL BE THE SAME SIZE AND SPACING AS THE REINFORCING SHOWN FOR THE SUBSEQUENT CONSTRUCTION.
4. ALL CONTINUOUS BARS OR DOWELS SHALL LAP 60 DIAMETERS IN CONCRETE AND 48 DIAMETERS IN MASONRY, UNLESS SHOWN OTHERWISE (24" MINIMUM).
5. REINFORCING SHALL HAVE THE FOLLOWING MINIMUM COVERS:

CONCRETE AGAINST EARTH NOT FORMED	3"
CONCRETE AGAINST EARTH FORMED OR TROWELED	2"
WALLS AND CURBS	1 1/2"
SLAB ON GRADE	AT CENTER

TENNIS COURT POST-TENSIONED CONCRETE SLAB NOTES:

SUB GRADE SOILS SHALL BE PREPARED BY SATURATING THE SOIL AS RECOMMENDED IN THE [illegible].

THE SOILS ENGINEER SHALL TEST AND APPROVE THE SUBGRADE PREPARATION PRIOR TO CASTING THE SLAB.

ANCHORAGE DEVICES SHALL BE SUPPLIED BY AN ICC APPROVED MANUFACTURER. SUBMIT ICC REPORT ALONG WITH SHOP DRAWINGS FOR REVIEW AND APPROVAL.

POST-TENTION SUBCONTRACTOR AND ONSITE INSPECTOR SHALL SUBMIT EVIDENCE OF AT LEAST 5 YEAR EXPERIENCE WITH SIMILAR TYPE PROJECTS AND LEVEL 2 CERTIFICATION.

CONCRETE SHALL BE 3000 PSI MIN. COMPRESSIVE STRENGTH AT 28 DAYS AND CAST WITH A SLUMP NOT TO EXCEED 4 INCHES. THE MAX. WATER CEMENT RATIO SHALL NOT EXCEED 0.45. USE TYPE II CEMENT WITH POZZOLAN. CALCIUM CHLORIDE OR OTHER MATERIALS CONTAINING CHLORIDE IN CONCRETE IS NOT ALLOWED IN POST-TENSION SLAB. DESIGNS TO STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING AND PLACING ANY CONCRETE. CONCRETE PLACEMENT SHALL CONFORM TO LATEST EDITION OF ACI 302.1R.

CONCRETE SURFACE SHALL BE TRUE AND MATCH THE GRADES NOTED ON THE APPROVED PLANS. THE SLAB SHALL BE FLAT TO WITHIN 3/16 INCH WHEN MEASURED WITH A 10 FOOT STRAIGHT EDGE AT ANY LOCATION.

POST TENSION CABLES SHALL BE 1/2 INCH STRESS RELIEVED 7 WIRE STRAND CONFORMING TO ASTM A-416. THE CABLES SHALL BE COATED WITH A CORROSION RESISTANT GREASE AND COVERED WITH A PLASTIC SHEATH. THE CABLES SHALL BE SECURED IN PLACE AT MID DEPTH OF THE SLAB BY SUPPORTING ON TOP OF REINFORCING STEEL.

ULTIMATE STRENGTH	= 41.3 Kips
CROSS SECTIONAL AREA	= .153 SQ In
MODULUS	= 28.6 x 10^3 KSI
JACKING FORCE (TEMPORARY)	= 33.0 kips
JACKING FORCE ELONGATION	= .86 in / 10 ft
TRANSFER FORCE @ ANCHOR	= 28.9 Kips
TRANSFER FORCE ELEONGATION	= .79 Inches / 10 ft
EFFECTIVE LOAD	= 26.9 Kips
ELENGATION TOLERANCE	= + - 10 %

25 % OF THE POST TENSIONING FORCE SHALL BE APPLIED WHEN THE SLAB HAS OBTAINED 2000 PSI. THE CONTRACTOR SHALL TAKE AND TEST EXTRA CYLINDERS OF THE SLAB TO VERIFY THE CONCRETE STRENGTH.

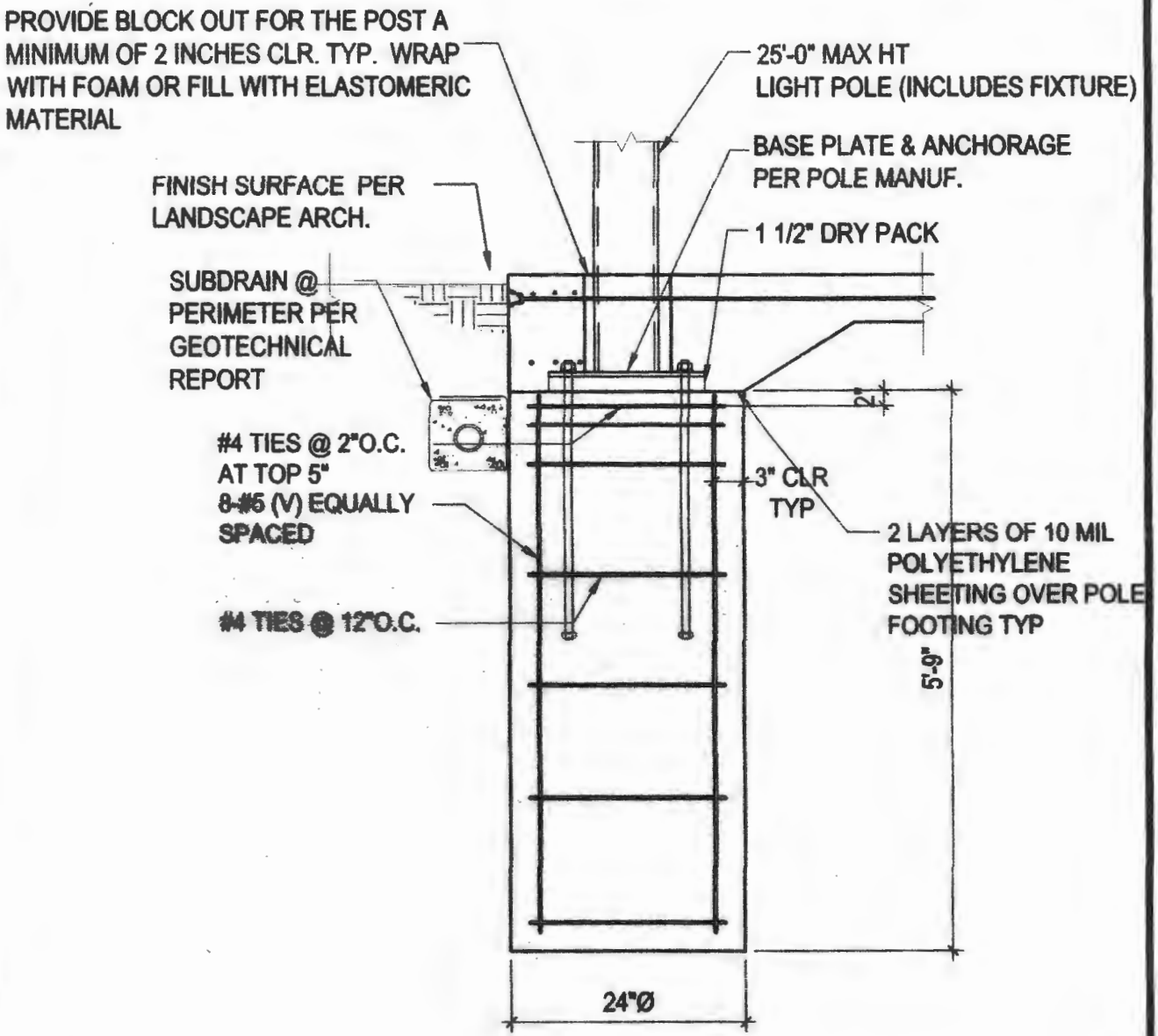
THE CONCRETE SLAB SHALL BE CONTINUOUSLY MOIST CURED UNTIL THE FULL PRESTRESS FORCE HAS BEEN APPLIED. AS AN ALTERNATE APPROVED MEMBRANE COATINGS MAY BE USED IF APPLIED IN TWO COATS AT RIGHT ANGLES TO EACH OTHER IN STRICT ACCORDANCE WITH THE MANUFACTURES RECOMMENDATIONS.

IF CONCRETE IS PLACED IN WEATHER WHERE THE TEMPERATURE IS EXPECTED TO EXCEED 80 DEGREES FAHRENHEIT OR WIND SPEED EXCEEDING 10 MPH THE CONCRETE SHALL BE PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ACI STANDARD 305-R.

APPLICATION OF CABLE FORCES SHALL BE MONITORED BY A SPECIAL DEPUTY INSPECTOR AND SHALL BE ESTABLISHED BY USE OF A CALIBRATED PRESSURE GAGE AND VERIFIED BY THE ELONGATION OF THE CABLES.

AFTER ALL THE CABLES ARE STRESSED THE TAILS SHALL BE BURNED OFF AND THE CABLE AND EXPOSED ANCHOR COATED WITH SIKATOP 109 ARMATEC CORROSION PROTECTION COATING FOLLOWED BY PATCHING THE ANCHOR RECESS WITH SIKAREPAIR 223 NON-SHRINK PATCHING MATERIAL AFTER CLEANING THE BONDING SURFACES.

L51.03



LIGHT POLE FOOTING

AT TENNIS COURT

N/S | 15

LS1.03

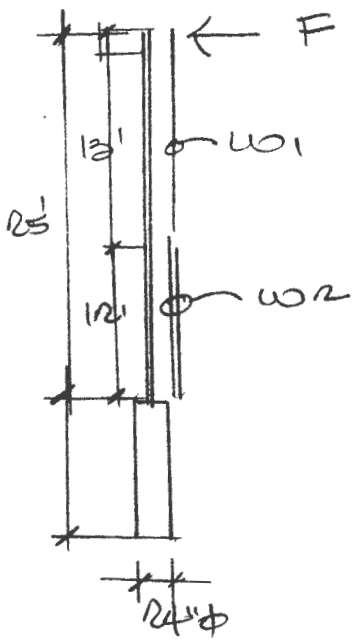
WELSH STRUCTURES, INC.

Project: _____ Sht: _____ of _____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 15/L51.03



$W_1 = 27(.5) = 13.5^{\#/'}$

$W_2 = 27(.9)10$ 90% solid @ Tennis Courts

$= 243^{\#/'}$

$F = 2.5' \times 1.5 \times 27$

$= 102^{\#}$

$M_{u\,max} = 13.5(13)18.5 + 243(12)^2/2 + 102(25)$

$= 3247^{'-\#} + 17496^{\#} + 2550 = 23,293^{'-\#}$

$= 23.293^{'-K} \rightarrow 279.5^{''-K}$

LIGHT POLES PER MANUF.

MIN 6" Schedule 40 PIPE

$\phi M_n = .9(35)10.6 = 333.9^{''-K}$ OK

$\Sigma F = 13.5(13) + 243(12) + 102 = 3194^{\#} \leftarrow F$

$h_{eq} = 23.293^{'-K}/3.194 = 7.29' \leftarrow h$

SEE FOLLOWING FTG CALC.

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project Descr:

Project ID: 74

Printed: 6 JUN 2016, 11:45AM

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~6\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11

Lic. # : KW-06008584 Licensee : WELSH STRUCTURES

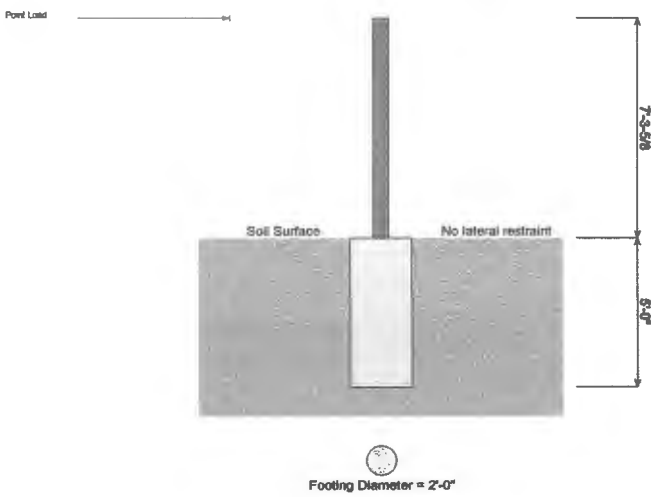
Description : 15/SL-1.03

Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf



Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	1.916 k
Moment	13.990 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**1,184.33** psf
Allowable	**1,186.0** psf

Minimum Required Depth **5.0 ft**

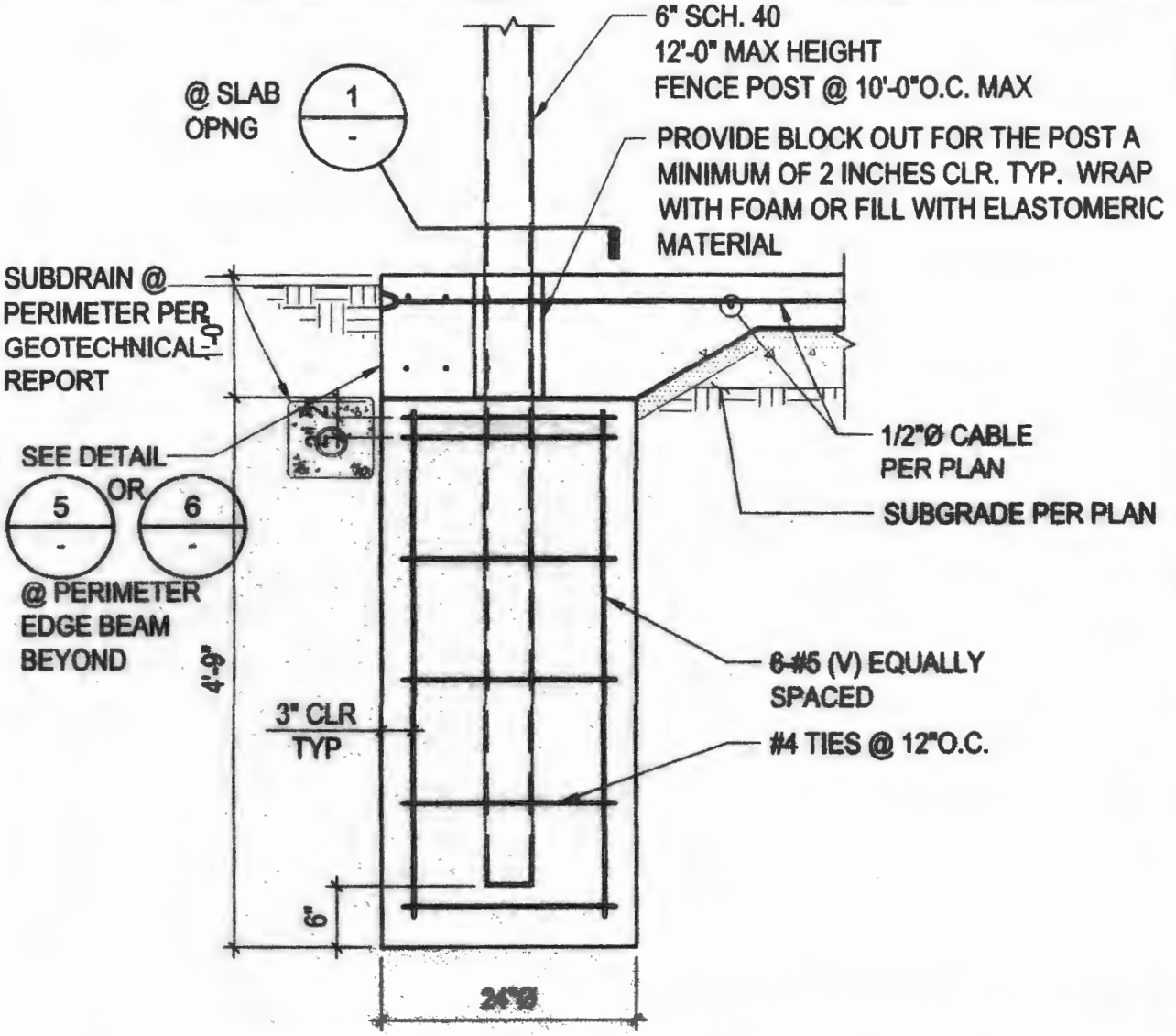
Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

Lateral Concentrated Load (k)		Lateral Distributed Loads (k/f)		Vertical Load (k)
D : Dead Load	k		k/ft	k
Lr : Roof Live	k		k/ft	k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	3.194 k		k/ft	k
E : Earthquake	k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	7.30 ft	TOP of Load above ground surface	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

	Forces @ Ground Surface		Required	Pressure at 1/3 Depth		Soil Increase
Load Combination	Loads - (k)	Moments - (ft-k)	Depth - (ft)	Actual - (psf)	Allow - (psf)	Factor
+D+0.60W+H	1.916	13.990	5.00	1,184.3	1,186.0	2.000



PERIMETER POLE FOOTING

N/S	13

LS1.03

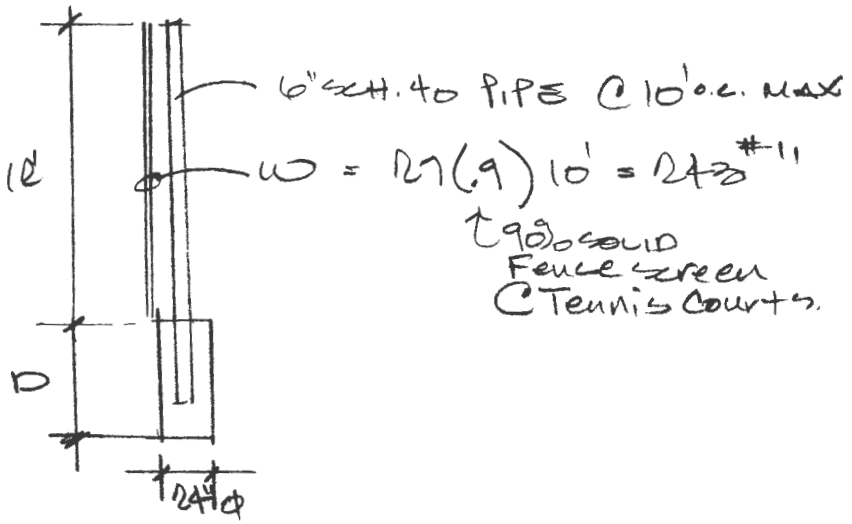
WELSH STRUCTURES, INC.

Project: _____ Sht: ____ of ____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 12/LS1.03



$\phi A_u = .243(12)^2/2 = 17.496^{1-k} = 209.9^{11-k}$

$\phi M_n = .9(35)10.6 = 333.9^{11-k} > M_u$ FOR USE 6" SCH 40 PIPE @ 10'-0" o.c.

SEE FOUNDATION CALC FOR FOOTING.

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06008584
Licensee : WELSH STRUCTURES

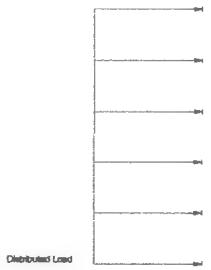
Description : 13/SL-1.03

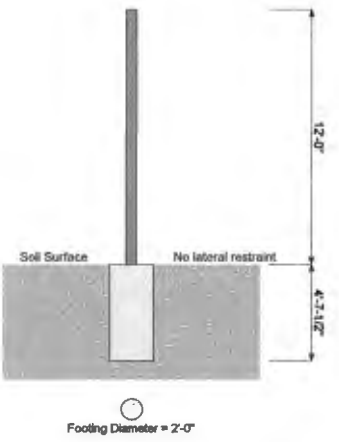
Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf





Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	1.750 k
Moment	10.498 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**1,092.61** psf
Allowable	**1,094.49** psf

Minimum Required Depth	**4.625 ft**

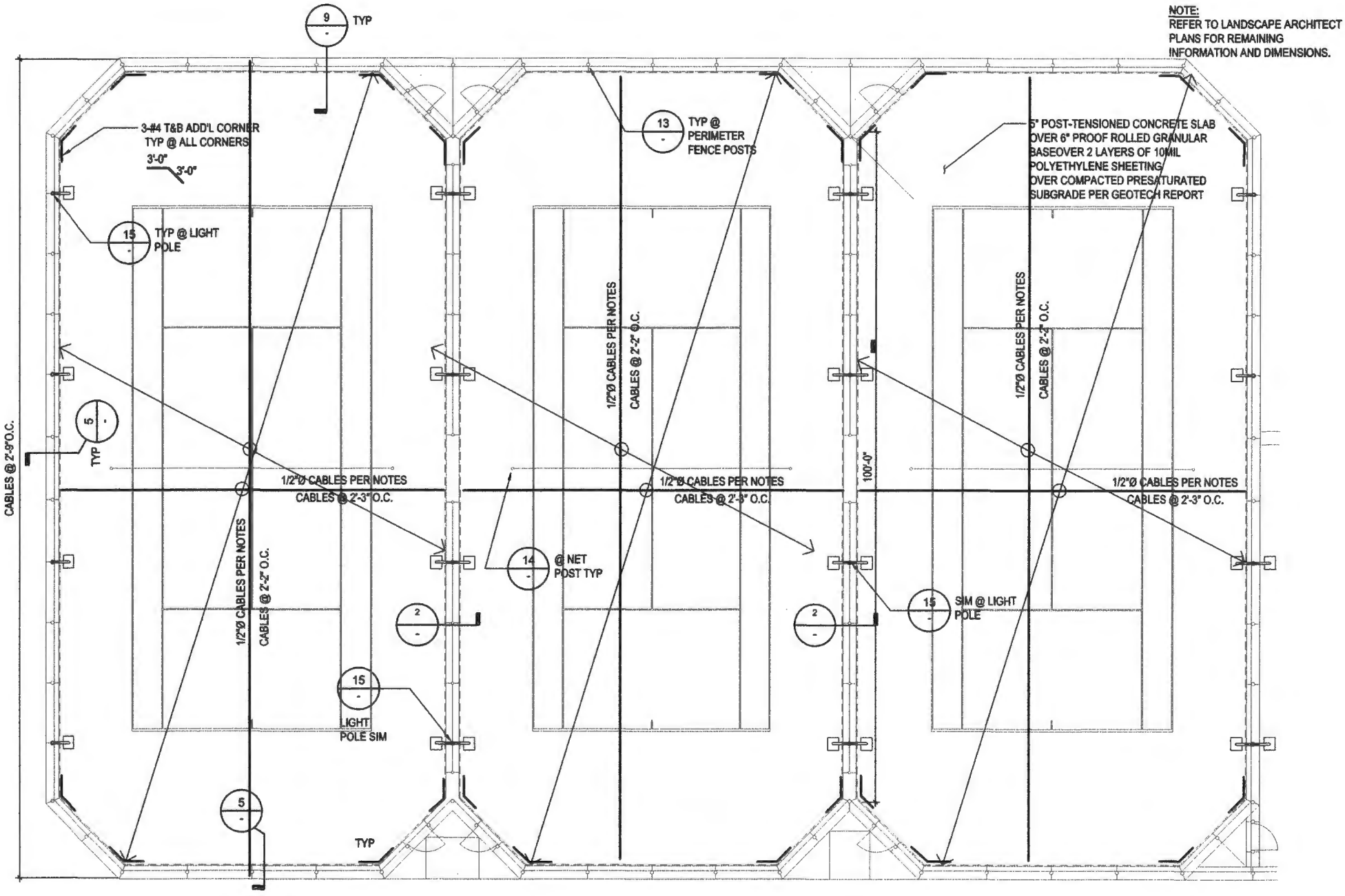
Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)		Vertical Load (k)
D : Dead Load	k		k/ft	k
Lr : Roof Live	k		k/ft	k
L : Live	k		k/ft	k
S : Snow	k		k/ft	k
W : Wind	k	0.2430	k/ft	k
E : Earthquake	k		k/ft	k
H : Lateral Earth	k		k/ft	k
Load distance above ground surface	ft	TOP of Load above ground surface: 12.0	ft	
		BOTTOM of Load above ground surface	ft	

Load Combination Results

Load Combination	Forces @ Ground Surface: Loads - (k)	Forces @ Ground Surface: Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth: Actual - (psf)	Pressure at 1/3 Depth: Allow - (psf)	Soil Increase Factor
+D+0.60W+H	1.750	10.498	4.63	1,092.6	1,094.5	2.000



TENNIS COURT P.T. LAYOUT

1"=10'-0" | 4

WSI

Job Name:	Portola Springs Community Park
Job #:	16-055
Date:	6/3/2016
Description:	Post Tensioned Sport Court Design - Long Direction
	Per Post-Tensioning Institute DC10.3-06

Total slab length (long dir)	Ls =	118.5	ft	
Weight of slab	Wslab =	62.5	pcf	Normal wt conc assumed.
Slab thickness	H =	5	in	
Coeff of friction btw slab and subgrade	μ =	1.25		
Min.average residual prestress force	fp =	125	psi	
Final eff force per tendon	Fe =	26900	lb	

Long tendon spacing = Fe /((fp x 12H)+(Wslab x .5Ls x μ))

2.217842 ft

WSI

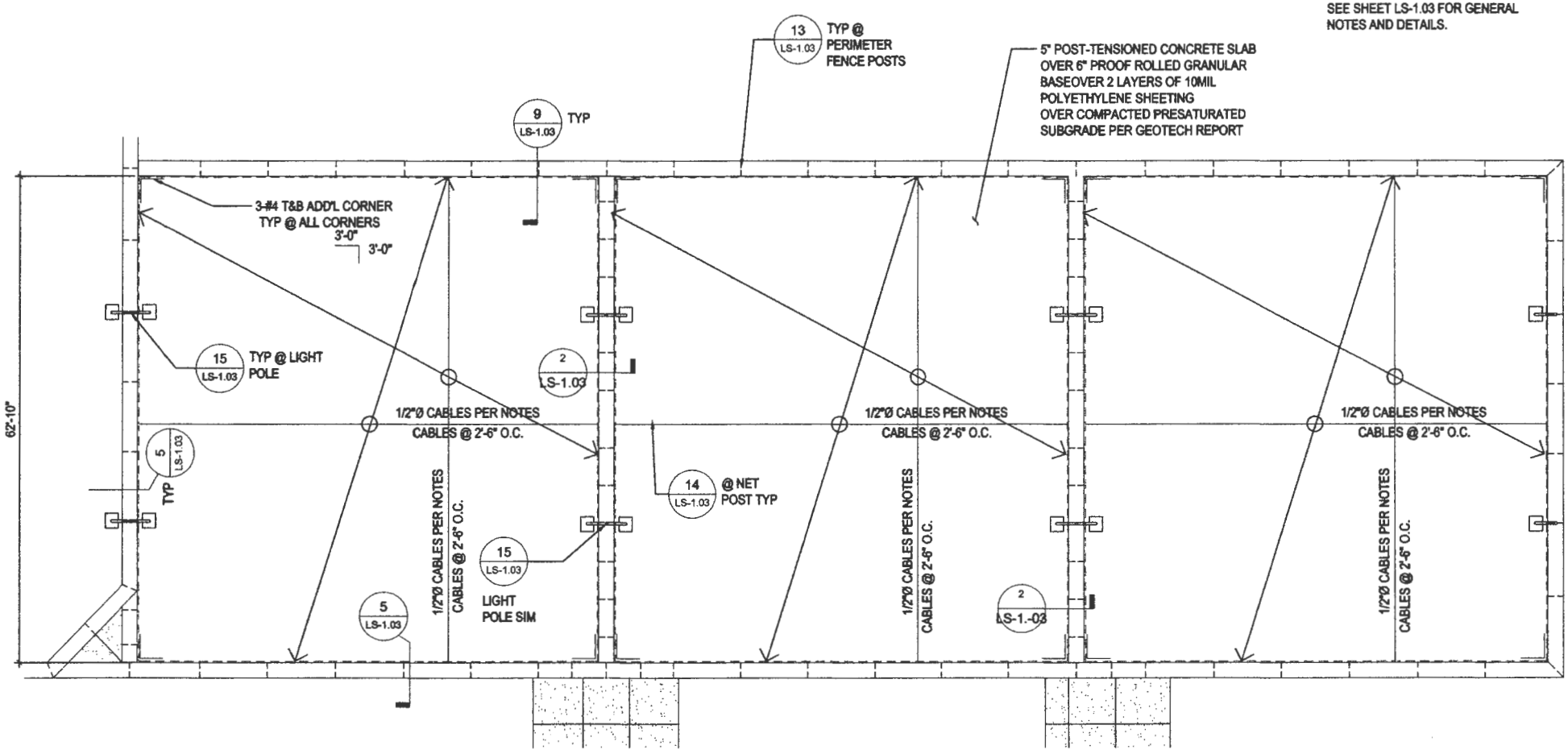
Job Name:	Portola Springs Community Park
Job #:	16-055
Date:	6/3/2016
Description:	Post Tensioned Sport Court Design - Short Direction
	Per Post-Tensioning Institute DC10.3-06

Total slab length (short dir)	Ls =	58.5	ft	
Weight of slab	Wslab =	62.5	pcf	Normal wt conc assumed.
Slab thickness	H =	5	in	
Coeff of friction btw slab and subgrade	μ =	1.25		
Min.average residual prestress force	fp =	125	psi	
Final eff force per tendon	Fe =	26900	lb	

Short tendon spacing = Fe /((fp x 12H)+(Wslab x .5Ls x μ))

2.749062 in

NOTE:
REFER TO LANDSCAPE ARCHITECT PLANS FOR REMAINING INFORMATION AND DIMENSIONS. SEE SHEET LS-1.03 FOR GENERAL NOTES AND DETAILS.



PICKLEBALL COURT P.T. LAYOUT	1"=10'-0"	4

WSI

Job Name:	Portola Springs Community Park
Job #:	16-055
Date:	6/3/2016
Description:	Post Tensioned Sport Court Design - Long Direction
	Per Post-Tensioning Institute DC10.3-06

Total slab length (long dir)	Ls =	62.83	ft	
Weight of slab	Wslab =	62.5	pcf	Normal wt conc assumed.
Slab thickness	H =	5	in	
Coeff of friction btw slab and subgrade	μ =	1.25		
Min.average residual prestress force	fp =	125	psi	
Final eff force per tendon	Fe =	26900	lb	

Long tendon spacing = Fe /((fp x 12H)+(Wslab x .5Ls x μ))

2.702351 ft

WSI

Job Name:	Portola Springs Community Park
Job #:	16-055
Date:	6/3/2016
Description:	Post Tensioned Sport Court Design - Short Direction
	Per Post-Tensioning Institute DC10.3-06

Total slab length (short dir)	Ls =	60 ft	
Weight of slab	Wslab =	62.5 pcf	Normal wt conc assumed.
Slab thickness	H =	5 in	
Coeff of friction btw slab and subgrade	μ =	1.25	
Min.average residual prestress force	fp =	125 psi	
Final eff force per tendon	Fe =	26900 lb	

Short tendon spacing = Fe /((fp x 12H)+(Wslab x .5Ls x μ))

2.732698 in

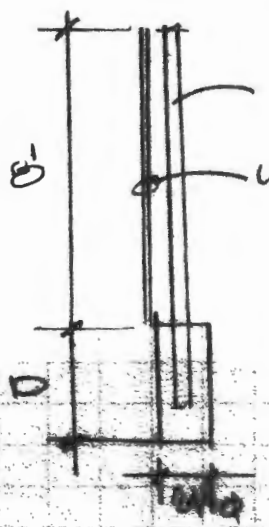
WELSH STRUCTURES, INC.

Project: _____ Sht: _____ of _____ Date: _____

By: _____ JOB#: _____

Checked By: _____ Drawing #: _____

Subject: 132/132 LOT



$M_u = .127(8)^2/2 = 4.78^{k-ft} = 93.3^{k-in}$

$\phi M_n = .9(35)4.05 = 127.6^{k-in} > M_u$ You use 4" sch 40 PIPE @ 10'-0" o.c. MAX.

← Footing One for Footing.

0.82
"L2"

Pole Footing Embedded in Soil

File = Z:\Projects\1TBZO0~8\C7A4YC~F\16-055.ec6
ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06008584
Licensee : WELSH STRUCTURES

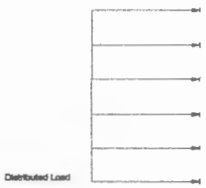
Description : 13/SL-1.04

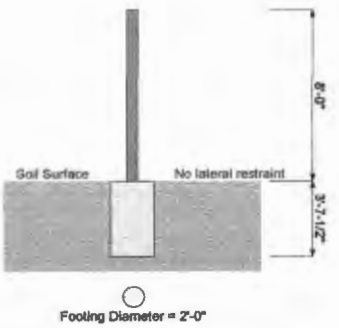
Code References

Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Pole Footing Shape	Circular
Pole Footing Diameter	24.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	360.0 pcf
Max Passive	3,000.0 psf





Controlling Values

Governing Load Combination : +D+0.60W+H

Lateral Load	1.166 k
Moment	4.666 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	**853.26** psf
Allowable	**854.12** psf

Minimum Required Depth	**3.625 ft**
Footing Base Area	3.142 ft^2
Maximum Soil Pressure	0.0 ksf

Applied Loads

	Lateral Concentrated Load (k)	Lateral Distributed Loads (klf)			Vertical Load (k)
D : Dead Load	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Lr : Roof Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
L : Live	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
S : Snow	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
W : Wind	0.0 k	0.2430	0.0	0.0 k/ft	0.0 k
E : Earthquake	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
H : Lateral Earth	0.0 k	0.0	0.0	0.0 k/ft	0.0 k
Load distance above ground surface	0.0 ft	TOP of Load above ground surface: 8.0	0.0	0.0 ft	
		BOTTOM of Load above ground surface: 0.0	0.0	0.0 ft	

Load Combination Results

Load Combination	Forces @ Ground Surface: Loads - (k)	Moments - (ft-k)	Required Depth - (ft)	Pressure at 1/3 Depth: Actual - (psf)	Allow - (psf)	Soil Increase Factor
+D+0.60W+H	1.166	4.666	3.63	853.3	854.1	2.000

PTD , Inc.

POST-TENSION DESIGN
POST-TENSION FOUNDATION SYSTEMS

2009 Porterfield Way, Suite L
Upland, CA 91786
Phone (909) 985-0787
Fax: (909) 985-5787

June 13, 2016

Low to Medium Expansive Soils

2013 CBC Section 1808.6.2 Slab-On-Ground Foundations

Pti – "Design of Post-Tension Foundations on Ground" manual (3rd edition)

Pti - "Standard Requirements for Design of Shallow Post-Tensioned Concrete Foundations on Expansive Soils"

Uniform Thickness Foundation Method

FOR:

Irvine Community Development Company
Portola Springs Community Park PA6
Irvine - California

PTD#16- 1334



Date of Signing: June 13, 2016

Project: **ICDC - Portola Springs Community Park PA6 - Irvine**

POST-TENSION DESIGN PARAMETERS

PTD#16- 1334

Soils report by: **NMG Geotechnical, Inc.**
Report No: **99070-35**
Report Date: **May 6, 2016**

Allowable Soil Bearing Pressure: Subgrade Modulus (k) **100** **pci/inch**

Allowable Soil Pressure at bottom of footings = **1800** **psf** **1.80** **ksf at a depth of:** **12"**

Allowable Soil Pressure at bottom of slab = **1000** **psf** **1.00** **ksf at pad surface**

Sulfate & Corrosion exposure for the project soils shall be verified with the project soils engineer prior to construction.
The soils engineers recommendations for the sulfate exposure shall be in compliance with current ACI 318 Table 4.3.1
The soil or corrosion engineers recommendations for corrosion exposure remedies shall also be followed.

Current report recommendations are for: **Negligible** **Sulfate**

Slab Subgrade: 1" dry sand over 15 mil. polyolefin memb. Over approved smooth Native Grade

Post-Tension Parameters	Community Building 3rd edition soil values		Consession Building			
Center Lift Em:	9.0	feet	9.0	feet		feet
Edge Lift Em:	4.8	feet	4.8	feet		feet
Center Lift Ym:	0.600	inches	0.600	inches		inches
Edge Lift Ym:	0.700	inches	0.700	inches		inches

Beam Dimensions	Width inches	Depth inches	Width inches	Depth inches	Width inches	Depth inches
Exterior Embedment		12		12		
Perimeter Beams:	12	22	12	23		
Interior Beams:	12	10	12	11		
Slab Thickness:	thickness=	9	thickness=	10	thickness=	

LOADING:

Loads to footings:

Roof:	45 psf	PTI design for Community Bldg	850 lbs/ft.
Floors:	55 psf	PTI design for Consession Bldg	1250 lbs/ft.

Stiffness Coefficient Limits: (Varies See PT Calculations)

Center Lift:	360	Max.Exterior Line Loads:	1200 lbs/ft.
Edge Lift:	720	Max.Interior Line Loads:	1250 lbs/ft.

Exterior Line Loads (Average):

Interior non-bearing walls at clear-span roof trusses must be detailed with top plate detached slip connections

MATERIALS:

CONCRETE STRENGTH: f'c = **4000** **psi @ 28 days** w/0.50 w/c ratio

STEEL: Cable 1/2 dia ASTM 416 Strand = **270** **Ksi**
Pjack (0.8 x fpy x area) = **33.0** **Kips**
Panchor (0.7 x fpy x area) = **28.9** **Kips**
Peffective (0.65 x fpy x area) = **26.9** **Kips**

ANCHORS: "PRECISION SURE-LOCK" anchors per ICC/ESR-#2381 (Los Angeles RR 24938) or EQUIVALENT

Material Values

CONCRETE

f'c =	4000	psi @ 28 days	
fc =	1800	psi	
Stress Tendons at =	3000	psi	(or 2000 psi min.)
Ec =	3,604,997	psi	
ft =	379.5	psi	
v =	126.5	psi	

STEEL

Cable 1/2 dia ASTM 416 Strand =		270	Ksi
Pjack (0.8 x fpy x area) =		33.0	Kips
Panchor (0.7 x fpy x area) =		28.9	Kips
Peffective (0.65 x fpy x area) =		26.9	Kips
Es =		28,000.0	Ksi
1/2 inch diameter strand	area =	0.153	Sq.Inches

Find Moment and loading Capacty of Slab:

Mt = Section Modulus x allowable Stress

Stress = (6 x sqrt f'c + P/A) = 429.47 psi

MinimumP/A = 50 psi

Section Modulus= BD^2/6 162 'ins^3 **Given** **Breath ins = 12.0**

Depth ins = 9.0

Moment = 5.798 kft

Since the Moment at the slab is also equal to [wL^2/2], where "L" = " L effective ", solve for "L eff ", where w = Soil Pressure

therefore "L eff"=: 5.798 = (Soil Pressure x "L eff"^2)/2 = "L eff" = 3.41 ft

Equivalent Strip of Ftg: (Ftg width + "L eff") =			**4.41**	**ft.**
Total Capacity of Exterior Ftg & Slab (Using Surface Bearing) =			**4.41**	**kips/lin.ft.**
Load from Exterior Wall =	**1.2**	**kips/lin.ft.** **Less than**	**4.41**	**kips/lin.ft.**
Equivalent Strip of Slab w/o Footing: (3.5" + "L eff") =			**3.71**	**ft.**
Total Capacity of Interior Ftg & Slab (Using Surface Bearing) =			**3.71**	**kips/lin ft**
Max. Interior Wall Load:	**1.25**	**kips/lin.ft.** **Less than**	**3.71**	**kips/lin.ft.**

Find Section Properties of Edge Beam

Beam Dimensions

Category I	b in	d in	D in	t in	Ws in	Lw in	Lh in
	12	22	22	9	54	0	0

Ws = Effective width of slab (6 x 't')
Lw = Width of ledge Lh = Height of ledge (Form)

Determine Section Properties:

	A	y	Ay	r	r^2	Io	A*r^2
Flange	486.00	17.50	8505.00	10.71	114.75	3280.50	55767.01
Stem	0.00	22.00	0.00	15.21	231.40	0.00	0.00
Beam	264.00	11.00	2904.00	-4.21	17.74	10648.00	4683.61
Sum A =	750.00	Sum Ay =	11409.00	Sum Ig =	74379.12	59047.51	=Ig Flange
Yt =	6.79 in		St =	10957.44 in^3		0.00	=Ig Stem
Yb =	15.21 in		Sb =	4889.50 in^3		15331.61	=Ig Beam

POINT LOAD CAPACITY OF EDGE BEAM:

L eff " = **3.41** **Ft.**
Equivalent Width of Ftg.= **4.41** **Ft.** (ftg.width +"L eff")
Assume to spread (2 x Depth of footing)
Nett area Sq.Ft.= **16.15** Under slab soil bearing Ksf = **1.00**
Max P L on Extrior Footing = 16.15 kips

For Uniform slab thickness of =	**9 Inches**
Use maximum point load of= 25% Reduction	**12.00 Kips**
Or add spread footing or reinforcing	

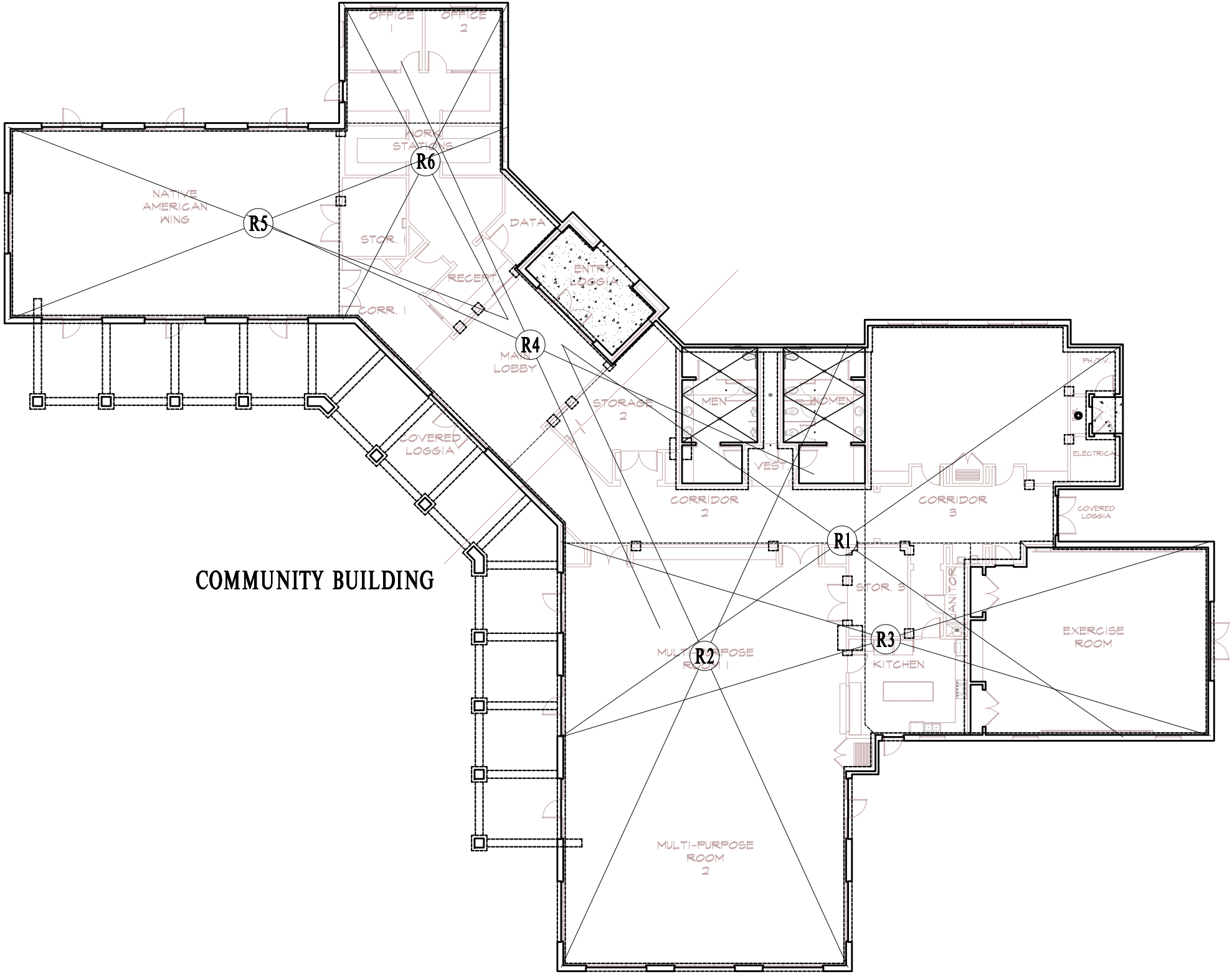
Punching Shear CAPACITY OF INTERIOR SLAB:

ACI 318-05 R11.12.1.2 **Vc= 4*Sqrt f'c *bo *d =**
d = Slab Thickne **9** b=bearing 4x4 post = **3.5**
bo = Perimeter of critical area (2*d/2+b) x4 **12.5** **50**
4 * Sqrt of f'c **253** Vc= 4*Sqrt f'c *bo *d *0.85 = **48.38**
d = t/2 **Kips**

Maximum Point Load on Slab

For Uniform slab thickness of =	**9 Inches**
w/ f'c = 4000	
Use maximum point load of 25% of capacity w/o additional	**12.00 Kips**
Or add spread footing or reinforcing	

L eff squared = **11.60** Nett area Sq.Ft.= Under slab soil bearing 1.0 Ksf
Max P L on Intrior Footing = 11.60 kips


OFFICE 1
OFFICE 2
WORK STATIONS
R6
NATIVE AMERICAN WING
R5
STOR. 1
DATA
RECEPT.
CORR. 1
ENTRY LOGGIA
R4
MAIN LOBBY
STORAGE 2
MEN
WOMEN
VEST.
CORRIDOR 2
CORRIDOR 3
PH/C.V.
ELECTRICAL
COVERED LOGGIA
COVERED LOGGIA
R1
COMMUNITY BUILDING
STOR. 3
VOLUNTARY
R3
KITCHEN
EXERCISE ROOM
R2
MULTI-PURPOSE ROOM 1
MULTI-PURPOSE ROOM 2

PTISlab 3.5

Geostructural Tool Kit, Inc.

Registered To : Post-Tension Design
Serial Number : 100-350-161

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R1
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	64.50 FT x 92.00 FT x 9.00 Inches
Uniform Thickness Slab : (rounded to the nearest 0.25 inch)	9.00 (8.94) Inches

Material Properties

Concrete Strength, f'_c :	4,000 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	164.8 Cubic Yards
Prestressing Tendon :	5,828.5 Linear Feet
Number of End Anchorages :	148

In the LONG direction ...

Number of Slab Tendons :	33
Slab Tendon Spacing :	1.95 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	41
Slab Tendon Spacing :	2.25 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	9,936	6,966
Moment of Inertia ($Inch^4$) :	67,068	47,021
Section Modulus, Top and Bottom ($Inch^3$) :	14,904	10,449
Beta Distance (Feet) :	8.35	7.64

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R1
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (8.94) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	41	33
Spacing of Tendons (FT)	2.25	1.95
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	768.8	555.9
Beta Distance Effective Prestress Force (K)	1,008.0	825.0
Minimum Effective Prestress (PSI)	77	80
Beta Distance Effective Prestress (PSI)	101	118

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.86 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.67 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.184	-0.154	Actual Stress	0.387	0.390

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 420

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	67,068	47,021
Required Moment of Inertia ($Inch^4$)	59,686	36,467
Required Moment of Inertia controlled by	6*Beta	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 1.10 K/FT
Maximum Shear, Long Direction 0.70 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	172	175
Actual Shear Stress (PSI)	10	6

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R1
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	396.1	317.2
0.5 Moment (FT-K)	177.4	118.4

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.49 FT-K/FT
Maximum Moment, Long Direction	2.46 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Long Direction		Compression in Top Fiber (KSI) Short Direction	Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.083	-0.064	Actual Stress	0.286	0.301

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	67,068	47,021
Required Moment of Inertia ($Inch^4$)	66,134	41,951
Required Moment of Inertia controlled by	6*Beta	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.50 K/FT
Maximum Shear, Long Direction	1.54 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	172	175
Actual Shear Stress (PSI)	14	14

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	396.1	317.2
0.5 Moment (FT-K)	114.6	79.5

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R1
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 64.50 FT x 92.00 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	4	12	3	8	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	11.0	11.0	11.0	11.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R1
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium 3rd edition

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 850.00 PLF

Stiffness Coefficients

Center Lift : 420
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTISlab 3.5

Geostructural Tool Kit, Inc.

Registered To : Post-Tension Design
Serial Number : 100-350-161

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R2
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	48.00 FT x 102.00 FT x 9.00 Inches
Uniform Thickness Slab : (rounded to the nearest 0.25 inch)	9.00 (9.11) Inches

Material Properties

Concrete Strength, f'_c :	4,000 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	136.0 Cubic Yards
Prestressing Tendon :	4,854.0 Linear Feet
Number of End Anchorages :	138

In the LONG direction ...

Number of Slab Tendons :	26
Slab Tendon Spacing :	1.84 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	43
Slab Tendon Spacing :	2.38 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	11,016	5,184
Moment of Inertia ($Inch^4$) :	74,358	34,992
Section Modulus, Top and Bottom ($Inch^3$) :	16,524	7,776
Beta Distance (Feet) :	8.56	7.09

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R2
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (9.11) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	43	26
Spacing of Tendons (FT)	2.38	1.84
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	878.5	426.0
Beta Distance Effective Prestress Force (K)	1,049.8	655.1
Minimum Effective Prestress (PSI)	80	82
Beta Distance Effective Prestress (PSI)	95	126

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.74 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.51 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.256	-0.208	Actual Stress	0.446	0.461

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 360

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	74,358	34,992
Required Moment of Inertia ($Inch^4$)	66,813	26,550
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 1.30 K/FT
Maximum Shear, Long Direction 0.81 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	171	177
Actual Shear Stress (PSI)	12	8

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R2
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	416.2	249.4
0.5 Moment (FT-K)	241.7	108.3

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.43 FT-K/FT
Maximum Moment, Long Direction	2.40 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Tension in Bottom Fiber (KSI) Long Direction		Compression in Top Fiber (KSI) Short Direction	Compression in Top Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.085	-0.052	Actual Stress	0.275	0.304

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	74,358	34,992
Required Moment of Inertia ($Inch^4$)	68,556	28,283
Required Moment of Inertia controlled by	Width	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.49 K/FT
Maximum Shear, Long Direction	1.57 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	171	177
Actual Shear Stress (PSI)	14	15

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	416.2	249.4
0.5 Moment (FT-K)	124.0	57.7

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R2
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 48.00 FT x 102.00 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	6	12	3	6	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	11.0	11.0	11.0	11.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R2
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium 3rd edition

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 1,300.00 PLF

Stiffness Coefficients

Center Lift : 360
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R3
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	31.53 FT x 105.53 FT x 9.00 Inches
Uniform Thickness Slab : (rounded to the nearest 0.25 inch)	9.00 (9.07) Inches

Material Properties

Concrete Strength, f'_c :	4,000 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	92.4 Cubic Yards
Prestressing Tendon :	3,202.7 Linear Feet
Number of End Anchorages :	116

In the LONG direction ...

Number of Slab Tendons :	17
Slab Tendon Spacing :	1.85 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	41
Slab Tendon Spacing :	2.59 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	11,397	3,405
Moment of Inertia ($Inch^4$) :	76,931	22,985
Section Modulus, Top and Bottom ($Inch^3$) :	17,096	5,108
Beta Distance (Feet) :	8.64	6.39

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R3
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (9.07) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	41	17
Spacing of Tendons (FT)	2.59	1.85
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	910.6	271.6
Beta Distance Effective Prestress Force (K)	992.4	430.7
Minimum Effective Prestress (PSI)	80	80
Beta Distance Effective Prestress (PSI)	87	126

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.84 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.65 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.197	-0.144	Actual Stress	0.371	0.397

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 480

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	76,931	22,985
Required Moment of Inertia ($Inch^4$)	49,015	16,948
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 0.97 K/FT
Maximum Shear, Long Direction 0.70 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	177
Actual Shear Stress (PSI)	9	6

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R3
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	397.8	163.1
0.5 Moment (FT-K)	202.4	57.6

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.48 FT-K/FT
Maximum Moment, Long Direction	2.46 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Long Direction		Compression in Top Fiber (KSI) Short Direction	Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.097	-0.055	Actual Stress	0.271	0.308

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	76,931	22,985
Required Moment of Inertia ($Inch^4$)	47,616	17,093
Required Moment of Inertia controlled by	Width	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.43 K/FT
Maximum Shear, Long Direction	1.55 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	177
Actual Shear Stress (PSI)	13	14

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	397.8	163.1
0.5 Moment (FT-K)	131.1	38.7

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R3
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 31.53 FT x 105.53 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	6	12	2	4	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	10.0	11.0	10.0	11.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R3
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium 3rd edition

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 850.00 PLF

Stiffness Coefficients

Center Lift : 480
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTISlab 3.5

Geostructural Tool Kit, Inc.

Registered To : Post-Tension Design
Serial Number : 100-350-161

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R4
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	35.50 FT x 95.00 FT x 9.00 Inches
Uniform Thickness Slab : (rounded to the nearest 0.25 inch)	9.00 (8.95) Inches

Material Properties

Concrete Strength, f'_c :	4,000 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	93.7 Cubic Yards
Prestressing Tendon :	3,230.5 Linear Feet
Number of End Anchorages :	112

In the LONG direction ...

Number of Slab Tendons :	19
Slab Tendon Spacing :	1.86 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	37
Slab Tendon Spacing :	2.58 Feet O.C.
Slab Tendon Centroid :	4.50 Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	10,260	3,834
Moment of Inertia ($Inch^4$) :	69,255	25,880
Section Modulus, Top and Bottom ($Inch^3$) :	15,390	5,751
Beta Distance (Feet) :	8.41	6.58

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R4
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (8.95) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	37	19
Spacing of Tendons (FT)	2.58	1.86
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	801.6	322.4
Beta Distance Effective Prestress Force (K)	898.1	480.4
Minimum Effective Prestress (PSI)	78	84
Beta Distance Effective Prestress (PSI)	88	125

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.88 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.65 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.274	-0.219	Actual Stress	0.449	0.470

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 480

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	69,255	25,880
Required Moment of Inertia ($Inch^4$)	63,210	25,009
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 1.23 K/FT
Maximum Shear, Long Direction 0.89 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	177
Actual Shear Stress (PSI)	11	8

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R4
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	359.0	182.3
0.5 Moment (FT-K)	231.8	82.5

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.48 FT-K/FT
Maximum Moment, Long Direction	2.45 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Tension in Bottom Fiber (KSI) Long Direction		Compression in Top Fiber (KSI) Short Direction	Compression in Top Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.096	-0.056	Actual Stress	0.271	0.307

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	69,255	25,880
Required Moment of Inertia ($Inch^4$)	48,123	19,768
Required Moment of Inertia controlled by	Width	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.46 K/FT
Maximum Shear, Long Direction	1.56 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	177
Actual Shear Stress (PSI)	13	14

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	359.0	182.3
0.5 Moment (FT-K)	117.7	43.5

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R4
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 35.50 FT x 95.00 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	6	10	2	4	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	12.0	11.0	12.0	11.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R4
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium Expansion

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 1,250.00 PLF

Stiffness Coefficients

Center Lift : 480
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTISlab 3.5

Geostructural Tool Kit, Inc.

Registered To : Post-Tension Design
Serial Number : 100-350-161

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R5
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	31.33 FT x 81.25 FT x 9.00	Inches
Uniform Thickness Slab :	9.00 (8.95)	Inches
(rounded to the nearest 0.25 inch)		

Material Properties

Concrete Strength, f'_c :	4,000	PSI
Tendon Strength, F_{pu} :	270	KSI
Tendon Diameter :	1 / 2	Inch

Material Quantities

Concrete Volume :	70.7	Cubic Yards
Prestressing Tendon :	2,398.6	Linear Feet
Number of End Anchorages :	96	

In the LONG direction ...

Number of Slab Tendons :	16	
Slab Tendon Spacing :	1.96	Feet O.C.
Slab Tendon Centroid :	4.50	Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	32	
Slab Tendon Spacing :	2.56	Feet O.C.
Slab Tendon Centroid :	4.50	Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	8,775	3,384
Moment of Inertia ($Inch^4$) :	59,231	22,840
Section Modulus, Top and Bottom ($Inch^3$) :	13,163	5,075
Beta Distance (Feet) :	8.09	6.38

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R5
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (8.95) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	32	16
Spacing of Tendons (FT)	2.56	1.96
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	713.5	287.5
Beta Distance Effective Prestress Force (K)	780.4	404.2
Minimum Effective Prestress (PSI)	81	85
Beta Distance Effective Prestress (PSI)	89	119

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.16 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.96 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.219	-0.174	Actual Stress	0.397	0.413

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 480

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	59,231	22,840
Required Moment of Inertia ($Inch^4$)	40,680	18,240
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 1.06 K/FT
Maximum Shear, Long Direction 0.73 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	170	176
Actual Shear Stress (PSI)	10	7

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R5
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	310.3	153.8
0.5 Moment (FT-K)	169.1	62.1

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.47 FT-K/FT
Maximum Moment, Long Direction	2.44 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Tension in Bottom Fiber (KSI) Long Direction		Compression in Top Fiber (KSI) Short Direction	Compression in Top Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.094	-0.062	Actual Stress	0.272	0.300

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	59,231	22,840
Required Moment of Inertia ($Inch^4$)	36,230	16,866
Required Moment of Inertia controlled by	Width	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.43 K/FT
Maximum Shear, Long Direction	1.53 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	170	176
Actual Shear Stress (PSI)	13	14

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	310.3	153.8
0.5 Moment (FT-K)	100.4	38.3

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R5
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 31.33 FT x 81.25 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	5	9	2	4	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	10.0	10.0	10.0	10.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R5
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium Expansion

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 1,000.00 PLF

Stiffness Coefficients

Center Lift : 480
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R6
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	26.83 FT x 51.50 FT x 9.00	Inches
Uniform Thickness Slab :	9.00 (8.89)	Inches
(rounded to the nearest 0.25 inch)		

Material Properties

Concrete Strength, f'_c :	4,000	PSI
Tendon Strength, F_{pu} :	270	KSI
Tendon Diameter :	1 / 2	Inch

Material Quantities

Concrete Volume :	38.4	Cubic Yards
Prestressing Tendon :	1,218.6	Linear Feet
Number of End Anchorages :	64	

In the LONG direction ...

Number of Slab Tendons :	12	
Slab Tendon Spacing :	2.26	Feet O.C.
Slab Tendon Centroid :	4.50	Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	20	
Slab Tendon Spacing :	2.61	Feet O.C.
Slab Tendon Centroid :	4.50	Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	5,562	2,898
Moment of Inertia ($Inch^4$) :	37,544	19,559
Section Modulus, Top and Bottom ($Inch^3$) :	8,343	4,346
Beta Distance (Feet) :	7.22	6.13

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R6
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **9.00 (8.89) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	20	12
Spacing of Tendons (FT)	2.61	2.26
Center of Gravity of Concrete (from top of slab) (Inch)	4.50	4.50
Center of Gravity of Tendons (from top of slab) (Inch)	4.50	4.50
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	457.3	244.3
Beta Distance Effective Prestress Force (K)	492.0	301.6
Minimum Effective Prestress (PSI)	82	84
Beta Distance Effective Prestress (PSI)	88	104

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.75 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 3.57 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.189	-0.160	Actual Stress	0.366	0.369

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 480

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	37,544	19,559
Required Moment of Inertia ($Inch^4$)	19,895	13,539
Required Moment of Inertia controlled by	Width	6*Beta

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 0.92 K/FT
Maximum Shear, Long Direction 0.67 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	173
Actual Shear Stress (PSI)	9	6

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R6
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	194.0	115.9
0.5 Moment (FT-K)	96.6	47.9

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.52 FT-K/FT
Maximum Moment, Long Direction	2.49 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Tension in Bottom Fiber (KSI) Long Direction		Compression in Top Fiber (KSI) Short Direction	Compression in Top Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.098	-0.080	Actual Stress	0.275	0.288

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 720

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	37,544	19,559
Required Moment of Inertia ($Inch^4$)	20,037	14,156
Required Moment of Inertia controlled by	Width	6*Beta

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.41 K/FT
Maximum Shear, Long Direction	1.47 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	173
Actual Shear Stress (PSI)	13	14

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	194.0	115.9
0.5 Moment (FT-K)	64.8	33.4

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R6
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016
Report Date : May 06, 2016
Report Number : 99070-35

Geotechnical Report : NMG Geotechnical, Inc.

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 26.83 FT x 51.50 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	3	6	2	3	
Depth :	13.0	13.0	13.0	13.0	Inches
Width :	10.0	10.0	10.0	10.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

Project Title : ICDC - Portola Springs Communitiy Park PA6 - R6
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium Expansion

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 800.00 PLF

Stiffness Coefficients

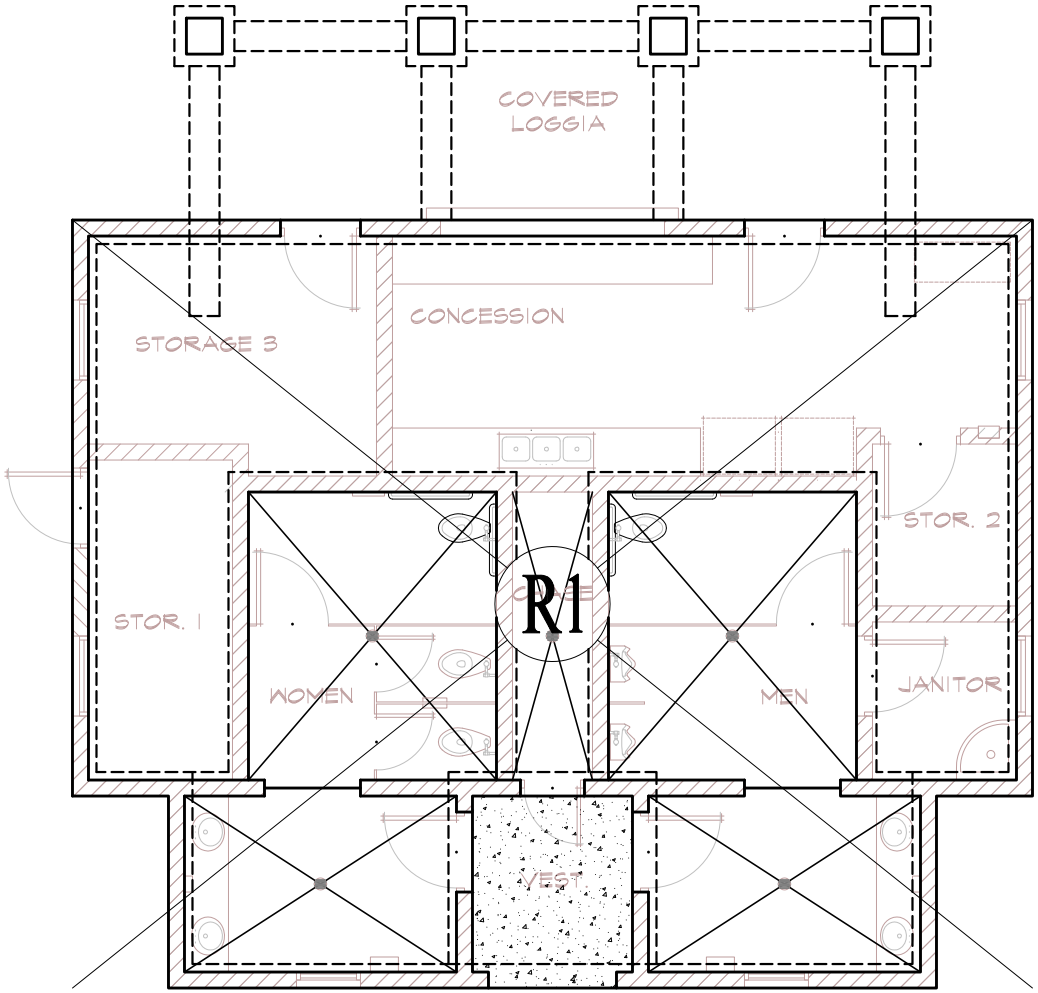
Center Lift : 480
Edge Lift : 720

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00



CONCESSION/RESTROOM BUILDING

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - Concession Bldg
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - DESIGN SUMMARY

Slab Dimensions :	32.00 FT x 40.00 FT x 10.00 Inches
Uniform Thickness Slab : (rounded to the nearest 0.25 inch)	10.00 (10.01) Inches

Material Properties

Concrete Strength, f'_c :	4,000 PSI
Tendon Strength, F_{pu} :	270 KSI
Tendon Diameter :	1 / 2 Inch

Material Quantities

Concrete Volume :	39.5 Cubic Yards
Prestressing Tendon :	1,208.0 Linear Feet
Number of End Anchorages :	64

In the LONG direction ...

Number of Slab Tendons :	15
Slab Tendon Spacing :	2.14 Feet O.C.
Slab Tendon Centroid :	5.00 Inches from top of slab

In the SHORT direction ...

Number of Slab Tendons :	17
Slab Tendon Spacing :	2.38 Feet O.C.
Slab Tendon Centroid :	5.00 Inches from top of slab

Selected Variables

	Short Direction	Long Direction
Cross Sectional Area ($Inch^2$) :	4,800	3,840
Moment of Inertia ($Inch^4$) :	40,000	32,000
Section Modulus, Top and Bottom ($Inch^3$) :	8,000	6,400
Beta Distance (Feet) :	7.33	6.94

Jacking Force : 33.05 KIPS

Project Title : ICDC - Portola Springs Communitiy Park PA6 - Concession Bldg
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS

Uniform Thickness Slab **10.00 (10.01) Inches**
(rounded to nearest 0.25 inch)

Prestress Summary

Subgrade Friction calculated by method prescribed in PTI Manual

	Short Direction	Long Direction
Number of Tendons	17	15
Spacing of Tendons (FT)	2.38	2.14
Center of Gravity of Concrete (from top of slab) (Inch)	5.00	5.00
Center of Gravity of Tendons (from top of slab) (Inch)	5.00	5.00
Eccentricity of Prestressing (Inch)	0.00	0.00
Minimum Effective Prestress Force (K)	375.2	322.0
Beta Distance Effective Prestress Force (K)	417.1	372.5
Minimum Effective Prestress (PSI)	78	84
Beta Distance Effective Prestress (PSI)	87	97

Moment Analysis - Center Lift Mode

Maximum Moment, Short Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.92 FT-K/FT
Maximum Moment, Long Dir. (calculated with Em=5.0 per PTI 4.3.2) 4.69 FT-K/FT

	Tension in Top Fiber (KSI) Short Direction	Tension in Top Fiber (KSI) Long Direction		Compression in Bottom Fiber (KSI) Short Direction	Compression in Bottom Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.208	-0.184	Actual Stress	0.382	0.378

Stiffness Analysis - Center Lift Mode

Based on a Stiffness Coefficient of 620

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	40,000	32,000
Required Moment of Inertia ($Inch^4$)	31,236	29,749
Required Moment of Inertia controlled by	Width	Length

Shear Analysis - Center Lift Mode

Maximum Shear, Short Direction 1.25 K/FT
Maximum Shear, Long Direction 0.79 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	171
Actual Shear Stress (PSI)	10	7

Project Title : ICDC - Portola Springs Communitiy Park PA6 - Concession Bldg
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

UNIFORM THICKNESS FOUNDATION - RESULTS OF ANALYSIS continued

Cracked Section Analysis - Center Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	183.3	161.3
0.5 Moment (FT-K)	98.4	75.0

Moment Analysis - Edge Lift Mode

Maximum Moment, Short Direction	2.68 FT-K/FT
Maximum Moment, Long Direction	2.58 FT-K/FT

	Tension in Bottom Fiber (KSI) Short Direction	Tension in Bottom Fiber (KSI) Long Direction		Compression in Top Fiber (KSI) Short Direction	Compression in Top Fiber (KSI) Long Direction
Allowable Stress	-0.379	-0.379	Allowable Stress	1.800	1.800
Actual Stress	-0.074	-0.058	Actual Stress	0.248	0.252

Stiffness Analysis - Edge Lift Mode

Based on a Stiffness Coefficient of 1150

	Short Direction	Long Direction
Available Moment of Inertia ($Inch^4$)	40,000	32,000
Required Moment of Inertia ($Inch^4$)	31,570	30,416
Required Moment of Inertia controlled by	Width	Length

Shear Stress Analysis - Edge Lift Mode

Maximum Shear, Short Direction	1.49 K/FT
Maximum Shear, Long Direction	1.51 K/FT

	Short Direction	Long Direction
Allowable Shear Stress (PSI)	169	171
Actual Shear Stress (PSI)	12	13

Cracked Section Analysis - Edge Lift Mode

	Short Direction	Long Direction
Cracked Section Capacity (FT-K)	183.3	161.3
0.5 Moment (FT-K)	53.6	41.3

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - Concession Bldg
Project Engineer : BNse
Project Number : 16-1334
Project Date : June 13, 2016
Geotechnical Report : NMG Geotechnical, Inc.
Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA

Material Properties

Material Label :

Concrete Strength, f'_c :	4,000.0	PSI
Concrete Creep Modulus, E_c :	1,500,000.0	PSI
Concrete Unit Weight :	145.0	PCF
Tendon Strength, F_{pu} :	270.0	KSI
Tendon Diameter :	1 / 2	Inch

Slab Properties

Rectangle Geometry : 32.00 FT x 40.00 FT x 4.00 Inches

	Short Direction	Long Direction
Minimum Permissible Prestress :	75.00 PSI	75.00 PSI

Beam Properties

	Short Direction		Long Direction		
	Type I	Type II	Type I	Type II	
Quantity :	2	5	2	4	
Depth :	14.0	14.0	14.0	14.0	Inches
Width :	12.0	12.0	12.0	12.0	Inches
Tendons :	0	1	0	1	
Cover :	0.00	3.00	0.00	3.00	Inches

Average beam spacing used in analysis

PTISlab 3.5

Geostructural Tool Kit, Inc.

Project Title : ICDC - Portola Springs Communitiy Park PA6 - Concession Bldg
Project Engineer : BNse

Project Number : 16-1334
Project Date : June 13, 2016

Geotechnical Report : NMG Geotechnical, Inc.

Report Date : May 06, 2016
Report Number : 99070-35

SUMMARY OF INPUT DATA - Continued

Soil Properties

Soil Label : Low to Medium 3rd edition

Allowable Bearing Pressure : 1,800.0 PSF

	Center Lift	Edge Lift
Edge Moisture Variation Distance, e_m :	9.00 Feet	4.80 Feet
Differential Soil Movement, y_m :	0.600 Inches	0.700 Inches

Load, Deflection and Subgrade Properties

Slab Loading

Uniform Superimposed Total Load : 50.00 PSF
Total Perimeter Load : 1,250.00 PLF

Stiffness Coefficients

Center Lift : 620
Edge Lift : 1150

Prestress Calculation

Subgrade Friction calculated by method prescribed in PTI Manual

Prestress Loss : 15.0 KSI

Subgrade Friction Coefficient : 1.00

PTD, Inc.
Upland, CA

Project Title: Toll Brothers - The Peak at the Canyons
Engineer: BNse
Project ID: 16-1348
Project Descr: PT slab-on-grade

Beam on Elastic Foundation

File = f:\EFC0PU~B\1YSKVT~Y.EC6
ENERCALC, INC. 1983-2016, Build:6.16.6.7, Ver:6.16.6.7

Lic. # : KW-06006185 — Licensee : PTD INC

Description : 1334-CMU column at center

CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

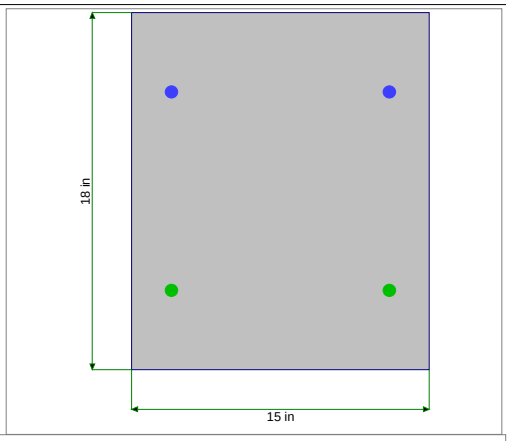
Material Properties

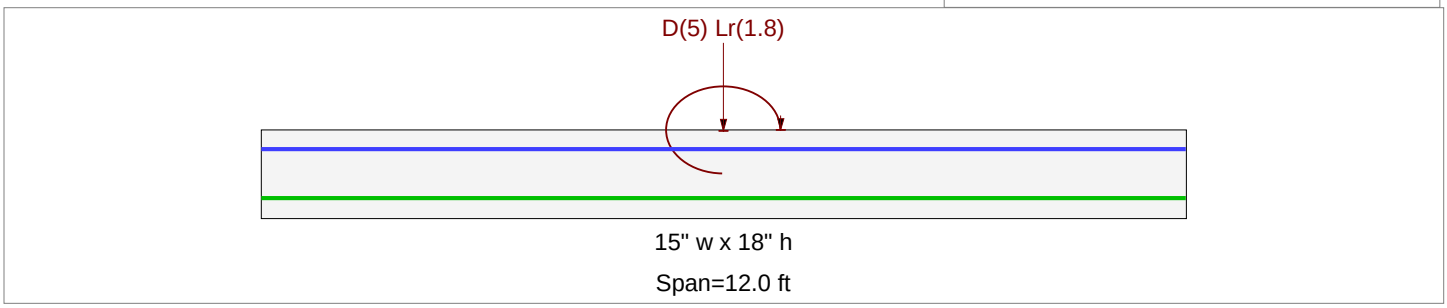
f'c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi			

Soil Subgrade Modulus = 100.0 psi / (inch deflection)
Load Combination ASCE 7-10

fy - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup		2

Beam is supported on an elastic foundation,





Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 18.0 in
Span #1 Reinforcing....
2-#5 at 4.0 in from Top, from 0.0 to 12.0 ft in this span
2-#5 at 4.0 in from Bottom, from 0.0 to 12.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.
Beam self weight calculated and added to loads
Load for Span Number 1
Moment : E = 27.850 k-ft, Location = 6.0 ft from left end of this span
Point Load : D = 5.0, Lr = 1.80 k @ 6.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = **0.616** : 1
Section used for this span **Typical Section**
Mu : Applied 27.601 k-ft
Mn * Phi : Allowable 44.793 k-ft
Load Combination +1.20D+0.50L+0.20S+1.40E
Location of maximum on span 6.071 ft
Span # where maximum occurs Span # 1

Maximum Deflection

Max Downward L+Lr+S Deflection	0.000 in
Max Upward L+Lr+S Deflection	0.000 in
Max Downward Total Deflection	0.143 in
Max Upward Total Deflection	-0.233 in

Maximum Soil Pressure = **2.063** ksf at 0.00 ft LdComb: +0.60D-E
Allowable Soil Pressure = **2.10** ksf OK

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	6.071	27.60	44.79	0.62
+1.40D+1.60H					
Span # 1	1	6.071	9.86	44.79	0.22
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	6.071	9.72	44.79	0.22

Beam on Elastic Foundation

File = f:\EFC0PU~B\1YSKVT~Y.EC6
ENERCALC, INC. 1983-2016, Build:6.16.6.7, Ver:6.16.6.7

Lic. # : KW-06006185 **Licensee : PTD INC**

Description : 1334-CMU column at center

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	6.071	8.45	44.79	0.19
+1.20D+1.60Lr+0.50L+1.60H					
Span # 1	1	6.071	12.51	44.79	0.28
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	6.071	12.51	44.79	0.28
+1.20D+0.50L+1.60S+1.60H					
Span # 1	1	6.071	8.45	44.79	0.19
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	6.071	8.45	44.79	0.19
+1.20D+0.50Lr+0.50L+W+1.60H					
Span # 1	1	6.071	9.72	44.79	0.22
+1.20D+0.50L+0.50S+W+1.60H					
Span # 1	1	6.071	8.45	44.79	0.19
+1.20D+0.50L+0.20S+1.40E+1.60H					
Span # 1	1	6.071	27.60	44.79	0.62
+1.20D+0.50L+0.20S-1.40E+1.60H					
Span # 1	1	5.929	27.60	44.79	0.62
+0.90D+W+0.90H					
Span # 1	1	6.071	6.34	44.79	0.14
+0.90D+1.40E+0.90H					
Span # 1	1	6.071	25.49	44.79	0.57
+0.90D-1.40E+0.90H					
Span # 1	1	5.929	25.49	44.79	0.57

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.0402	6.000	Span 1	-0.2330	12.000

Beam on Elastic Foundation

File = f:\EFC0PU~B\1YSKVT~Y.EC6
ENERCALC, INC. 1983-2016, Build:6.16.6.7, Ver:6.16.6.7

Lic. # : KW-06006185
Licensee : PTD INC

Description : 1334-CMU column at end/corner

CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, CBC 2013, ASCE 7-10
Load Combinations Used : ASCE 7-10

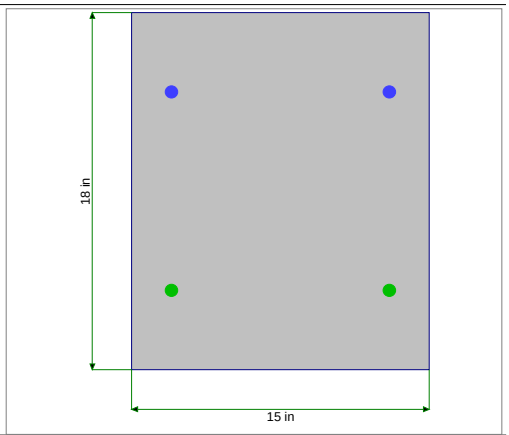
Material Properties

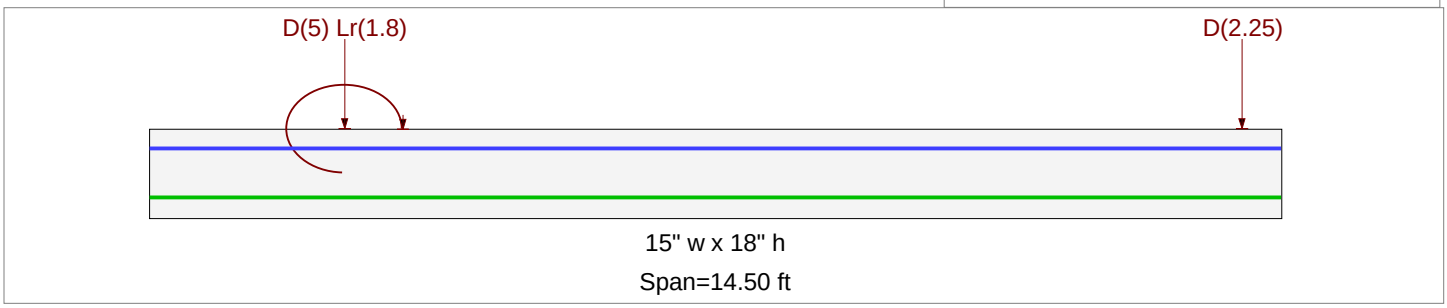
f'c = 3.0 ksi
fr = f'c^1/2 * 7.50 = 410.792 psi
ψ Density = 145.0 pcf
λ Lt Wt Factor = 1.0
Elastic Modulus = 3,122.0 ksi
Soil Subgrade Modulus = 100.0 psi / (inch deflection)
Load Combination ASCE 7-10

ϕ Phi Values Flexure : 0.90
Shear : 0.750
β1 = 0.850

fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Fy - Stirrups = 40.0 ksi
E - Stirrups = 29,000.0 ksi
Stirrup Bar Size # = # 3
Number of Resisting Legs Per Stirrup = 2

Beam is supported on an elastic foundation,





Cross Section & Reinforcing Details

Rectangular Section, Width = 15.0 in, Height = 18.0 in
Span #1 Reinforcing....
2-#5 at 4.0 in from Top, from 0.0 to 14.50 ft in this span
2-#5 at 4.0 in from Bottom, from 0.0 to 14.50 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
Moment : E = 27.850 k-ft, Location = 2.50 ft from left end of this span
Point Load : D = 2.250 k @ 14.0 ft
Point Load : D = 5.0, Lr = 1.80 k @ 2.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = **0.837**: 1
Section used for this span **Typical Section**
Mu : Applied 37.50 k-ft
Mn * Phi : Allowable 44.793 k-ft
Load Combination +1.20D+0.50L+0.20S+1.40E
Location of maximum on span 2.559 ft
Span # where maximum occurs Span # 1

Maximum Deflection
Max Downward L+Lr+S Deflection 0.000 in
Max Upward L+Lr+S Deflection 0.000 in
Max Downward Total Deflection 0.121 in
Max Upward Total Deflection -0.028 in

Maximum Soil Pressure = **1.741** ksf at 0.00 ft LdComb: +D-E
Allowable Soil Pressure = **2.10** ksf OK

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope					
Span # 1	1	2.559	37.50	44.79	0.84
+1.40D+1.60H					
Span # 1	1	14.159	0.03	44.79	0.00
+1.20D+0.50Lr+1.60L+1.60H					

Beam on Elastic Foundation

File = f:\EFC0PU~B\1YSKVT~Y.EC6
ENERCALC, INC. 1983-2016, Build:6.16.6.7, Ver:6.16.6.7

Lic. # : KW-06006185 **Licensee : PTD INC**

Description : 1334-CMU column at end/corner

Load Combination / Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1 +1.20D+1.60L+0.50S+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+1.60Lr+0.50L+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+1.60Lr+0.50W+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+0.50L+1.60S+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+1.60S+0.50W+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+0.50Lr+0.50L+W+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+0.50L+0.50S+W+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+0.50L+0.20S+1.40E+1.60H	1	14.159	0.02	44.79	0.00
Span # 1 +1.20D+0.50L+0.20S-1.40E+1.60H	1	2.559	37.50	44.79	0.84
Span # 1 +0.90D+W+0.90H	1	14.329	-0.01	44.79	0.00
Span # 1 +0.90D+1.40E+0.90H	1	14.159	0.02	44.79	0.00
Span # 1 +0.90D-1.40E+0.90H	1	2.559	36.83	44.79	0.82
Span # 1	1	14.329	-0.01	44.79	0.00

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
Span 1	1	0.1209	0.000		0.0000	0.000

ENGINEERING – PW CASE FILES
SCAN SHEET

PW CASE TYPE: MISCELLANEOUS CONSTRUCTION

CASE #: 00674798-MCE

DESCRIPTION: LOCATION: PEARBLOSSOM AND TOMATO SPRINGS STREET IMPROVEMENTS FOR TOMATO SPRINGS ROAD EXTENSION. TRACT 17769. COMMUNITY PARK. PA6 N4B (RELATED DOCS.)

RECORDATION #:

APPROVAL DATE: 4/17/2019

City of Irvine
Development Engineering
Public Works Dept.
One Civic Center Plaza
PO Box 19575 Irvine, CA 92623-9575
For Permit Info: (949) 724-6300 For Inspections: (949) 724-6501

Misc. Const. Eng Permit

00674798-MCE

ADDRESS: 1 GRID TT18

TRACT: GRID **LOT:** TT18 **APN:** TT18

PLANNING AREA: 6

DESCRIPTION OF WORK:
LOCATION: PEARBLOSSOM/TOMATO SPRINGS
STREET IMPROVEMENTS FOR TOMATO SPRINGS ROAD EXTENSION. TRACT 17769. COMMUNITY PARK. PA6 N4B

CONTRACTOR

LICENSED CONTRACTORS DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

License Class A Lic.No. 976420

Date 11/17/2016 Contractor IRVINE COMMUNITY DEVELOPMENT COMPANY LLC

OWNER-BUILDER

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractor's License Law for the following reason:

- ☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale.
- ☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project.
- ☐ I am exempt under Sec. _____, B&PC, for this Reason _____

Date _____ Owner _____

WORKERS' COMPENSATION

WORKERS' COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

- ☐ I have and will maintain a certificate of consent to self-insure for workers' compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.
- ☒ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance is carrier and policy number are:

Carrier Ace American

Policy # WLRC49103487

- ☐ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California, and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date _____ Applicant K Blanchard

WARNING: FAILURE TO SECURE WORKERS' COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

LENDER

CONSTRUCTION LENDING AGENCY

I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.)

Lender's Name _____

Lender's Address _____

I certify that I have read this application and state that the above information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction, and hereby authorize representatives of this city to enter upon the above-mentioned property for inspection purposes.

Kristi Blanchard 11/17/16
Signature of Applicant or Agent Date

Kristi Blanchard
Print Applicant's/Agent's Name

OWNER: << IRVINE COMMUNITY DEVELOPMENT
ADDRESS: 550 NEWPORT CENTER DR
CITY, ST ZIP: NEWPORT BEACH CA 92660
PHONE: (949) 720-2000

APPLICANT: >> STANTEC
ADDRESS: 38 TECHNOLOGY DR 100
CITY, ST ZIP: IRVINE CA 92618
CONTACT: KELSEY CARTON 949-202-9222
PHONE: (949) 923-6260

CONTRACTOR: IRVINE COMMUNITY DEVELOPMENT COMPANY LLC
ADDRESS: 550 NEWPORT CENTER DR
CITY, ST ZIP: NEWPORT BEACH CA 92660
CONTR LIC EXP: 9/30/2018
IRV BUS LIC: 1203431 **EXP DATE:** 11/30/2016
INSURANCE POLICY:

PROFESSIONAL:
ADDRESS:
CITY, ST ZIP:
PHONE:
LICENSE #:

GEOTECHNICAL:
ADDRESS:
CITY, ST ZIP:
LICENSE#:

SITE AC: **TOT SQFT:** 0
AD ACQUISITION:
ASSESSMENT DISTRICT: **AD#:**

PERMIT FEES

Traffic System -USA alert	109.00
Issuance Fee Comm	37.00
Right Of Way Insp	1,098.45



Total Permit Fees: $1,244.45

Receipt# **00146361**

CIP #:
PLAN CHECK # :00674416-EMC
APPROVAL BY: PAVEL HORN 09/02/16
PERMIT ISSUED BY: HUNTER ALVARADO 11/17/2016

NOTICE: Pursuant to Assembly Bill 3020, no excavation permit is valid unless the following is performed:
1. UNDERGROUND SERVICE ALERT has been contacted and has provided inquiry I.D. Number
2. The applicant agrees to contact and obtain an inquiry I.D. Number from UNDERGROUND SERVICE ALERT (1-800-422-4133) at least 2 working days prior to commencing excavation.

CONSTRUCTION WORKING HOURS
Weekdays: 7 AM - 7 PM, Saturday 9 AM - 6 PM
Sunday/Holiday: PROHIBITED

PERMIT EXPIRATION: Permit becomes null & void if work is not completed in 180 calendar days, or if work has not started and/or is suspended for 60 calendar days or more.Permits may be extended upon written request from the Applicant and approval by the City Engineer.
NOTE: I have received the Standard Conditions and Regulations for Encroachment/Miscellaneous Construction Permits.

CERTIFICATION OF COMPLETION

I certify that under date _____ of _____ that I made a final inspection of all work under the following permit types and from this inspection it appears that the Building or Facility is now ready for occupancy. By _____ Date _____

INDIVIDUAL APPROVAL

Plumbing By _____ Date _____

Mechanical By _____ Date _____

Electrical By _____ Date _____

Fire Sprinkler By _____ Date _____

Swimming Pool By _____ Date _____

Building By _____ Date _____

Grading By _____ Date 4/17/19

Encroachment By _____ Date _____

Landscaping By _____ Date _____

Construction Permit By _____ Date _____

OTHER_____ By _____ Date _____

UTILITY RELEASES

Electrical By _____ Date _____

Gas By _____ Date _____

BOND RELEASE

Bond Released By _____ Date _____

COMMUNITY DEVELOPMENT
Building and Safety

GRADING, STREET IMPROVEMENT AND LANDSCAPE PROJECT DOCUMENTATION CHECKLIST

PROJECT ADDRESS	PERMIT
PORTOLA SPRINGS [PA-6] PEARBLOSSOM/TOMATO SPRINGS STREET IMPROVEMENTS TRACT 17769.	00674798-MCE

GRADING/STREET IMPROVEMENT PROJECT

DOCUMENTATION	REQUIRED	DATE	RECEIVED
Civil Engineer Certification	☒ YES ☐ NO		
Soils Certification and Final Soils Report	☒ YES ☐ NO		
Individual PDF files of drawing and AutoCAD files; Permit number and words "RECORD DRAWING" shall appear on all sheets	☒ YES ☐ NO		
Land Use Conditions	☐ YES ☒ NO		
WQMP Operations and Maintenance Plan Sheet	☐ YES ☒ NO		
Other:	☐ YES ☒ NO		

LANDSCAPE PROJECT

DOCUMENTATION	REQUIRED	DATE	RECEIVED
Landscape Architect Certification	☐ YES ☐ NO		
Individual PDF files of drawing and AutoCAD files; Permit number and words "RECORD DRAWING" shall appear on all sheets	☐ YES ☐ NO		
Operating Maintenance Manuals, Warranties (NOTE: Applies only to projects which will be maintained by the City of Irvine)	☐ YES ☐ NO		
Land Use Conditions	☐ YES ☐ NO		
Other:	☐ YES ☐ NO		

ALL REQUIRED DOCUMENTS RECEIVED.

CITY INSPECTOR

4/12/19
DATE

COMMUNITY DEVELOPMENT
Building and Safety

FINAL GRADE SOILS

Director of Community Development
Department of Community Development
Building and Safety Division
City of Irvine
One Civic Center Plaza
Irvine, CA 92606-5208

ATTENTION: Tim Anderson, City Grading Inspector

SUBJECT: Soil Engineer's Certificate of Compliance for Earthwork and Onsite Paving as Per Approved grading and improvement plans for PA-6, N4B Backbone Street Improvements, VTTM 16814 and 17769

REFERENCE PROJECT:

PERMIT NUMBERS :00662796-MCE & :00674798-MCE
JOB ADDRESS Tomato Springs/Pearlblossom
OWNER Irvine Community Development Company
GENERAL CONTRACTOR Irvine Community Development Company
WORK BEGAN September 2, 2016
WORK COMPLETED August 15, 2017

In accordance with the Irvine Grading and Excavation Code and the requirements of the Building Code, I certify that I have personally supervised the testing and inspection during placement of all onsite improvements.

It is my judgment that work is complete on this project, in full compliance with said codes. This certification does not include exact horizontal or vertical control nor dimensions of the earthwork within the purview of others.

BY: _____ September 17, 2018
SIGNATURE DATE

Dante P. Domingo, Principal Engineer 57939
NAME AND TITLE RCE #

KLING CONSULTING GROUP, INC.
COMPANY NAME



Stantec Consulting Services Inc.
38 Technology Drive Suite 100, Irvine CA 92618-5312

January 24, 2019
File: 2042492050

Attention: City Inspector

Reference: STREET IMPROVEMENTS CIVIL
Civil Engineer's Certification of Compliance
Planning Area 6 - N4B, VTTM 17769

Project:

Permit Number: 00674798-MCE
Job Address: Pearblossom/Tomato Springs
Owner The Irvine Company
General Contractor: Irvine Community Development Company, LLC
Work Began: November 2016 Work Completed: December 2018

In accordance with the Irvine Grading and Excavation Code and the requirements of the Building Code, I certify approval of this project as outlined above. Street improvements have been completed substantially in conformance with the approved improvement plan for this project and in full compliance with said Codes. Certification includes horizontal and vertical control for drainage devices and street improvements as verified by the owner's surveyor during construction. This certification does not include approval of the placement and compaction of earthwork within the purview of others.

By: _____
Kevin B. Brandt, P.E.

Date: 01/24/19



V:\2042\active\2042492050\record\record_drawings\00674798-mce_st_dw_ss_rw_vttm_17769\00674798_mce_pa6_n4b_vttm_17769_st_ad_cert_letter_20190124.docx

COMMUNITY DEVELOPMENT
Building and Safety

PROJECT ACCEPTANCE

PERMIT #	PLAN CHECK #
00674798 - MCE	00674416 - EMC
PROJECT NAME	**CONTRACTOR**
PORTOLA SPRINGS PA-67 PEARBLOSSOM SIP TRACT 17769	

STREETS DEPARTMENT

BY: Joe Dell DATE: 3/29/19

			NEW	REHAB
AC Paving (NEW)	12,090	SF	X	
AC Paving (REHAB)	215	SF		X
AC Paving Length (Centerline)	~~331~~	LF		
AC Slurry	N/A	SF		
Sidewalk	4,225	SF	X	
Curb and Gutter	665	LF	X	
Off Street Bike Trail	N/A	LF		

			NEW	REHAB
STORM DRAIN PIPE		LF		
CATCH BASINS		EA		
JUNCTION STRUCTURES		EA		
OPEN "V" DITCH		LF		
WATER QUALITY STRUCT.		EA		
OTHER		EA		
MAP ATTACHED	☐			

COMMUNITY SERVICES

BY: DATE:

UTILITIES:

TYPE	METER ADDRESS	METER #	METER READING

TRAFFIC OPERATIONS

BY: DATE:

INTERSECTION	METER ADDRESS	METER #	METER READING	SAFETY LIGHTS

LANDSCAPE DEPARTMENT

BY: DATE:

TRAFFIC ENGINEERING

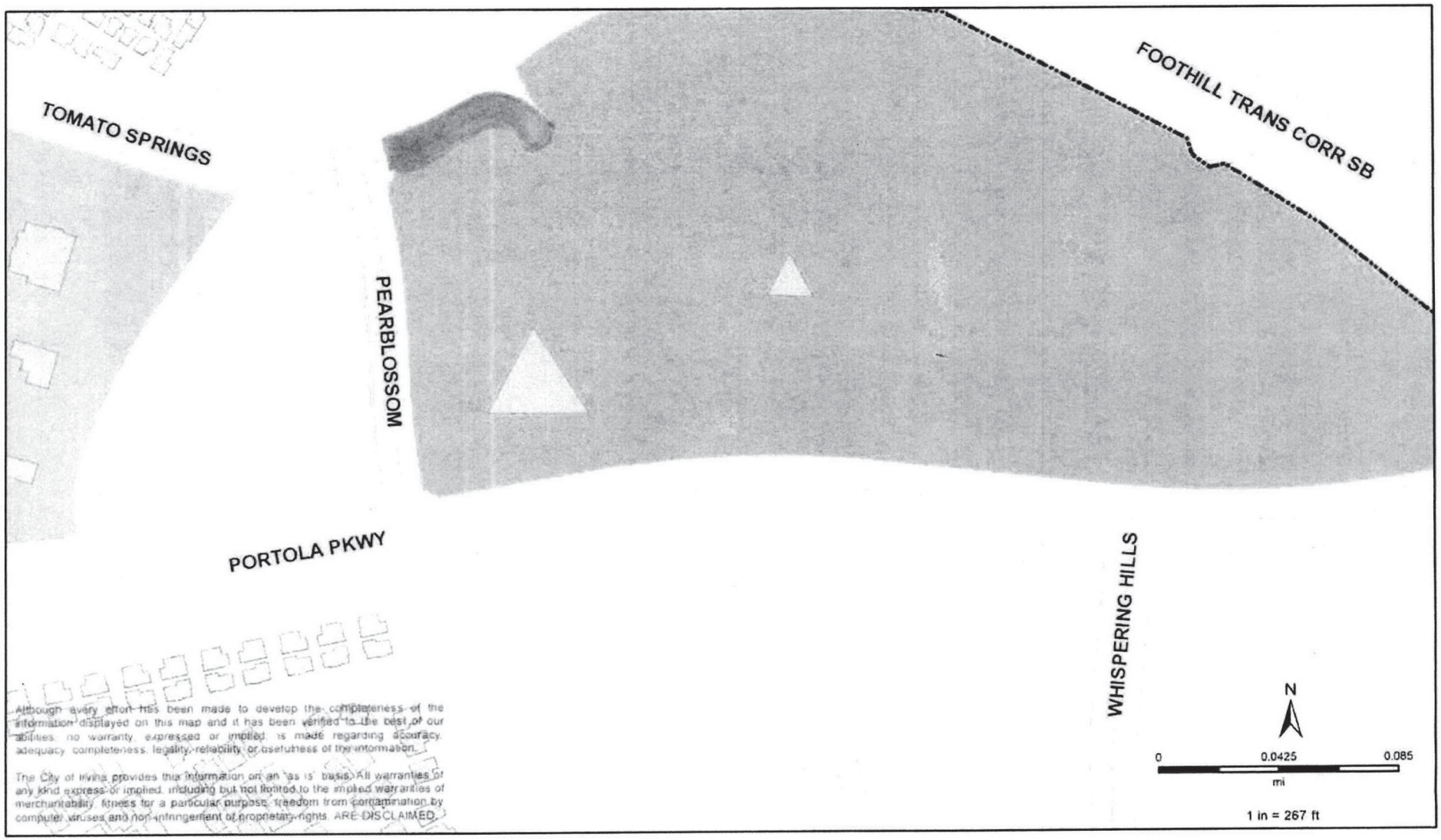
BY: DATE:

INSPECTION ACCEPTANCE

BY: DATE:

NOTE: After final inspection signature, send this form and associated maps to streetacceptance@cityofirvine.org

Parcel Viewer Map



DOCUMENT DESCRIPTION

Address:
Feature:
APN:
Tract/Lot: /
Planning Area:
Zoning:
Zone Description:
School District:

HOA:
Master HOA:
Flood Zone:
Flood Zone Community#:
Flood Zone Map#:
Flood Zone Map Date:
Fire Ordinance Zone:
Property size: acres

Date: February 4, 2019

Permit 00674798-MCE

Punch List

1.) Remove plastic on truncated domes.
2.) Remove all USA markings from road and sidewalks
3.) Repair or replace chipped sidewalk panels.

Joe Dillman

From: Byron Gemmell
Sent: Wednesday, February 06, 2019 10:29 AM
To: Joe Dillman; Aaron Taylor - (Contractor)
Cc: Bill Walker
Subject: RE: Tomato Springs Park entry street

Joe and Aaron:

RE: Permit 00674798 - Tomato Springs entry street

Please add the following traffic related items to the punch list:

1. Refresh all striping - including detail 22/29 (double yellow), and detail 38 (8" white).
2. Replace missing rpm's - including yellow, white, and blue.

Let me know if there are any questions.

Thank you,

Byron Gemmell, Street Maintenance Specialist
Public Works
6427 Oak Canyon
City of Irvine, CA 92618
949-337-7019
bgemmell@cityofirvine.org

From: Joe Dillman <jdillman@cityofirvine.org>
Sent: Tuesday, February 5, 2019 9:53 AM
To: Aaron Taylor - (Contractor) <AATaylor@cityofirvine.org>
Cc: Bill Walker <BWalker@cityofirvine.org>; Byron Gemmell <bgemmell@cityofirvine.org>
Subject: RE: Tomato Springs Park entry street

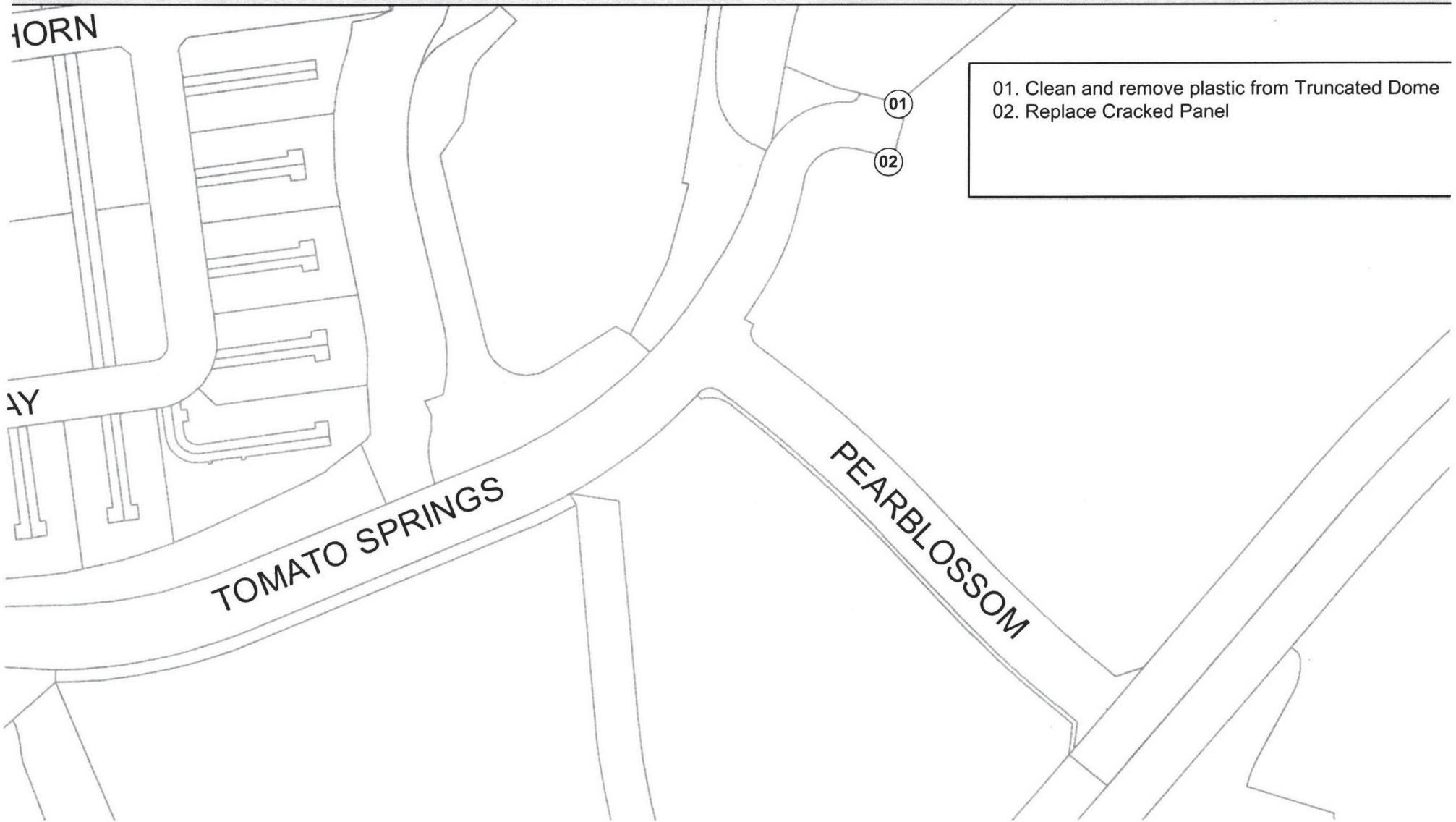
Thank you Aaron,

Billy and Byron, please let me know once you review these areas. Please send any punch list items to Aaron as well.

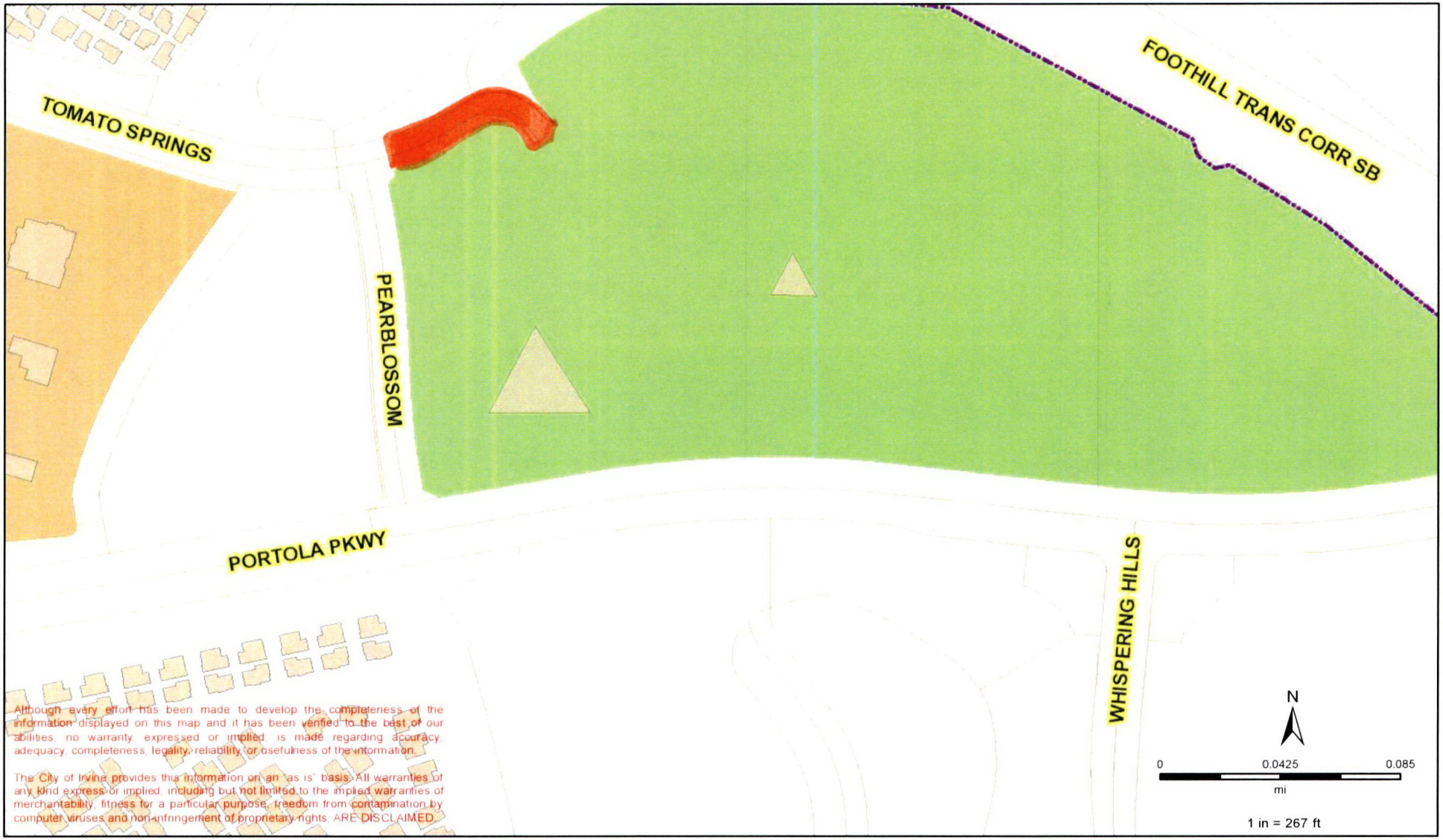
Thanks!

JOE DILLMAN | STREET MAINTENANCE SUPERINTENDENT | PUBLIC WORKS DEPARTMENT
949-724-7696 | 6427 Oak Canyon, Irvine, CA
jdillman@cityofirvine.org | www.cityofirvine.org

TOMATO SPRINGS PARK ENTRY STREET



Parcel Viewer Map



DOCUMENT DESCRIPTION

Address:
Feature:
APN:
Tract/Lot: /
Planning Area:
Zoning:
Zone Description:
School District:

HOA:
Master HOA:
Flood Zone:
Flood Zone Community#:
Flood Zone Map#:
Flood Zone Map Date:
Fire Ordinance Zone:
Property size: acres

Date: February 4, 2019