CITY OF LAKE FOREST

Portola Center Park Lighting
PW 2017-16A

August 2022

Prepared By:
RJM Design Group
31591 Camino Capistrano
San Juan Capistrano, CA 92675

Under the Supervision Of:
CITY OF LAKE FOREST
Public Works Department
25550 Commercentre Drive, Suite 100
Lake Forest, CA 92630

Approved By: _____
Thomas Wheeler, P.E.
Director of Public Works/City Engineer

CITY OF LAKE FOREST

Portola Center Park
PW 2017-16

May 2019

Prepared By:
RJM Design Group
31591 Camino Capistrano
San Juan Capistrano, CA 92675

Larry Ryan, LLA

Under the Supervision Of:
CITY OF LAKE FOREST
Public Works Department
25550 Commercentre Drive, Suite 100
Lake Forest, CA 92630

Approved By: _____
Thomas Wheeler, P.E.
Director of Public Works/City Engineer

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SECTION 00100
NOTICE INVITING BIDS

The City of Lake Forest ("City") will receive electronic bids for the **Portola Center Park Lighting (PW 2017-16A)** Project, no later than **2:00 p.m. on September 13th, 2022**. he electronic bid management system will not accept late bids. Bids shall be valid for 90 calendar days after the bid opening date.

Bids must be submitted on City's Bid Forms, available to registered vendors through the City's electronic bid management system, PlanetBids, at http://www.lakeforestca.gov/ by selecting "Bids and Proposals" on the home page. The Contract Documents may be downloaded at no charge. Electronic modifications to or withdrawal of bids may be made by the bidder prior to the bid closing deadline. Contract Documents will not be available for sale at City Hall.

Plan rooms that register may also download the contract documents and offer them for review. All parties downloading Contract Documents will be listed under the solicitation's "Prospective Bidders" tab.

A MANDATORY Pre-Bid Conference and Site Walk will be held at Portola Park Parking Lot at **28040 Glenn Ranch Road (Project Site)** on the following date(s) and time(s): **September 6th, 2022 at 10:00 a.m.** Each and every Bidder SHOULD attend the Pre-Bid Conference and Site Walk. Bids WILL NOT be accepted from any bidder who did not attend the Pre-Bid Conference and Site Walk.

Bids must be accompanied by cash, a certified or cashier's check, or a Bid Bond in favor of the City in an amount not less than ten percent (10%) of the submitted Total Bid Price.

The successful bidder will be required to furnish City with a Performance Bond equal to 100% of the successful bid, and a Payment Bond equal to 100% of the successful bid, prior to execution of the Contract. All bonds are to be secured from a surety that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure Section 995.120, and is admitted by the State of California.

Pursuant to Public Contract Code Section 22300, the successful bidder may substitute certain securities for funds withheld by City to ensure his performance under the Contract.

The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract which will be awarded to the successful bidder, copies of which are on file and will be made available to any interested party upon request at Lake Forest Public Works Department or online at http://www.dir.ca.gov/dlsr. A copy of these rates shall be posted by the successful bidder at the job site. The successful bidder and all subcontractor(s) under him, shall comply with all applicable Labor Code provisions, which include, but are not limited to the payment of not less than the required prevailing rates to all workers employed by them in the execution of the Contract, the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the

Department of Industrial Relations to perform public work. If awarded a Contract, the Bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. In bidding on this project, it shall be the Bidder's sole responsibility to evaluate and include the cost of complying with all labor compliance requirements under this contract and applicable law in its bid.

Each bidder shall be a licensed contractor pursuant to the Business and Professions Code and shall be licensed in the following appropriate classification(s) of contractor's license(s), for the work bid upon, and must maintain the license(s) throughout the duration of the Contract: **A or C-10**. In addition. the successful bidder will be required to self-perform at least 50% of the work.

Pursuant to Public Contract Code Section 3400(b), if City has made any findings designating certain materials, products, things, or services by specific brand or trade name, such findings and the materials, products, things, or services and their specific brand or trade names will be set forth in the Special Conditions.

Award of Contract: City shall award the Contract for the Project to the lowest responsible bidder as determined from the base bid alone. City reserves the right to reject any or all bids or to waive any irregularities or informalities in any bids or in the bidding process.

For further information, contact Naz Mokarram, Principal Civil Engineer at 949-461-3490 or nmokarram@lakeforestca.gov.

END OF NOTICE INVITING BIDS

SECTION 00200
INSTRUCTIONS TO BIDDERS

1. AVAILABILITY OF CONTRACT DOCUMENTS

Bids must be submitted to City on the Bid Forms which are a part of the Bid Package for the Project. Prospective bidders may download a complete set of Contract Documents at no charge as stated in the Notice Inviting Bids.

The Contract Documents may be made available for review at one or more plan rooms that have registered with Planet Bids. Please Note: Prospective bidders who choose to review the Contract Documents at a plan room must also register with the City's electronic bid management system to ensure it receives all relevant updates and to submit a bid electronically, if authorized in the Notice Inviting Bids.

2. EXAMINATION OF CONTRACT DOCUMENTS

City has made copies of the Contract Documents available, as indicated above. Bidders shall be solely responsible for examining the Project Site and the Contract Documents, including any Addenda issued during the bidding period, and for informing itself with respect to local labor availability, means of transportation, necessity for security, laws and codes, local permit requirements, wage scales, local tax structure, contractors' licensing requirements, availability of required insurance, and other factors that could affect the Work. Bidders are responsible for consulting the standards referenced in the Contract. Failure of Bidder to so examine and inform itself shall be at its sole risk, and no relief for error or omission will be given except as required under State law.

3. INTERPRETATION OF CONTRACT DOCUMENTS

Discrepancies in, and/or omissions from the Plans, Specifications or other Contract Documents or questions as to their meaning shall be immediately brought to the attention of City by submission of a written request for an interpretation or correction to City. Such submission, if any, must be sent via the electronic bid management system and received no later than **5:00 p.m. on September 7th, 2022**.

Any interpretation of the Contract Documents will be made only by written addenda duly issued and posted to the bid management system. All plan holders will be notified by e-mail when an addendum is posted. City will not be responsible for any explanations or interpretations provided in any other manner. No person is authorized to make any oral interpretation of any provision in the Contract Documents to any bidder, and no bidder should rely on any such oral interpretation.

Bids shall include complete compensation for all items that are noted in the Contract Documents as the responsibility of the Contractor.

4. INSPECTION OF SITE; PRE-BID CONFERENCE AND SITE WALK

Each prospective bidder is responsible for fully acquainting itself with the conditions of the Project Site (which may include more than one site), as well as those relating to the construction and labor of the Project, to fully understand the facilities, difficulties and restrictions which may impact the cost or effort required to complete the Project. To this end, a Pre-Bid Conference and Site Walk will be held on the date(s) and time(s) indicated in the Notice Inviting Bids. Storm, surface,

ground, nuisance, or other waters may be encountered at various times during construction of the Project. Federal and State laws require the City and its contractors to appropriately manage such waters pursuant to the requirements of California State Water Resources Control Board Order Number 2009-0009-DWQ and any amendment or renewal thereof, the Federal Clean Water Act, the California Porter Cologne Water Quality Control Act, Lake Forest Municipal Code, and any orders issued pursuant to these requirements. By submitting a Bid, each bidder acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

5. ADDENDA

City reserves the right to revise the Contract Documents prior to the bid opening date. Revisions, if any, shall be made by written Addenda. All Addenda issued by City shall be included in the bid and made part of the Contract Documents. Pursuant to Public Contract Code Section 4104.5, if City issues an Addendum which includes material changes to the Project less than 72 hours prior to the deadline for submission of bids, City will extend the deadline for submission of bids. City may determine, in its sole discretion, whether an Addendum warrants postponement of the bid submission date. Announcement of any extension shall be made via the electronic bid management system to all plan holders. Please Note: Bidders are responsible for ensuring that they have received any and all Addenda. To this end, the electronic bid management system requires each bidder acknowledge receipt of all addenda before submission of the bid.

6. ALTERNATE BIDS

If alternate bid items are called for in the Contract Documents, the lowest bid will be determined on the basis of the base bid only, unless otherwise specified in the Notice Inviting Bids. However, City may choose to award the contract on the basis of the base bid alone or the base bid and any alternate or combination of alternates. The time required for completion of the alternate bid items has been factored into the Contract duration and no additional Contract time will be awarded for any of the alternate bid items. City may elect to include one or more of the alternate bid items, or to otherwise remove certain work from the Project scope of work, accordingly each Bidder must ensure that each bid item contains a proportionate share of profit, overhead and other costs or expenses which will be incurred by the Bidder.

7. COMPLETION OF BID FORMS

Bids shall only be prepared using copies of the Bid Forms which are included in the Contract Documents and available on the electronic bid management system. The use of substitute bid forms will not be permitted. Bids shall be executed by an authorized signatory as described in these Instructions to Bidders. Deviations in the bid form may result in the bid being deemed non-responsive.

8. ELECTRONIC SUBMISSION REQUIREMENTS

The bidder **must enter pricing in the electronic bid form** for any and all line items or a lump sum bid amount, as required. The pricing provided in the electronic bid form will be the only valid bid pricing for determination of low bid.

The bidder **must enter subcontractor information in the electronic bid form**. The subcontractor information provided electronically will be the only valid subcontractor information.

The bidder must attach a pdf file(s) to the electronic bid submission containing all of the completed and signed Bid Documents.

9. MODIFICATIONS OF BIDS

Each Bidder shall submit its Bid in strict conformity with the requirements of the Contract Documents. Unauthorized additions, modifications, revisions, conditions, limitations, exclusions or provisions attached to a Bid may render it non-responsive and may cause its rejection. Bidders shall neither delete, modify, nor supplement the printed matter on the Bid Forms, nor make substitutions thereon. Oral, telephonic and electronic modifications will not be considered, unless the Notice Inviting Bids authorizes the submission of electronic bids and modifications thereto and such modifications are made in accordance with the Notice Inviting Bids.

10. SIGNING OF BIDS

All Bids submitted shall be executed by the Bidder or its authorized representative. Bidder shall upload an electronic scanned copy of the executed Bid Form to the electronic bid management system. Bidders may be asked to provide evidence in the form of an authenticated resolution of its Board of Directors or a Power of Attorney evidencing the capacity of the person signing the Bid to bind the Bidder to each Bid and to any Contract arising therefrom.

If a Bidder is a joint venture or partnership, it may be asked to submit an authenticated Power of Attorney executed by each joint venturer or partner appointing and designating one of the joint venturers or partners as a management sponsor to execute the Bid on behalf of Bidder. Only that joint venturer or partner shall execute the Bid. The Power of Attorney shall also: (1) authorize that particular joint venturer or partner to act for and bind Bidder in all matters relating to the Bid; and (2) provide that each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of Bidder assumed under the Bid and under any Contract arising therefrom. The Bid shall be executed by the designated joint venturer or partner on behalf of the joint venture or partnership in its legal name.

11. DESIGNATION OF SUBCONTRACTORS

Pursuant to State law, the Bidders must designate the name, license number, and location of each subcontractor who will perform work or render services for the Bidder in an amount that exceeds one half of one percent (1/2%) of the Bidder's Total Bid Price, as well as the portion of work each such subcontractor will perform on the form provided herein by City. No additional time will be provided to bidders to submit any of the requested information in the Designation of Subcontractor form. The successful bidder will be required to self-perform at least 50% of the work.

12. BID GUARANTEE (BOND)

Each bid shall be accompanied by: (a) cash; (b) a certified check made payable to City; (c) a cashier's check made payable to City; or (d) a bid bond payable to City executed by the bidder as principal and surety as obligor in an amount not less than 10% of the maximum amount of the bid. Personal sureties and unregistered surety companies are unacceptable. The surety insurer shall be California admitted surety insurer, as defined in Code of Civil Procedure Section 995.120. The cash, check or bid bond shall be given as a guarantee that the bidder shall execute the Contract if it be awarded to the bidder, shall provide the payment and performance bonds and

insurance certificates and endorsements as required herein within ten (10) calendar days after notification of the award of the Contract to the bidder. Failure to provide the required documents may result in forfeiture of the bidder's bid deposit or bond to City and City may award the Contract to the next lowest responsive, responsible bidder, or may call for new bids.

THE BID SECURITY MUST BE RECEIVED PRIOR TO THE SPECIFIED DATE AND TIME FOR BID OPENING.

The Bid Security must be submitted directly to the City Clerk at City Hall, 25550 Commercentre Drive, Suite 100, Lake Forest, CA 92630, in an envelope clearly labeled with the Project Name/Number and Bidder's Name and Address.

If Bidder elects to provide the required Bid Security in the form of a Bid Bond, the original hard copy Bid Bond must be submitted to the City at the address indicated above prior to the specified date and time for bid opening.

13. SUBMISSION OF SEALED BIDS

Bidders may submit their bids via electronic transmission pursuant to Public Contract Code Sections 1600 and 1601. The acceptable method(s) of electronic transmission are stated in the Notice Inviting Bids. City shall not accept bids otherwise transmitted. No oral, telephonic, or facsimile bids will be considered.

It is the sole responsibility of each bidder to see that its Bid is properly submitted to PlanetBids in the proper form and prior to the stated closing time. THE ELECTRONIC BID MANAGEMENT SYSTEM WILL NOT ACCEPT LATE BIDS. The City will only consider bids that have transmitted successfully and have been issued a confirmation number with a time stamp from PlanetBids indicating that the Bid was submitted successfully.

Bidders experiencing any technical difficulties with the bid submission process may contact the PlanetBids system support at 818-992-1771. If you continue to have difficulty, call the City's Public Works Department at 949-461-3480. Neither the City, nor the City's bid management system, make any guarantee as to the timely availability of assistance, or assurance that any given problem will be resolved by the bid submission date and/or time.

14. DELIVERY AND OPENING OF BIDS

Bids will be received by the City via the electronic bid management system up to the date and time shown in the Notice Inviting Bids. It is the Bidder's sole responsibility to ensure that its Bid is received as specified. Bids may be submitted earlier than the dates(s) and time(s) indicated.

Bid results are immediately available to the public at the closing deadline on the City's website in the electronic bid management system. The City's City Clerk's office will also have bid results, immediately following bid opening. The City Clerk's office is located at: 25550 Commercentre Drive, Suite 100, Lake Forest, CA 92630. City reserves the right to reject any or all Bids and to waive any informality or irregularity in any Bid.

15. WITHDRAWAL OF BID

Prior to the bid closing deadline, a Bid may be electronically withdrawn by the Bidder. Any request to withdraw a bid after bid closing must be made in accordance with Public Contract Code section 5100 et seq. and must be submitted in writing within five (5) working days, excluding Saturday, Sundays and State holidays, specifying in detail how the mistake was made.

16. BASIS OF AWARD; BALANCED BIDS

City shall award the Contract to the lowest responsive, responsible Bidder submitting a responsive Bid. City may reject any Bid which, in its opinion when compared to other bids received or to City's internal estimates, does not accurately reflect the cost to perform the Work. City may reject as non-responsive any bid which unevenly weights or allocates costs, including but not limited to overhead and profit to one or more particular bid items.

17. LICENSING REQUIREMENTS

Pursuant to Section 7028.15 of the Business and Professions Code and Section 3300 of the Public Contract Code, all bidders must possess proper licenses for performance of this Contract. Subcontractors must possess the appropriate licenses for each specialty subcontracted. Pursuant to Section 7028.5 of the Business and Professions Code, City shall consider any bid submitted by a contractor not currently licensed in accordance with state law and pursuant to the requirements found in the Contract Documents to be non-responsive, and City shall reject the Bid. City shall have the right to request, and Bidders shall provide within five (5) calendar days, evidence satisfactory to City of all valid license(s) currently held by that Bidder and each of the Bidder's subcontractors, before awarding the Contract.

18. DISQUALIFICATION OF BIDDERS; INTEREST IN MORE THAN ONE BID

No bidder shall be allowed to make, submit or be interested in more than one bid. However, a person, firm, corporation or other entity that has submitted a subproposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to other bidders submitting a bid to City. No person, firm, corporation, or other entity may submit subproposal to a bidder, or quote prices of materials to a bidder, when also submitting a prime bid on the same Project.

19. INSURANCE REQUIREMENTS

The successful bidder shall procure the insurance in the form and in the amount specified in the Contract Documents.

20. AWARD PROCESS

Once all Bids are opened and reviewed to determine the lowest responsive and responsible Bidder, City Council may award the contract. The apparent successful Bidder should begin to prepare the following documents: (1) the Performance Bond; (2) the Payment Bond; and (3) the required insurance certificates and endorsements. Once City notifies the Bidder of the award, the Bidder will have ten (10) consecutive calendar days from the date of this notification to execute the Contract and supply City with all of the required documents and certifications. Regardless whether the Bidder supplies the required documents and certifications in a timely manner, the

Contract time will begin to run ten (10) calendar days from the date of the notification. Once City receives all of the properly drafted and executed documents and certifications from the Bidder, City shall issue a Notice to Proceed to that Bidder.

21. FILING OF BID PROTESTS

Bidders may file a "protest" of a Bid with City's Director of Public Works. In order for a Bidder's protest to be considered valid, the protest must:

A. Be filed in writing within five (5) calendar days after the bid opening date;

B. Clearly identify the specific irregularity or accusation;

C. Specify, in detail, the grounds of the protest and the facts supporting the protest; and

D. Include all relevant, supporting documentation with the protest at time of filing.

If the protest does not comply with each of these requirements, it may be rejected without further review.

If the protest is valid, City's Director of Public Works, or other designated City staff member, shall review the basis of the protest and all relevant information. The Director of Public Works will provide a written decision to the protestor. The protestor may then appeal the decision of the Director of Public Works to the City Manager.

The procedure and time limits set forth in this section are mandatory and are the sole and exclusive remedy in the event of a bid protest. Failure to comply with these procedures shall constitute a failure to exhaust administrative remedies and a waiver of any right to further pursue the bid protest,

22. WORKERS COMPENSATION

Each bidder shall submit the Contractor's Certificate Regarding Workers' Compensation form.

23. SUBSTITUTION OF SECURITY

The Contract Documents call for monthly progress payments based upon the percentage of the work completed. The City will retain five percent (5%) of each progress payment as provided by the Contract Documents. At the request and expense of the successful Bidder, the City will substitute securities for the amount so retained in accordance with Public Contract Code Section 22300.

24. PREVAILING WAGES

City has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract. These rates are on file and available at Department of Public Works or may be obtained online at http://www.dir.ca.gov/dlsr. Bidders are advised that a copy of these rates must be posted by the successful Bidder at the job site(s).

25. DEBARMENT OF CONTRACTORS AND SUBCONTRACTORS

In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to City. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

26. IRAN CONTRACTING ACT CERTIFICATION

Each bidder shall submit the certification required by the Iran Contracting Act of 2010, Public Contract Code section 2200 et seq. as provided with the Bid Documents.

27. PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. If awarded a Contract, the Bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project. To this end, Bidder shall sign and submit with its Bid the Public Works Contractor Registration Certification on the form provided, attesting to the facts contained therein. Failure to submit this form may render the Bid non-responsive. In addition, each Bidder shall provide the registration number for each listed subcontractor in the space provided in the Designation of Subcontractors Form.

28. PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

Within the time specified in the Contract Documents, the Bidder to whom a Contract is awarded shall deliver to City four identical counterparts of the Performance Bond and Payment Bond in the form supplied by City and included in the Contract Documents. Failure to do so may, in the sole discretion of City, result in the forfeiture of the Bid Guarantee. The surety supplying the bond must be an admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, authorized to do business as such in the State of California and satisfactory to City. The Performance Bond and the Payment Bond shall be for one hundred percent (100%) of the Total Bid Price.

29. REQUEST FOR SUBSTITUTIONS

The successful bidder shall comply with the substitution request procedures set forth in the Bid and Contract Documents. Any deadlines for substitution requests that occur prior to the bid opening date are set forth in the Special Conditions.

30. SALES AND OTHER APPLICABLE TAXES, PERMITS, LICENSES AND FEES

Contractor and its subcontractors performing work under this Contract will be required to pay California sales tax and other applicable taxes, and to pay for permits, licenses and fees required by the agencies with authority in the jurisdiction in which the work will be located, unless otherwise expressly provided by the Contract Documents.

31. EXECUTION OF CONTRACT

As required herein the Bidder to whom an award is made shall execute the Contract in the amount determined by the Contract Documents. City may require appropriate evidence that the persons executing the Contract are duly empowered to do so.

END OF INSTRUCTIONS TO BIDDERS

SECTION 00400
BID FORM

NAME OF BIDDER:_____

The undersigned, hereby declare that we have carefully examined the location of the proposed Work, and have read and examined the Contract Documents, including all plans, specifications, and all addenda, if any, for the following Project:

Portola Center Park Lighting (PW 2017-16A)

We hereby propose to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the Project for the Total Bid Price indicated in the electronically submitted bid schedule. In the event the electronic bid schedule requires unit pricing, final payment shall be determined by the City from measured quantities of work performed based upon the unit price.

The undersigned agrees that the electronic bid accompanied by this Bid Form constitutes a firm offer to the City which cannot be withdrawn for the number of calendar days indicated in the Notice Inviting Bids from and after the bid opening, or until a Contract for the Work is fully executed by the City and a third party, whichever is earlier.

If the Contract Documents specify alternate bid items, the Alternate Additive or Deductive Bid amounts shall be added to or deducted from the Total Bid Price at the City's sole option. The City can choose to include one or more of the Alternate Bids in the Project. If any of the Alternate Bids are selected by the City, the resulting amount shall be added to or deducted from Total Bid Price for the Project. The City may select one or more of the Alternate Bids at the stated Bid Price up to sixty (60) days following award of the Contract. The City can award/select Alternate Bid items at any time(s).

The Contract duration shall commence on the date stated in City's Notice to Proceed, and shall be completed by the Contractor in the time specified in the Contract Documents. In no case shall the Contractor commence construction prior to the date stated in City's Notice to Proceed.

Bidder certifies that it is licensed in accordance with the law providing for the registration of Contractors, License No. _____, Expiration Date _____, class of license _____. If the bidder is a joint venture, each member of the joint venture must include the above information.

The undersigned acknowledges understanding and full consideration of the electronically issued addenda to the Contract Documents.

Bidder has attached and incorporates the following in its bid:

1. The electronically submitted Bid Schedule (Line Item tab).

2. The required bid security in the amount of not less than 10% of the Total Bid Price.

3. The fully executed Noncollusion Declaration form.

4. The completed Designation of Subcontractors form.

5. The completed Bidder Information Form.

6. The completed Contractor's Certificate Regarding Workers' Compensation form.

7. The completed Iran Contracting Act Certification form.

8. The completed Public Works Contractor Registration Certification form.

I hereby certify under penalty of perjury under the laws of the State of California, that all of the information submitted in connection with this Bid and all of the representations made herein are true and correct.

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF BID FORM

SECTION 00405
CONTRACTOR'S CERTIFICATE REGARDING WORKERS' COMPENSATION

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

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF CONTRACTOR'S CERTIFICATE REGARDING WORKERS' COMPENSATION

SECTION 00410
BID BOND

The makers of this bond are _____, as Principal, and _____, as Surety and are held and firmly bound unto the City of Lake Forest, hereinafter called City, in the penal sum of TEN PERCENT (10%) OF THE TOTAL BID PRICE of the Principal submitted to City for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted the accompanying bid dated _____, 2019 for the **Portola Center Park Lighting (PW 2017-16A)**.

If the Principal does not withdraw its bid within the time specified in the Contract Documents; and if the Principal is awarded the Contract and provides all documents to City as required by the Contract Documents; then this obligation shall be null and void. Otherwise, this bond will remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents shall in affect its obligation under this bond, and Surety does hereby waive notice of any such changes.

In the event a lawsuit is brought upon this bond by City and judgment is recovered, the Surety shall pay all litigation expenses incurred by City in such suit, including reasonable attorneys' fees, court costs, expert witness fees and expenses.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____ day of _____, 2019, the name and corporate seal of each corporation.

(Corporate Seal)_____

Contractor/ Principal

By

Title

(Corporate Seal)_____

Surety

By

Attorney-in-Fact

(Attach Attorney-in-Fact Certificate) Title_____

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally
Date — Name And Title Of Officer (e.g. "Jane Doe, Notary Public")
appeared _____, who proved to me on the basis of satisfactory
Name(s) of Signer(s)
evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

_____
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

Individual
Corporate Officer

_____
Title(s)

Partner(s) Limited / General
Attorney-In-Fact
Trustee(s)
Guardian/Conservator
Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

SECTION 00420
NONCOLLUSION DECLARATION

The undersigned declares:

I am the _____ of _____, 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].

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF NONCOLLUSION DECLARATION

SECTION 00430
CONTRACTOR INFORMATION AND EXPERIENCE FORM

A. INFORMATION ABOUT BIDDER

Failure to complete all information may render your bid nonresponsive - indicate not applicable ("N/A") where appropriate.

NOTE: Where Bidder is a joint venture, pages shall be duplicated and information provided for all parties to the joint venture.

1.0 Name of Bidder: _____

2.0 Type, if Entity: _____

3.0 Bidder Address: _____
_____
_____
_____

Facsimile Number _____ Telephone Number_____

Website Address_____

4.0 How many years has Bidder's organization been in business as a Contractor? _____

5.0 How many years has Bidder's organization been in business under its present name? _____

5.1 Under what other or former names has Bidder's organization operated?:_____

6.0 If Bidder's organization is a corporation, answer the following:

6.1 Date of Incorporation: _____

6.2 State of Incorporation: _____

6.3 President's/CEO Name: _____

6.4 Vice President's Name(s): _____

6.5 Secretary's Name: _____

6.6 Treasurer's Name: _____

7.0 If an individual or a partnership, answer the following:

7.1 Date of Organization: _____

7.2 Name and address of all partners (state whether general or limited partnership):

_____
_____
_____

8.0 If other than a corporation or partnership, describe organization and name principals:

_____
_____

9.0 List other states in which Bidder's organization is legally qualified to do business.

_____
_____
_____

10.0 What type of work does the Bidder normally perform with its own forces?

_____
_____
_____

11.0 Has Bidder ever failed to complete any work awarded to it? If so, note when, where, and why:

_____
_____
_____

12.0 Has the Bidder ever been in default, debarred or suspended in any way? If so, note when and why:

_____
_____
_____

13.0 Within the last five years, has any officer or partner of Bidder's organization ever been an officer or partner of another organization when it failed to complete a contract? If so, attach a separate sheet of explanation:

_____
_____
_____

14.0 List Trade References (Materials Suppliers, Vendors, Union Representatives, etc.:

_____
_____
_____
_____
_____
_____

15.0 List Bank References (Bank and Branch Address):

_____
_____
_____

16.0 Name of Bonding Company and Name and Address, email address and phone number of Agent:

_____
_____
_____

B. LIST OF CURRENT PROJECTS (BACKLOG)

Duplicate Page if needed for listing additional current projects.

Project and Client Contact Person and Phone Number	Description of Bidder's Work	Completion Date	Cost of Bidder's Work	Amounted Bonded

C. LIST OF COMPLETED PROJECTS LAST THREE YEARS

Duplicate Page if needed for listing additional completed projects.

Please include only those projects which are similar enough to demonstrate Bidder's ability to perform the required Work.

Client	Description of Bidder's Work	Period of Performance	Cost of Bidder's Work	Contact Name & Phone

D. EXPERIENCE AND TECHNICAL QUALIFICATIONS QUESTIONNAIRE

Personnel:

The Bidder shall identify the key personnel to be assigned to this project in a management, construction supervision or engineering capacity.

1. List each person's job title, name and percent of time to be allocated to this project:

2. Summarize each person's specialized education:

3. List each person's years of construction experience relevant to the project:

4. Summarize such experience:

Bidder agrees that any personnel named in this Bid will remain on this Project until completion of all relevant Work, unless substituted by personnel of equivalent experience and qualifications approved in advance by City.

Additional Bidder's Statements:

If the Bidder feels that there is additional information which has not been included in the questionnaire above, and which would contribute to the qualification review, it may add that information in a statement here or on an attached sheet, appropriately marked:

E. VERIFICATION AND EXECUTION

These Bid Forms shall be executed only by a duly authorized official of the Bidder:

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

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF CONTRACTOR INFORMATION AND EXPERIENCE FORM

SECTION 00440
LIST OF SUBCONTRACTORS FORM

In compliance with the Subletting and Subcontracting Fair Practices Act of the Public Contract Code of the State of California, each bidder shall set forth below: (a) the name and the location of the place of business, (b) the California contractor license number, and (c) the portion of the work which will be done by each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work in an amount in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price. Notwithstanding the foregoing, if the work involves streets and highways, then the Contractor shall list each subcontractor who will perform work or labor or render service to Contractor in or about the work in an amount in excess of one-half of one percent (1/2%) of the Contractor's Total Bid Price or $10,000, whichever is greater. No additional time shall be granted to provide the below requested information.

If no subcontractor is specified, for a portion of the work, or if more than one subcontractor is specified for the same portion of Work, then the Contractor shall be deemed to have agreed that it is fully qualified to perform that Work, and that it shall perform that portion itself. **The Prime Contractor is required to complete at least 50% of the contract value with its own forces.**

Work to be done by Subcontractor	Subcontractor	Location of Business	CSLB Contractor License No.	DIR Registration Number	% of the Work

Work to be done by Subcontractor	Subcontractor	Location of Business	CSLB Contractor License No.	DIR Registration Number	% of the Work

Work to be done by Subcontractor	Subcontractor	Location of Business	CSLB Contractor License No.	DIR Registration Number	% of the Work

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF LIST OF SUBCONTRACTORS FORM

SECTION 00450

IRAN CONTRACTING ACT CERTIFICATION(Public Contract Code Section 2200 et seq.)

As required by California Public Contract Code Section 2204, the Contractor certifies subject to penalty for perjury that the option checked below relating to the Contractor's status in regard to the Iran Contracting Act of 2010 (Public Contract Code Section 2200 et seq.) is true and correct:

□ The Contractor is not:

(i) identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203; or

(ii) a financial institution that extends, for 45 days or more, credit in the amount of $20,000,000 or more to any other person or entity identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code Section 2203, if that person or entity uses or will use the credit to provide goods or services in the energy sector in Iran.

□ The City has exempted the Contractor from the requirements of the Iran Contracting Act of 2010 after making a public finding that, absent the exemption, the City will be unable to obtain the goods and/or services to be provided pursuant to the Contract.

□ The amount of the Contract payable to the Contractor for the Project does not exceed $1,000,000.

Signed:_____

Titled:_____

Firm:_____

Date:_____

Note: In accordance with Public Contract Code Section 2205, false certification of this form shall be reported to the California Attorney General and may result in civil penalties equal to the greater of $250,000 or twice the Contract amount, termination of the Contract and/or ineligibility to bid on contracts for three years.

END OF IRAN CONTRACTING ACT CERTIFICATION

SECTION 00460
PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. See http://www.dir.ca.gov/Public-Works/PublicWorks.html for additional information.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work.

Bidder hereby certifies that it is aware of the registration requirements set forth in Labor Code sections 1725.5 and 1771.1 and is currently registered as a contractor with the Department of Industrial Relations.

Name of Bidder:_____

DIR Registration Number:_____

Bidder further acknowledges:

1. Bidder shall maintain a current DIR registration for the duration of the project.

2. Bidder shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.

3. Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Name of Bidder_____

Signature_____

Name_____

Title_____

Dated_____

END OF PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

SECTION 00500
CONTRACT

THIS CONTRACT is made this _____ day of _____, 2018, in the County of Orange, State of California, by and between the City of Lake Forest hereinafter called City, and _____, hereinafter called Contractor. City and the Contractor for the considerations stated herein agree as follows:

ARTICLE 1. SCOPE OF WORK. The Contractor shall perform all Work within the time stipulated the contract and shall provide all labor, materials, equipment, tools, utility services, and transportation to complete all of the Work required in strict compliance with the Contract Documents as specified in Article 5 below for the following Project:

Portola Center Park Lighting (PW 2017-16A)

The Contractor and its surety shall be liable to City for any damages arising as a result of the Contractor's failure to comply with this obligation.

ARTICLE 2. TIME FOR COMPLETION. The Work shall be commenced on the date stated in City's Notice to Proceed. The Contractor shall complete all Work required by the Contract Documents within **20** working days from the commencement date stated in the Notice to Proceed. By its signature hereunder, Contractor agrees the time for completion set forth above is adequate and reasonable to complete the Work.

ARTICLE 3. CONTRACT PRICE. City shall pay to the Contractor as full compensation for the performance of the Contract, subject to any additions or deductions as provided in the Contract Documents, and including all applicable taxes and costs, the sum of _____ Dollars ($_____). Payment shall be made as set forth in the General Conditions**.**

ARTICLE 4. LIQUIDATED DAMAGES. In accordance with Government Code section 53069.85, it is agreed that the Contractor will pay City the sum of $2,500 for each and every calendar day of delay beyond the time prescribed in the Contract Documents for finishing the Work, as Liquidated Damages and not as a penalty or forfeiture. In the event that Liquidated Damages are not paid, the Contractor agrees City may deduct that amount from any money due or that may become due the Contractor under the Contract. This Article does not affect the City's rights to other damages or remedies specified in the Contract Documents or allowed by law.

ARTICLE 5. COMPONENT PARTS OF THE CONTRACT. The "Contract Documents" include the following:

Notice Inviting Bids
Instructions to Bidders
Bid Form
Contractor's Certificate Regarding Workers' Compensation
Bid Bond
Designation of Subcontractors
Information Required of Bidders
Noncollusion Declaration form

Iran Contracting Act Certification
Public Works Contractor Registration Certification
Contract
Performance Bond
Payment Bond
General Conditions
Special Conditions
Technical Specifications
Addenda
Plans and Drawings
Approved and fully executed change orders
Any other documents contained in or incorporated into the Contract

The Contactor shall complete the Work in strict accordance with all of the Contract Documents.

All of the Contract Documents are intended to be complementary. Work required by one of the Contract Documents and not by others shall be done as if required by all. This Contract shall supersede any prior agreement of the parties.

ARTICLE 6. PROVISIONS REQUIRED BY LAW. Each and every provision of law required to be included in these Contract Documents shall be deemed to be included in these Contract Documents. The Contractor shall comply with all requirements of applicable federal, state and local laws, rules and regulations, including, but not limited to, the provisions of the California Labor Code and California Public Contract Code which are applicable to this Project.

ARTICLE 7. INDEMNIFICATION. Contractor shall provide indemnification as set forth in the General Conditions.

ARTICLE 8. PREVAILING WAGES. Contractor shall be required to pay the prevailing rate of wages in accordance with the Labor Code which such rates shall be made available at City Hall or may be obtained online at http//www.dir.ca.gov/dlsr. and which must be posted at the job site.

IN WITNESS WHEREOF, this Contract has been duly executed by the above-named parties, on the day and year above written.

[NAME OF CONTRACTOR]	**CITY OF LAKE FOREST**
By _____	By _____
Name: _____	
Title: _____	
License No. _____	

By _____

Name: _____

Title: _____

(If Corporation, TWO SIGNATURES, President **OR** Vice President **AND** Secretary OR Treasurer REQUIRED)]

Attest:

_____
Maria D. Huizar
City Clerk

Approved as to Form:

_____
Best Best & Krieger, LLP
City Attorney

END OF CONTRACT

SECTION 00610
PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the City of Lake Forest (hereinafter referred to as "City") has awarded to _____, (hereinafter referred to as the "Contractor") an agreement for _____ (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Contractor is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Contractor is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, _____, the undersigned Contractor and _____as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the City in the sum of _____ _____ DOLLARS and _____ CENTS ($_____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including, if provided as part of the Contract Documents, the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the City, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the guarantee obligation shall hold good for a period of one (1) year after the acceptance of the work by City, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the City from loss or damage resulting from or caused by defective materials or faulty workmanship the above obligation in penal sum thereof shall remain in full force and effect. However, anything in this paragraph to the contrary notwithstanding, the obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the City's rights or the Contractor or Surety's obligations under the Contract Documents, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by the City to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the City's option:

(1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or

(2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a contract between such bidder, the Surety and the City, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the City under the Contract Documents and any modification thereto, less any amount previously paid by the City to the Contractor and any other set offs pursuant to the Contract Documents.

(3) Permit the City to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the City under the Contract Documents and any modification thereto, less any amount previously paid by the City to the Contractor and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the City may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Contractor.

Surety shall not utilize Contractor in completing the Project nor shall Surety accept a bid from Contractor for completion of the Project if the City, when declaring the Contractor in default, notifies Surety of the City's objection to Contractor's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project and the provisions of Section 2819 and 2845 of the California Civil Code. Without limiting the foregoing, such changes, extensions of time and alterations or additions shall include, but are not limited to, changes or alterations to the Contract Documents (including, without limitation, an increase in the total dollar amount of the Contract Documents), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor.

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

CONTRACTOR/PRINCIPAL
(Corporate Seal of Contractor/
Principal, if a Corporation)

_____
Name of Contractor/Principal (Type or Print)

By: _____
Name (Signature)

_____
Name (Type or Print)

_____
Title (Type or Print)

SURETY
(Seal of Surety)

_____
Name of Surety (Type or Print)

By:_____
Attorney-In-Fact

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached.

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, $_____.

(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM
Any claims under this bond may be addressed to:

(Name and Address of Surety) _____
_____
_____

(Name and Address of Agent or Representative for service of process in California, if different from above) _____
_____
_____

(Telephone number of Surety and Agent or Representative for service of process in California) _____
_____
_____

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally
Date — Name And Title Of Officer (e.g. "Jane Doe, Notary Public")
appeared _____, who proved to me on the basis of satisfactory
Name(s) of Signer(s)
evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

_____
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

Individual
Corporate Officer

_____
Title(s)

Partner(s) Limited / General

Attorney-In-Fact
Trustee(s)
Guardian/Conservator
Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

NOTE: A copy of the Power-of-Attorney to local representatives of the bonding company must be attached hereto.

END OF PERFORMANCE BOND FORM

SECTION 00620
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the City of Lake Forest (hereinafter designated as the "City"), by action taken or a resolution passed _____ , 20____ has awarded to _____ _____ hereinafter designated as the "Principal," a contract for the work described as follows: _____ _____ (the "Project"); and

WHEREAS, the work to be performed by the Principal is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, said Principal is required to furnish a bond in connection with said Contract Documents; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor, the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the City in the penal sum of _____ _____ DOLLARS and _____ CENTS ($_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, fail to pay for any materials, provisions or other supplies, 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 amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract Documents, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, all litigation expenses incurred by the City in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond shall inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract (including the Contract Documents), plans, specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or attempted rescission or attempted rescission of the Contract Documents, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the owner or City and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 9100 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

Notwithstanding any other provision of this bond, it is expressly understood, acknowledged and agreed that it shall provide all of the protections required by California Civil Code Sections 9550 through 9566, including the specific coverage protections required by Section 9554.

REMAINDER OF PAGE LEFT INTENTIONALLY BLANK

SIGNATURES ON FOLLOWING PAGE

IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety above named, on the _____ day of _____ 20_____ the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

CONTRACTOR/PRINCIPAL
(Corporate Seal of Contractor/
Principal, if a Corporation)

_____
Name of Contractor/Principal (Type or Print)

By: _____
Name (Signature)

_____
Name (Type or Print)

_____
Title (Type or Print)

SURETY
(Seal of Surety)

_____
Name of Surety (Type or Print)

By:_____
Attorney-In-Fact

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally
Date — Name And Title Of Officer (e.g. "Jane Doe, Notary Public")
appeared _____, who proved to me on the basis of satisfactory
Name(s) of Signer(s)
evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

_____
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

Individual
Corporate Officer

_____
Title(s)

Partner(s) Limited / General

Attorney-In-Fact
Trustee(s)
Guardian/Conservator
Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

NOTE: A copy of the Power-of-Attorney to local representatives of the bonding company must be attached hereto.

END OF PAYMENT BOND FORM

SECTION 00700
GENERAL CONDITIONS

ARTICLE 1. DEFINITIONS

a. Acceptable, Acceptance or words of similar import shall be understood to be the acceptance of the Engineer and/or City.

b. Act of God is an earthquake in excess of a magnitude of 3.5 on the Richter scale and tidal waves.

c. Approval means written authorization by Engineer and/or City.

d. Contract Documents includes all documents as stated in the Contract.

e. City and Contractor are those stated in the Contract. The terms City and Owner may be used interchangeably.

f. Day shall mean calendar day unless otherwise specifically designated.

g. Engineer shall mean the City Manager, or his or her designee, of the City, acting either directly or through properly authorized agents, such as agents acting within the scope of the particular duties entrusted to them. Also sometimes referred to as "City's Representative" or "Representative" in the Contract Documents.

h. Equal, Equivalent, Satisfactory, Directed, Designated, Selected, As Required and similar words shall mean the written approval, selection, satisfaction, direction, or similar action of the Engineer and/or City.

i. Indicated, Shown, Detailed, Noted, Scheduled or words of similar meaning shall mean that reference is made to the drawings, unless otherwise noted. It shall be understood that the direction, designation, selection, or similar import of the Engineer and/or City is intended, unless stated otherwise.

j. Install means the complete installation of any item, equipment or material.

k. Material shall include machinery, equipment, manufactured articles, or construction such as form work, fasteners, etc., and any other classes of material to be furnished in connection with the Contract. All materials shall be new unless specified otherwise.

l. Perform shall mean that the Contractor, at Contractor's expense, shall take all actions necessary to complete The Work, including furnishing of necessary labor, tools, and equipment, and providing and installing Materials that are indicated, specified, or required to complete such performance.

m. Project is The Work planned by City as provided in the Contract Documents.

n. Provide shall include provide, complete in place, that is furnish, install, test and make ready for use.

o. Recyclable Waste Materials shall mean materials removed from the Project site which are required to be diverted to a recycling center rather than an area landfill. Recyclable Waste Materials include asphalt, concrete, brick, concrete block, and rock.

p. Specifications means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the work. Except for Sections 1-9 of the Standard Specifications for Public Works Construction ("Greenbook"), 2015 Edition which are specifically excluded from incorporation into these Contract Documents, the Work shall be done in accordance with the Greenbook, including all current supplements, addenda, and revisions thereof. In the case of conflict between the Greenbook and the Contract Documents, the Contract Documents shall prevail.

q. The Work means the entire improvement planned by City pursuant to the Contract Documents.

r. Work means labor, equipment and materials incorporated in, or to be incorporated in the construction covered by the Contract Documents.

ARTICLE 2. CONTRACT DOCUMENTS

a. Contract Documents. The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all.

b. Interpretations. The Contract Documents are intended to be fully cooperative and to be complementary. If Contractor observes that any documents are in conflict, the Contractor shall promptly notify the Engineer in writing. In case of conflicts between the Contract Documents, the order of precedence shall be as follows:

1) Change Orders or Work Change Directives

2) Addenda

3) Special Provisions (or Special Conditions)

4) Technical Specifications

5) Plans (Contract Drawings)

6) Contract

7) General Conditions

8) Instructions to Bidders

9) Notice Inviting Bids

10) Contractor's Bid Forms

11) Greenbook Standard Specifications (Sections 1-9 Excluded)

12) Standard Plans

13) Reference Documents

With reference to the Drawings, the order of precedence shall be as follows:

1) Figures govern over scaled dimensions

2) Detail drawings govern over general drawings

3) Addenda or Change Order drawings govern over Contract Drawings

4) Contract Drawings govern over Standard Drawings

5) Contract Drawings govern over Shop Drawings

c. Conflicts in Contract Documents. Notwithstanding the orders of precedence established above, in the event of conflicts, the higher standard shall always apply.

d. Organization of Contract Documents. Organization of the Contract Documents into divisions, sections, and articles, and arrangement of drawings shall not control the Contractor in dividing The Work among subcontractors or in establishing the extent of Work to be performed by any trade.

ARTICLE 3. CONTRACTS DOCUMENTS: COPIES & MAINTENANCE

Contractor will be furnished, free of charge, 2 copies of the Contract Documents. Additional copies may be obtained at cost of reproduction.

Contractor shall maintain a clean, undamaged set of Contract Documents at the Project site.

ARTICLE 4. DETAIL DRAWINGS AND INSTRUCTIONS

a. Examination of Contract Documents. Before commencing any portion of The Work, Contractor shall again carefully examine all applicable Contract Documents, the Project site and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify the Engineer of any potential error, inconsistency, ambiguity, conflict or lack of detail or explanation. If Contractor performs, permits, or causes the performance of any Work which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction. In no case shall the Contractor or any subcontractor proceed with Work if uncertain as to the applicable requirements.

b. Additional Instructions. After notification of any error, inconsistency, ambiguity, conflict or lack of detail or explanation, the Engineer will provide any required

additional instructions, by means of drawings or other written direction, necessary for proper execution of Work.

c. Quality of Parts, Construction and Finish. All parts of The Work shall be of the best quality of their respective kinds and the Contractor must use all diligence to inform itself fully as to the required construction and finish. In no case shall Contractor proceed with The Work without obtaining first from the Engineer such Approval may be necessary for the proper performance of Work.

d. Contractor's Variation from Contract Document Requirements. If it is found that the Contractor has varied from the requirements of the Contract Documents including the requirement to comply with all applicable laws, ordinances, rules and regulations, the Engineer may at any time, before or after completion of the Work, order the improper Work removed, remade or replaced by the Contractor at the Contractor's expense.

ARTICLE 5. EXISTENCE OF UTILITIES AT THE WORK SITE

a. City has endeavored to determine the existence of utilities at the Project site from the records of the owners of known utilities in the vicinity of the Project. The positions of these utilities as derived from such records are shown on the Plans.

b. No excavations were made to verify the locations shown for underground utilities. No guarantee is made or implied that the information is complete or accurate. It shall be the Contractor's responsibility alone to determine the exact location of underground utilities or substructures of every nature and to protect them from damage.

c. The service connections to these utilities are not shown on the plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections and, if necessary, Contractor shall arrange for the relocation of service connections. The Contractor shall make its own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing Work which could result in damage to such utilities. The Contractor shall immediately notify City in writing of any utility discovered in a different position than shown on the Plans or which is not shown on the Plans.

d. All water meters, water valves, fire hydrants, electrical utility vaults, telephone vaults, gas utility valves, and other subsurface structures shall be relocated or adjusted to final grade by the Contractor. Locations of existing utilities shown on the Plans are approximate and may not be complete. The Contractor shall be responsible for coordinating its Work with all utility companies during the construction of The Work. The Contractor will not be entitled to damages or additional payment for delays attributable to utility relocations or alterations

e. Notwithstanding the above, pursuant to Section 4215 of the Government Code, City has the responsibility to identify, with reasonable accuracy, main or trunkline facilities on the plans and specifications. In the event that main or trunkline utility facilities are not identified with reasonable accuracy in the plans and specifications

made a part of the invitation for bids, City shall assume the responsibility for their timely removal, relocation, or protection.

f. Contractor, except in an emergency, shall contact the appropriate regional notification center, Southern California Underground Service Alert at 1-800-227-2600 at least two working days prior to commencing any excavation if the excavation will be performed in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by City, and obtain an inquiry identification number from that notification center. No excavation shall be commenced or carried out by the Contractor unless such an inquiry identification number has been assigned to the Contractor or any subcontractor of the Contractor and City has been given the identification number by the Contractor.

ARTICLE 6. SCHEDULE

a. Estimated Schedule. Within fourteen (14) days after the issuance of the Notice to Proceed, Contractor shall prepare a Project schedule and shall submit this to the Engineer for Approval. The receipt or Approval of any schedules by the Engineer or City shall not in any way relieve the Contractor of its obligations under the Contract Documents. The Contractor is fully responsible to determine and provide for any and all staffing and resources at levels which allow for good quality and timely completion of the Project. Contractor's failure to incorporate all elements of Work required for the performance of the Contract or any inaccuracy in the schedule shall not excuse the Contractor from performing all Work required for a completed Project within the specified Contract time period. If the required schedule is not received by the time the first payment under the Contract is due, Contractor shall not be paid until the schedule is received, reviewed and accepted by the Engineer.

b. Schedule Contents. The schedule shall allow enough time for inclement weather. The schedule shall indicate the beginning and completion dates of all phases of construction; critical path for all critical, sequential time related activities; and "float time" for all "slack" or "gaps" in the non-critical activities. The schedule shall clearly identify all staffing and other resources which in the Contractor's judgment are needed to complete the Project within the time specified for completion. Schedule duration shall match the Contract time. Schedules indicating early completion will be rejected.

c. Schedule Updates. Contractor shall continuously update its construction schedule. Contractor shall submit an updated and accurate construction schedule to the Engineer whenever requested to do so by Engineer and with each progress payment request. The Engineer may withhold progress payments or other amounts due under the Contract Documents if Contractor fails to submit an updated and accurate construction schedule.

ARTICLE 7. SUBSTITUTIONS

a. Pursuant to Public Contract Code Section 3400(b) City may make a finding that is described in the invitation for bids that designates certain products, things, or services by specific brand or trade name.

b. Unless specifically designated in the Contract Documents, whenever any material, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such Specifications shall be deemed to be used for the purpose of facilitating the description of the material, process or article desired and shall be deemed to be followed by the words "or equal." Contractor may, unless otherwise stated, offer for substitution any material, process or article which shall be substantially equal or better in every respect to that so indicated or specified in the Contract Documents. However, City may have adopted certain uniform standards for certain materials, processes and articles.

c. Contractor shall submit requests, together with substantiating data, for substitution of any "or equal" material, process or article no later than thirty-five (35) days after award of the Contract. To facilitate the construction schedule and sequencing, some requests may need to be submitted before thirty-five (35) days after award of Contract. Provisions regarding submission of "or equal" requests shall not in any way authorize an extension of time for performance of this Contract. If a proposed "or equal" substitution request is rejected, Contractor shall be responsible for providing the specified material, process or article. The burden of proof as to the equality of any material, process or article shall rest with the Contractor. City has the complete and sole discretion to determine if a material, process or article is an "or equal" material, process or article that may be substituted. **See Section 00750, Special Conditions, Item 8 for additional specific substitution requirements.**

d. Data required to substantiate requests for substitutions of an "or equal" material, process or article data shall include a signed affidavit from the Contractor stating that, and describing how, the substituted "or equal" material, process or article is equivalent to that specified in every way except as listed on the affidavit. Substantiating data shall include any and all illustrations, specifications, and other relevant data including catalog information which describes the requested substituted "or equal" material, process or article, and substantiates that it is an "or equal" to the material, process or article. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process or article. Failure to submit all the required substantiating data, including the signed affidavit, to City in a timely fashion will result in the rejection of the proposed substitution.

e. The Contractor shall bear all of City's costs associated with the review of substitution requests.

f. The Contractor shall be responsible for all costs related to a substituted "or equal" material, process or article.

g. Contractor is directed to the Special Conditions (if any) to review any findings made pursuant to Public Contract Code section 3400.

ARTICLE 8. SHOP DRAWINGS

a. Contractor shall check and verify all field measurements and shall submit with such promptness as to provide adequate time for review and cause no delay in his own Work or in that of any other contractor, subcontractor, or worker on the Project, six (6) copies of all shop or setting drawings, calculations, schedules, and materials list, and all other provisions required by the Contract. Contractor shall sign all submittals affirming that submittals have been reviewed and approved by Contractor prior to submission to Engineer. Each signed submittal shall affirm that the submittal meets all the requirements of the Contract Documents except as specifically and clearly noted and listed on the cover sheet of the submittal.

b. Contractor shall make any corrections required by the Engineer, and file with the Engineer six (6) corrected copies each, and furnish such other copies as may be needed for completion of the Work. Engineer's approval of shop drawings shall not relieve Contractor from responsibility for deviations from the Contract Documents unless Contractor has, in writing, called Engineer's attention to such deviations at time of submission and has secured the Engineer's written Approval. Engineer's Approval of shop drawings shall not relieve Contractor from responsibility for errors in shop drawings.

ARTICLE 9. SUBMITTALS

a. Contractor shall furnish to the Engineer for approval, prior to purchasing or commencing any Work, a log of all samples, material lists and certifications, mix designs, schedules, and other submittals, as required in the specifications. The log shall indicate whether samples will be provided in accordance with other provisions of this Contract.

b. Contractor will provide samples and submittals, together with catalogs and supporting data required by the Engineer, to the Engineer within a reasonable time period to provide for adequate review and avoid delays in the Work.

c. These requirements shall not authorize any extension of time for performance of this Contract. Engineer will check and approve such samples, but only for conformance with design concept of work and for compliance with information given in the Contract Documents. Work shall be in accordance with approved samples and submittals.

ARTICLE 10. MATERIALS

a. Except as otherwise specifically stated in the Contract Documents, Contractor shall provide and pay for all materials, labor, tools, equipment, water, lights, power, transportation, superintendence, temporary constructions of every nature, and all other services and facilities of every nature whatsoever necessary to execute and complete this Contract within specified time.

b. Unless otherwise specified, all materials shall be new and the best of their respective kinds and grades as noted and/or specified, and workmanship shall be of good quality.

c. Materials shall be furnished in ample quantities and at such times as to ensure uninterrupted progress of The Work and shall be stored properly and protected as required by the Contract Documents. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or Work.

d. No materials, supplies, or equipment for Work under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the Project, to City free from any claims, liens, or charges.

e. Materials shall be stored on the Project site in such manner so as not to interfere with any operations of City or any independent contractor.

ARTICLE 11. CONTRACTOR'S SUPERVISION

Contractor shall continuously keep at the Project site, a competent and experienced full-time Project superintendent approved by City. Superintendent must be able to proficiently speak, read and write in English. Contractor shall continuously provide efficient supervision of the Project.

ARTICLE 12. WORKERS

a. Contractor shall at all times enforce strict discipline and good order among its employees. Contractor shall not employ on the Project any unfit person or any one not skilled in the Work assigned to him or her.

b. Any employee of the Contractor whom City determines is incompetent or unfit shall be removed from this Project.

ARTICLE 13. SUBCONTRACTORS

a. Contractor agrees to bind every subcontractor to the terms of the Contract Documents as far as such terms are applicable to subcontractor's portion of The Work. All subcontracts entered into by Contractor relating to any of the Work under this Contract shall comply with and be limited to the extent required by Civil Code section 2872.05. Contractor shall be as fully responsible to City for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by its subcontractors, as Contractor is for acts and omissions of persons directly employed by Contractor. Nothing contained in these Contract Documents shall create any contractual relationship between any subcontractor and City.

b. City reserves the right to Approve all subcontractors. City's Approval of any subcontractor under this Contract shall not in any way relieve Contractor of its obligations in the Contract Documents.

c. Prior to substituting any subcontractor listed in the Bid Forms, Contractor must comply with the requirements of the Subletting and Subcontracting Fair Practices Act pursuant to California Public Contract Code section 4100 et seq.

ARTICLE 14. PERMITS AND LICENSES

Permits and licenses necessary for prosecution of The Work shall be secured and paid for by Contractor, unless otherwise specified in the Contract Documents.

a. Contractor shall obtain and pay for all other permits and licenses required for The Work, including excavation permit and for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under jurisdiction of public agencies other than City.

b. The Contractor shall arrange and pay for all off-site inspection of the Work related to permits and licenses, including certification, required by the specifications, drawings, or by governing authorities, except for such off-site inspections delineated as City's responsibility pursuant to the Contract Documents.

c. Before Acceptance of the Project, the Contractor shall submit all licenses, permits, certificates of inspection and required approvals to City.

ARTICLE 15. UTILITY USAGE

a. All temporary utilities, including but not limited to electricity, water, gas, and telephone, used on the Work shall be furnished and paid for by Contractor. Contractor shall Provide necessary temporary distribution systems, including meters, if necessary, from distribution points to points on The Work where the utility is needed. Upon completion of The Work, Contractor shall remove all temporary distribution systems.

b. Contractor shall provide necessary and adequate utilities and pay all costs for water, electricity, gas, oil, and sewer charges required for completion of the Project.

c. All permanent meters Installed shall be listed in the Contractor’s name until the Work is accepted.

d. If the Contract is for construction in existing facilities, Contractor may, with prior written Approval of City, use City’s existing utilities by compensating City for utilities used by Contractor.

ARTICLE 16. INSPECTION FEES FOR PERMANENT UTILITIES

All inspection fees and other municipal charges for permanent utilities including, but not limited to, sewer, electrical, phone, gas, water, and irrigation shall be paid for by City. Contractor shall be responsible for arranging the payment of such fees, but inspection fees and other municipal fees relating to permanent utilities shall be paid by City. Contractor may either request reimbursement from City for such fees, or shall be responsible for arranging and coordination with City for the payment of such fees.

ARTICLE 17. TRENCHES

a. Trenches Five Feet or More in Depth. The Contractor shall submit to City, in advance of excavation, 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 feet or more in depth. If the plan varies from shoring system standards, the plan shall be prepared by a registered civil or structural engineer. The plan shall not be less effective than the shoring, bracing, sloping, or other provisions of the Construction Safety Orders, as defined in the California Code of Regulations.

b. Excavations Deeper than Four Feet. If work under this Contract involves digging trenches or other excavation that extends deeper than four feet below the surface, Contractor shall promptly, and before the following conditions are disturbed, notify City, in writing, of any:

1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

2) Subsurface or latent physical conditions at the site differing from those indicated.

3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

City shall promptly investigate the conditions, and if it finds that the conditions do so materially differ, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of The Work, shall issue a change order under the procedures described in the Contract Documents.

In the event that a dispute arises between City and the Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of The Work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the parties.

ARTICLE 18. DIVERSION OF RECYCLABLE WASTE MATERIALS

In compliance with the applicable City's waste reduction and recycling efforts, Contractor shall divert all Recyclable Waste Materials to appropriate recycling centers. Contractor will be required to submit weight tickets and written proof of diversion with its monthly progress payment requests, with an electronic copy Christine Groves, Management Analyst, Public Works at cgroves@lakeforestca.gov, or as otherwise directed by the City. Contractor shall complete and

execute any certification forms required by City or other applicable agencies to document Contractor's compliance with these diversion requirements. All costs incurred for these waste diversion efforts shall be the responsibility of the Contractor.

ARTICLE 19. REMOVAL OF HAZARDOUS MATERIALS

Should Contractor encounter material reasonably believed to be polychlorinated biphenyl (PCB) or other toxic wastes and hazardous materials which have not been rendered harmless at the Project site, the Contractor shall immediately stop work at the affected Project site and shall report the condition to City in writing. City shall contract for any services required to directly remove and/or abate PCBs and other toxic wastes and hazardous materials, if required by the Project site(s), and shall not require the Contractor to subcontract for such services. The Work in the affected area shall not thereafter be resumed except by written agreement of City and Contractor.

ARTICLE 20. SANITARY FACILITIES

Contractor shall provide sanitary temporary toilet buildings for the use of all workers. All toilets shall comply with all applicable federal, state, and local codes ordinances, and regulations. Toilets shall be kept supplied with toilet paper and shall have workable door fasteners. Toilets shall be serviced no less than once weekly and shall be present in a quantity of not less than 1 per 20 workers as required by CAL-OSHA regulation. The toilets shall be maintained in a sanitary condition at all times. Use of toilet facilities in The Work under construction shall not be permitted. Any other Sanitary Facilities required by CAL-OSHA shall be the responsibility of the Contractor.

ARTICLE 21. AIR POLLUTION CONTROL

Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes. All containers of paint, thinner, curing compound, solvent or liquid asphalt shall be labeled to indicate that the contents fully comply with the applicable material requirements.

Without limiting the foregoing, Contractor must fully comply with all applicable laws, rules and regulations in furnishing or using equipment and/or providing services, including, but not limited to, emissions limits and permitting requirements imposed by the South Coast Air Quality Management District (SCAQMD) and/or California Air Resources Board (CARB). Although the SCAQMD and CARB limits and requirements are more broad, Contractor shall specifically be aware of their application to "portable equipment", which definition is considered by SCAQMD and CARB to include any item of equipment with a fuel-powered engine. Contractor shall indemnify City against any fines or penalties imposed by SCAQMD, CARB, or any other governmental or regulatory agency for violations of applicable laws, rules and/or regulations by Contractor, its subcontractors, or others for whom Contractor is responsible under its indemnity obligations provided for in Article 50.

ARTICLE 22. WATER QUALITY MANAGEMENT AND COMPLIANCE

a. Storm, surface, ground, nuisance, or other waters may be encountered at various times during the Work. Contractor hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

b. Contractor must keep itself and all subcontractors, staff, and employees fully informed of and in compliance with all local, state and federal laws, rules and regulations that may impact, or be implicated by the performance of the Work including, without limitation, all applicable provisions of the City's ordinances regulating discharges of stormwater; the Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.); the California Porter-Cologne Water Quality Control Act (Water Code § 13000 et seq.); and any and all regulations, policies, or permits issued pursuant to any such authority. These include, but are not limited to California Regional Water Quality Control Boards (Santa Ana and San Diego Regions) Order No. R8-2009-0030 (NPDES Permit No. CAS 618030) ("Santa Ana MS4 Permit"), Order No. R8-2009-0045, Order No. R9-2013-0001 as amended by Order Nos. R9-2015-0001 and R9-2015-0100 (NPDES Permit No. CAS0109266) ("San Diego MS4 Permit"); and State Water Resources Control Board Order No. 2010-0014-DWQ, Order No. 2009-0009-DWQ, and Order No. 2012-0006-DWQ (NPDES Permit No. CAS000002) ("Construction General Permit"), and any amendment or renewal thereof.

c. Contractor must comply with the lawful requirements of the City, and any other municipality, drainage district, or other local agency with jurisdiction over the location where the Work is to be conducted, regarding discharges of stormwater to separate storm drain systems or watercourses. These requirements include but are not limited to, all applicable requirements of the Orange County Drainage Area Management Plan ("DAMP"), the City of Lake Forest Local Implementation Plan ("LIP"), and the Erosion and Sediment Control Plan. The DAMP contains requirements related to the design and construction of public projects. Contractor must be familiar with the DAMP, and the LIP and must comply with the requirements as specified therein. In the event the DAMP and LIP are revised or replaced in accordance with the requirements of a state or federal law, rule or permit that impacts the performance of the Work, Contractor must comply with the revised or replaced requirements.

   A copy of the DAMP is available on the internet at:

   http://www.ocwatersheds.com/documents/damp/mapplan

   A copy of the LIP is available on the internet at:

   http://www.lakeforestca.gov/296/Local-Implementation-Plan-LIP

d. Contractor is required to comply with all aspects of the Construction General Permit for all projects that involve construction on or disturbance of one acre or more of land or which are part of a larger common area of development.

e. City may require Contractor to file the Notice of Intent and obtain coverage for the Project under the Construction General Permit. This may include filing all necessary documentation including the Permit Registration Documents ("PRDs") through the Stormwater Multiple Applications and Report Tracking System (SMARTS); preparing and implementing a Storm Water Pollution Prevention Plan ("SWPPP") for the Work site; implementing all other provisions, and monitoring and reporting requirements required by the Construction General Permit; and

providing a Qualified SWPPP Developer and Qualified SWPPP Practitioner, as necessary for all Work site activities, including but not limited to preparation and submittal of all reports, plans, inspections, and monitoring information in compliance with the Construction General Permit. City retains the right to develop its own documentation for the project site, including but not limited to the SWPPP, and in the alternative may require Contractor to adopt and implement portions of the City-developed SWPPP. Specific requirements for the Work site shall be set forth in the Special Conditions. Contractor shall include all costs of compliance with specified requirements in the Contract amount.

f. For those Work sites where construction activity results in the disturbance of less than one acre of total land area and/or do not need coverage under the Construction General Permit, the Contractor is responsible for preparing and implementing an Erosion and Sediment Control Plan in accordance with the Santa Ana MS4 Permit and San Diego MS4 Permit and any amendment or renewal thereof, the City's LIP and Orange County DAMP and any revision or replacement thereof.

g. Notwithstanding the above, before any PRDs, SWPPP, or other Construction General Permit related document may be submitted to the State Water Resources Control Board or implemented on the Work site, it must first be reviewed by the City and/or the City's designee, who retains the right to reject or require revisions thereto. The City expressly reserves the right to procure coverage under the Construction General Permit for the Work site if Contractor fails to draft satisfactory PRDs or SWPPP or otherwise fails to proceed in a manner that complies with the requirements of the Construction General Permit. The City additionally reserves the right to hire additional contractors to maintain compliance at the Work site. Whether Contractor has adequately maintained compliance with the Construction General Permit shall be the City's sole determination. Any costs incurred by the City in procuring coverage under the Construction General Permit, or drafting and/or implementing a SWPPP for the Work site shall be paid by Contractor.

h. Failure to comply with laws, regulations, and ordinances listed in this Article 22 is a violation of federal and state law. Notwithstanding any other indemnity contained in this Agreement, Contractor agrees to indemnify and hold harmless the City, its officials, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which the City, its officials, officers, agents, employees and authorized volunteers may sustain or incur for noncompliance with the laws, regulations, and ordinances listed above, arising out of or in connection with the Work, except for liability resulting from the sole established negligence, willful misconduct or active negligence of the City, its officials, officers, agents, employees or authorized volunteers.

i. City reserves the right to defend any enforcement action or civil action brought against the City for Contractor's failure to comply with any applicable water quality law, regulation, or policy. Contractor agrees to be bound by, and to reimburse the City for the costs associated with, any enforcement action and/or settlement reached between the City and any relevant enforcement entity.

j. City may seek damages from Contractor for delay in completing the Work in accordance with the Contract Documents, caused by Contractor's failure to comply with the laws, regulations and policies described in this Article 22, or any other relevant water quality law, regulation, or policy.

ARTICLE 23. CLEANING UP

a. Contractor at all times shall keep premises free from debris such as waste, rubbish, and excess materials and equipment. Contractor shall not store debris under, in, or about the premises. Upon completion of Work, Contractor shall clean the interior and exterior of the building or improvement including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections, and any areas where debris has collected so surfaces are free from foreign material or discoloration. Contractor shall clean and polish all glass, plumbing fixtures, and finish hardware and similar finish surfaces and equipment and contractor shall also remove temporary fencing, barricades, planking and construction toilet and similar temporary facilities from site. Contractor shall also clean all buildings, asphalt and concrete areas to the degree necessary to remove oil, grease, fuel, or other stains caused by Contractor operations or equipment.

b. Contractor shall fully clean up the site at the completion of The Work. If the Contractor fails to immediately clean up at the completion of The Work, City may do so and the cost of such clean up shall be charged back to the Contractor.

ARTICLE 24. LAYOUT AND FIELD ENGINEERING

All field engineering required for laying out The Work and establishing grades for earthwork operations, location and alignment of any and all site elements (buildings, paving, walks, fencing, furnishings, etc.) shall be furnished by the Contractor at its expense. A digital AutoCAD (version 2011) file shall be provided to the Contractor by the City indicating the location and layout of all site elements for the use by the Contractors surveyor. Layout shall be done by a registered civil engineer or a licensed land surveyor Approved by the Engineer. Any surveying necessary to establish the grade and line of the work is to be done by a properly licensed land surveyor retained by the contractor. Any required "as-built" drawings of the Work shall be prepared by the registered civil engineer.

ARTICLE 25. EXCESSIVE NOISE

a. The Contractor shall use only such equipment on the work and in such state of repair so that the emission of sound therefrom is within the noise tolerance level of that equipment as established by CAL-OSHA.

b. The Contractor shall comply with the most restrictive of the following: (1) local sound control and noise level rules, regulations and ordinances and (2) the requirements contained in these Contract Documents, including hours of operation requirements. No internal combustion engine shall be operated on the Project without a muffler of the type recommended by the manufacturer. Should any muffler or other control device sustain damage or be determined to be ineffective or defective, the Contractor shall promptly remove the equipment and shall not return said equipment to the job until the device is repaired or replaced. Said noise

and vibration level requirements shall apply to all equipment on the job or related to the job, including but not limited to, trucks, transit mixers or transit equipment that may or may not be owned by the Contractor.

ARTICLE 26. TESTS AND INSPECTIONS

a. If the Contract Documents, the Engineer, or any instructions, laws, ordinances, or public authority require any part of The Work to be tested or Approved, Contractor shall provide the Engineer at least two (2) working days notice of its readiness for observation or inspection. If inspection is by a public authority other than City, Contractor shall promptly inform City of the date fixed for such inspection. Required certificates of inspection (or similar) shall be secured by Contractor. Costs for City testing and City inspection shall be paid by City. Costs of tests for Work found not to be in compliance shall be paid by the Contractor.

b. If any Work is done or covered up without the required testing or approval, the Contractor shall uncover or deconstruct the Work, and the Work shall be redone after completion of the testing at the Contractor's cost in compliance with the Contract Documents.

c. Where inspection and testing are to be conducted by an independent laboratory or agency, materials or samples of materials to be inspected or tested shall be selected by such laboratory or agency, or by City, and not by Contractor. All tests or inspections of materials shall be made in accordance with the commonly recognized standards of national organizations.

d. In advance of manufacture of materials to be supplied by Contractor which must be tested or inspected, Contractor shall notify City so that City may arrange for testing at the source of supply. Any materials which have not satisfactorily passed such testing and inspection shall not be incorporated into The Work.

e. If the manufacture of materials to be inspected or tested will occur in a plant or location outside the geographic limits of City, the Contractor shall pay for any excessive or unusual costs associated with such testing or inspection, including but not limited to excessive travel time, standby time and required lodging.

f. Reexamination of Work may be ordered by City. If so ordered, Work must be uncovered or deconstructed by Contractor. If Work is found to be in accordance with the Contract Documents, City shall pay the costs of reexamination and reconstruction. If such work is found not to be in accordance with the Contract Documents, Contractor shall pay all costs.

ARTICLE 27. PROTECTION OF WORK AND PROPERTY

a. The Contractor shall be responsible for all damages to persons or property that occur as a result of The Work. Contractor shall be responsible for the proper care and protection of all materials delivered and Work performed until completion and final Acceptance by City. All Work shall be solely at the Contractor's risk. Contractor shall adequately protect adjacent property from settlement or loss of lateral support as necessary. Contractor shall comply with all applicable safety

laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the Project site where Work is being performed. Contractor shall erect and properly maintain at all times, as required by field conditions and progress of work, all necessary safeguards, signs, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created in the course of construction.

b. In an emergency affecting safety of life or of work or of adjoining property, Contractor, without special instruction or authorization from the Engineer, is hereby permitted to act to prevent such threatened loss or injury; and Contractor shall so act, without appeal, if so authorized or instructed by the Engineer or City. Any compensation claimed by Contractor on account of emergency work shall be determined by and agreed upon by City and the Contractor.

c. Contractor shall provide such heat, covering, and enclosures as are necessary to protect all Work, materials, equipment, appliances, and tools against damage by weather conditions.

d. Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, and other adjoining property and structures, and to avoid damage thereto, and Contractor shall repair any damage thereto caused by The Work operations. Contractor shall:

1) Enclose the working area with a substantial barricade, and arrange work to cause minimum amount of inconvenience and danger to the public.

2) Provide substantial barricades around any shrubs or trees indicated to be preserved.

3) Deliver materials to the Project site over a route designated by the Engineer.

4) Provide any and all dust control required and follow the Applicable air quality regulations as appropriate. If the Contractor does not comply, City shall have the immediate authority to provide dust control and deduct the cost from payments to the Contractor.

5) Confine Contractor's apparatus, the storage of materials, and the operations of its workers to limits required by law, ordinances, permits, or directions of the Engineer. Contractor shall not unreasonably encumber the Project site with its materials.

6) Take care to prevent disturbing or covering any survey markers, monuments, or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved civil engineer or land surveyor, at no cost to City.

7) Ensure that existing facilities, fences and other structures are all adequately protected and that, upon completion of all Work, all facilities

that may have been damaged are restored to a condition acceptable to City.

8) Preserve and protect from injury all buildings, pole lines and all direction, warning and mileage signs that have been placed within the right-of-way.

9) At the completion of work each day, leave the Project site in a clean, safe condition.

10) Comply with any stage construction and traffic handling plans. Access to residences and businesses shall be maintained at all times.

e. These precautionary measures will apply continuously and not be limited to normal working hours. Full compensation for the Work involved in the preservation of life, safety and property as above specified shall be considered as included in the prices paid for the various contract items of Work, and no additional allowance will be made therefor.

f. Should damage to persons or property occur as a result of The Work, Contractor shall be responsible for proper investigation, documentation, including video or photography, to adequately memorialize and make a record of what transpired. City shall be entitled to inspect and copy any such documentation, video, or photographs.

ARTICLE 28. CONTRACTORS MEANS AND METHODS

Contractor is solely responsible for the means and methods utilized to Perform The Work. In no case shall the Contractor's means and methods deviate from commonly used industry standards.

ARTICLE 29. INSPECTOR'S FIELD OFFICE

a. The Contractor shall be responsible for providing the inspector's field office. The Office shall be a substantial waterproof construction with adequate natural light and ventilation by means of stock design windows. Door shall have a key type lock or padlock clasp. The office shall have heating and air conditioning and shall be equipped with a telephone, a telephone answering machine, and a fax machine at Contractor's expense.

b. A table satisfactory for the study of plans and two chairs shall be Provided by Contractor. Contractor shall Provide and pay for adequate electric lights, local telephone service, and adequate heat and air conditioning for the field office until authorized removal.

ARTICLE 30. AUTHORIZED REPRESENTATIVES

City shall designate representatives, who shall have the right to be present at the Project site at all times. City may designate an inspector who shall have the right to observe all of the Contractor's Work. The inspector is not authorized to make changes in the Contract Documents. The inspector shall not be responsible for the Contractor's failure to carry out The Work in

accordance with the Contract Documents. Contractor shall provide safe and proper facilities for such access.

ARTICLE 31. HOURS OF WORK

a. Eight (8) hours of work shall constitute a legal day's work. The Contractor and each subcontractor shall forfeit, as penalty to City, twenty-five dollars ($25) for each worker employed in the execution of Work by the Contractor or any subcontractor for each day during which such worker is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, except as provided in Labor Code Section 1815.

b. Unless otherwise provided in the Special Conditions, Work shall be accomplished on a regularly scheduled eight (8) hour per day work shift basis, Monday through Friday, between the hours of 7:00 a.m. and 5:00 p.m.

c. It shall be unlawful for any person to operate, permit, use, or cause to operate any of the following at the Project site, other than between the hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, with no Work allowed on City-observed holidays, unless otherwise Approved by the Engineer:

   1) Powered Vehicles

   2) Construction Equipment

   3) Loading and Unloading Vehicles

   4) Domestic Power Tool.

ARTICLE 32. PAYROLL RECORDS

a. Pursuant to Labor Code Section 1776, the Contractor and each subcontractor shall maintain weekly certified payroll records showing the name, address, social security number, work classification, straight time and overtime hours paid each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the work. Contractor shall certify under penalty of perjury that records maintained and submitted by Contractor are true and accurate. Contractor shall also require subcontractor(s) to certify weekly payroll records under penalty of perjury.

b. In accordance with Labor Code section 1771.4, the Contractor and each subcontractor shall furnish the certified payroll records directly to the Department of Industrial Relations ("DIR") on a weekly basis and in the format prescribed by the DIR, which may include electronic submission. Contractor shall comply with all requirements and regulations from the DIR relating to labor compliance monitoring and enforcement.

c. The payroll records described herein shall be certified and submitted by the Contractor at a time designated by City. The Contractor shall also provide the following:

1) A certified copy of the employee's payroll records shall be made available for inspection or furnished to such employee or his or her authorized representative on request.

2) A certified copy of all payroll records described herein shall be made available for inspection or furnished upon request of the Department of Industrial Relations ("DIR").

d. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") of the DIR or shall contain the same information as the forms provided by the DLSE.

e. Any copy of records made available for inspection and furnished upon request to the public shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the Contractor or any subcontractor shall not be marked or obliterated.

f. In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying any item or actions necessary to ensure compliance with this section. Should noncompliance still be evident after such ten (10) day period, the Contractor shall, as a penalty to City, forfeit one hundred dollars ($100.00) for each day, or portion thereof, for each worker until strict compliance is effectuated. Upon the request of the DIR, such penalties shall be withheld from contract payments.

ARTICLE 33. PREVAILING RATES OF WAGES

a. The Contractor is aware of the requirements of Labor Code Sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Project involves an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is $1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this Agreement from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations located at www.dir.ca.gov/dlsr/. In the alternative, the Contractor may view a copy of the prevailing rates of per diem wages at City. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. Contractor shall defend, indemnify and hold City, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws.

b. The Contractor and each subcontractor shall forfeit as a penalty to City not more than two hundred dollars ($200) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

c. Contractor shall post, at appropriate conspicuous points on the Project site, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.

ARTICLE 34. EMPLOYMENT OF APPRENTICES

The Contractor's attention is directed to the provisions of Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning employment of apprentices by the Contractor or any subcontractor. The Contractor shall obtain a certificate of apprenticeship before employing any apprentice pursuant to Section 1777.5, 1777.6, and 1777.7 of the Labor Code. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, the Administrator of Apprenticeships, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

ARTICLE 35. NONDISCRIMINATION/EQUAL EMPLOYMENT OPPORTUNITY

Pursuant to Labor Code Section 1735 and other applicable provisions of law, the Contractor and its subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap on this Project. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.

ARTICLE 36. LABOR/EMPLOYMENT SAFETY

The Contractor shall maintain emergency first aid treatment for his employees which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 et seq.), and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4.

ARTICLE 37. INSURANCE

Contractor agrees to procure and maintain, at Contractor's expense all insurance specified in Appendix "1" attached hereto and by this reference incorporated herein. Contractor shall require all subcontractors to carry the same policies and limits of insurance that the Contractor is required to maintain, unless otherwise approved in writing by the City.

ARTICLE 38. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

a. Time for Completion/Liquidated Damages. Work shall be commenced within ten (10) days of the date stated in City's Notice to Proceed and shall be completed by

Contractor in the time specified in the Contract Documents. City is under no obligation to consider early completion of the Project; and the Contract completion date shall not be amended by City's receipt or acceptance of the Contractor's proposed earlier completion date. Furthermore, Contractor shall not, under any circumstances, receive additional compensation from City (including but not limited to indirect, general, administrative or other forms of overhead costs) for the period between the time of earlier completion proposed by the Contractor and the Contract completion date. If The Work is not completed as stated in the Contract Documents, it is understood that City will suffer damage. In accordance with Government Code section 53069.85, being impractical and infeasible to determine the amount of actual damage, it is agreed that Contractor shall pay to City as fixed and liquidated damages, and not as a penalty, the sum stipulated in the Contract for each day of delay until The Work is fully completed. Contractor and its surety shall be liable for any liquidated damages. Any money due or to become due the Contractor may be retained to cover liquidated damages.

b. Inclement Weather. Contractor shall abide the Engineer's determination of what constitutes inclement weather. Time extensions for inclement weather shall only be granted when the Work stopped during inclement weather is on the critical path of the Project schedule.

c. Extension of Time. Contractor shall not be charged liquidated damages because of any delays in completion of The Work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor (or its subcontractors or suppliers). Contractor shall within five (5) Days of identifying any such delay notify City in writing of causes of delay. City shall ascertain the facts and extent of delay and grant extension of time for completing The Work when, in its judgment, the facts justify such an extension. Time extensions to the Project shall be requested by the Contractor as they occur and without delay. No delay claims shall be permitted unless the event or occurrence delays the completion of the Project beyond the Contract completion date.

d. No Damages for Reasonable Delay. City's liability to Contractor for delays for which City is responsible shall be limited to only an extension of time unless such delays were unreasonable under the circumstances. In no case shall City be liable for any costs which are borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and other ongoing costs. Damages caused by unreasonable City delay, including delays caused by items that are the responsibility of City pursuant to Government Code section 4215, shall be based on actual costs only, no proportions or formulas shall be used to calculate any delay damages.

ARTICLE 39. COST BREAKDOWN AND PERIODIC ESTIMATES

Contractor shall furnish on forms Approved by City:

a. Within ten (10) Days of award of the Contract a detailed estimate giving a complete breakdown of the Contract price;

b. A monthly itemized estimate of Work done for the purpose of making progress payments. In order for City to consider and evaluate each progress payment application, the Contractor shall submit a detailed measurement of Work performed and a progress estimate of the value thereof before the tenth (10th) Day of the following month.

c. Contractor shall submit, with each of its payment requests, an adjusted list of actual quantities, verified by the Engineer, for unit price items listed, if any, in the Bid Form.

d. Following City's Acceptance of the Work, the Contractor shall submit to City a written statement of the final quantities of unit price items for inclusion in the final payment request.

e. City shall have the right to adjust any estimate of quantity and to subsequently correct any error made in any estimate for payment.

Contractor shall certify under penalty of perjury, that all cost breakdowns and periodic estimates accurately reflect the Work on the Project.

ARTICLE 40. MOBILIZATION

a. When a bid item is included in the Bid Form for mobilization, the costs of Work in advance of construction operations and not directly attributable to any specific bid item will be included in the progress estimate ("Initial Mobilization"). When no bid item is provided for "Initial Mobilization," payment for such costs will be deemed to be included in the other items of The Work.

b. Payment for Initial Mobilization based on the lump sum provided in the Bid Form, which shall constitute full compensation for all such Work and shall not exceed 5% of the total contract. No payment for Initial Mobilization will be made until all of the listed items have been completed to the satisfaction of the Engineer. The scope of the Work included under Initial Mobilization shall include, but shall not be limited to, the following principal items:

1) Obtaining and paying for all bonds, insurance, and permits.

2) Moving on to the Project site of all Contractor's plant and equipment required for first month's operations.

3) Installing temporary construction power, wiring, and lighting facilities.

4) Establishing fire protection system.

5) Developing and installing a construction water supply.

6) Providing and maintaining the field office trailers for the Contractor and the Engineer, complete, with all specified furnishings and utility services including telephones, telephone appurtenances, computer and printer, and copying machine.

7) Providing on-site communication facilities for the Owner and the Engineer, including telephones, radio pagers, and fax machines.

8) Providing on-site sanitary facilities and potable water facilities as specified per Cal-OSHA and these Contract Documents.

9) Furnishing, installing, and maintaining all storage buildings or sheds required for temporary storage of products, equipment, or materials that have not yet been installed in the Work. All such storage shall meet manufacturer's specified storage requirements, and the specific provisions of the specifications, including temperature and humidity control, if recommended by the manufacturer, and for all security.

10) Arranging for and erection of Contractor's work and storage yard.

11) Posting all OSHA required notices and establishment of safety programs per Cal-OSHA.

12) Full-time presence of Contractor's superintendent at the job site as required herein.

13) Submittal of Construction Schedule as required by the Contract Documents.

ARTICLE 41. PAYMENTS

a. City shall make monthly progress payments following receipt of undisputed and properly submitted payment requests. Contractor shall be paid a sum equal to ninety-five percent (95%) of the value of Work performed up to the last day of the previous month, less the aggregate of previous payments, except where the City has adopted a finding that the Work done under the Contract is substantially complex, and then the Contractor shall be paid a sum equal to ninety percent (90%) of the value of the Work performed up to the last day of the previous month, less the aggregate of previous payments.

b. The Contractor shall, after the full completion of The Work, submit a final payment application. All prior progress estimates shall be subject to correction in the final estimate and payment.

c. Unless otherwise required by law, the final payment of five percent (5%) of the value of the Work (or ten percent (10%) in the event the City has adopted a finding that the Work under the Contract is substantially complex), if unencumbered, shall be paid no later than sixty (60) Days after the date of recordation of the Notice of Completion.

d. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against City arising from this Contract.

e. Payments to the Contractor shall not be construed to be an acceptance of any defective work or improper materials, or to relieve the Contractor of its obligations under the Contract Documents.

f. The Contractor shall submit with each payment request the Contractor's conditional waiver of lien for the entire amount covered by such payment request, as well as a valid unconditional waiver of lien from the Contractor and all subcontractors and materialmen for all work and materials included in any prior invoices. Waivers of lien shall be in the forms prescribed by California Civil Code Section 8132. Prior to final payment by City, the Contractor shall submit a final waiver of lien for the Contractor's work, together with releases of lien from any subcontractor or materialmen.

ARTICLE 42. PAYMENTS WITHHELD AND BACKCHARGES

a. In addition to amounts which City may retain under other provisions of the Contract Documents City may withhold payments due to Contractor as may be necessary to cover:

1) Stop Notice Claims.

2) Defective work not remedied.

3) Failure of Contractor to make proper payments to its subcontractors or suppliers.

4) Completion of the Contract if there exists a reasonable doubt that the work can be completed for balance then unpaid.

5) Damage to another contractor or third party.

6) Amounts which may be due City for claims against Contractor.

7) Failure of Contractor to keep the record ("as-built") drawings up to date.

8) Failure to provide updates on the construction schedule.

9) Site clean up.

10) Failure of the Contractor to comply with requirements of the Contract Documents.

11) Liquated damages.

12) Legally permitted penalties.

b. Upon completion of the Contract, City will reduce the final Contract amount to reflect costs charged to the Contractor, backcharges or payments withheld pursuant to the Contract Documents.

ARTICLE 43. CHANGES AND EXTRA WORK

a. Change Order Work.

1) City, without invalidating the Contract, may order changes in the Work consisting of additions, deletions or other revisions, and the Contract Price and Contract Time will be adjusted accordingly. All such changes in the Work shall be authorized by Change Order, shall be performed under the applicable conditions of the Contract Documents, and shall be subject to the approval authority requirements of Article 4 of the Contract. A Change Order signed by the Contractor indicates the Contractor's agreement therewith, including any adjustment in the Contract amount or the Contract time, and the full and final settlement of all costs (direct, indirect and overhead) related to the Work authorized by the Change Order.

2) All claims for additional compensation to the Contractor shall be presented in writing before the expense is incurred and will be adjusted as provided herein. No work shall be allowed to lag pending such adjustment, but shall be promptly executed as directed, even if a dispute arises. No claim will be considered after the work in question has been done unless a written contract change order has been issued or a timely written notice of claim has been made by Contractor. Contractor shall not be entitled to claim or bring suit for damages, whether for loss of profits or otherwise, on account of any decrease or omission of any item or portion of Work to be done. Whenever any change is made as provided for herein, such change shall be considered and treated as though originally included in the Contract, and shall be subject to all terms, conditions and provisions of the original Contract.

3) Owner Initiated Change. The Contractor must submit a complete cost proposal, including any change in the Contract time, within seven (7) Days after receipt of a scope of a proposed change order, unless City requests that proposals be submitted in less than seven (7) Days.

4) Contractor Initiated Change. The Contractor must give written notice of a proposed change order required for compliance with the Contract Documents within seven (7) Days of discovery of the facts giving rise to the proposed change order.

5) Whenever possible, any changes to the Contract amount shall be in a lump sum mutually agreed to by the Contractor and City.

6) Price quotations from the Contractor shall be accompanied by sufficiently detailed supporting documentation to permit verification by City.

7) If the Contractor fails to submit the cost proposal within the seven (7) Day period (or as requested), City has the right to order the Contractor in writing to commence the work immediately on a force account basis and/or issue a lump sum change to the contract price in accordance with City's estimate of cost. If the change is issued based on City estimate, the Contractor will

waive its right to dispute the action unless within fifteen (15) Days following completion of the added/deleted work, the Contractor presents written proof that City's estimate was in error.

8) Estimates for lump sum quotations and accounting for cost-plus-percentage work shall be limited to direct expenditures necessitated specifically by the subject extra work, and shall be segregated as follows:

(a) Labor. The costs of labor will be the actual cost for wages prevailing locally for each craft or type of worker at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessment or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the extra work cost will not be permitted unless the contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

(b) Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available in the quantities involved, plus sales tax, freight and delivery. Materials cost shall be based upon supplier or manufacturer's invoice. If invoices or other satisfactory evidence of cost are not furnished within fifteen (15) Days of delivery, then the Engineer shall determine the materials cost, at its sole discretion.

(c) Tool and Equipment Use. No payment will be made for the use of small tools, tools which have a replacement value of $1,000 or less. Regardless of ownership, the rates to be used in determining equipment use costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, or Caltrans Equipment Rental Rates (without surcharge) at the time the work is performed.

(d) Overhead, Profit and Other Charges. The mark-up for overhead (including supervision) and profit on work added to the Contract shall be according to the following:

i. "Net Cost" is defined as consisting of costs of labor, materials and tools and equipment only excluding overhead and profit. The costs of applicable insurance and bond premium will be reimbursed to the Contractor and subcontractors at cost only, without mark-up.

ii. For Work performed by the Contractor's forces the added cost for overhead and profit shall not exceed fifteen percent (15%) of the Net Cost of the Work.

iii. For Work performed by a subcontractor, the added cost for overhead and profit shall not exceed fifteen percent (15%) of the Net Cost of the Work to which the Contractor may add five percent (5%) of the subcontractor's Net Cost.

iv. For Work performed by a sub-subcontractor the added cost for overhead and profit shall not exceed fifteen percent (15%) of the Net Cost for Work to which the subcontractor and general contractor may each add an additional five percent (5%) of the Net Cost of the lower tier subcontractor.

v. No additional mark up will be allowed for lower tier subcontractors, and in no case shall the added cost for overhead and profit payable by City exceed twenty-five percent (25%) of the Net Cost as defined herein.

9) All of the following costs are included in the markups for overhead and profit described above, and Contractor shall not receive any additional compensation for: Submittals, drawings: field drawings, Shop Drawings, including submissions of drawings; field inspection; General Superintendence; General administration and preparation of cost proposals, schedule analysis, Change Orders, and other supporting documentation; computer services; reproduction services; Salaries of project engineer, superintendent, timekeeper, storekeeper, and secretaries; Janitorial services; Small tools, incidentals and consumables; Temporary on Site facilities (Offices, Telephones, Internet access, Plumbing, Electrical Power, lighting; Platforms, Fencing, Water), Jobsite and Home office overhead or other expenses; vehicles and fuel used for work otherwise included in the Contract Documents; Surveying; Estimating; Protection of Work; Handling and disposal fees; Final cleanup; Other incidental Work; Related warranties.

10) For added or deducted Work by subcontractors, the Contractor shall furnish to City the subcontractor's signed detailed estimate of the cost of labor, material and equipment, including the subcontractor markup for overhead and profit. The same requirement shall apply to sub-subcontractors.

11) For added or deducted work furnished by a vendor or supplier, the Contractor shall furnish to City a detailed estimate or quotation of the cost to the Contractor, signed by such vendor or supplier.

12) Any change in The Work involving both additions and deletions shall indicate a net total cost, including subcontracts and materials. Allowance for overhead and profit, as specified herein, shall be applied if the net total cost is an extra; overhead and profit allowances shall not be applied if the net total cost is a credit. The estimated cost of deductions shall be based on labor and material prices on the date the Contract was executed.

13) Contractor shall not reserve a right to assert impact costs, extended job site costs, extended overhead, constructive acceleration and/or actual

acceleration beyond what is stated in the change order for work. No claims shall be allowed for impact, extended overhead costs, constructive acceleration and/or actual acceleration due to a multiplicity of changes and/or clarifications. The Contractor may not change or modify City's change order form in an attempt to reserve additional rights.

14) If City disagrees with the proposal submitted by Contractor, it will notify the Contractor and City will provide its opinion of the appropriate price and/or time extension. If the Contractor agrees with City, a change order will be issued by City. If no agreement can be reached, City shall have the right to issue a unilateral change order setting forth its determination of the reasonable additions or savings in costs and time attributable to the extra or deleted work. Such determination shall become final and binding if the Contractor fails to submit a claim in writing to City within fifteen (15) Days of the issuance of the unilateral change order, disputing the terms of the unilateral change order.

15) No dispute, disagreement or failure of the parties to reach agreement on the terms of the change order shall relieve the Contractor from the obligation to proceed with performance of the work, including extra work, promptly and expeditiously.

16) Any alterations, extensions of time, extra work or any other changes may be made without securing consent of the Contractor's surety or sureties.

b. Contract Unit Prices

1) Increases more than twenty-five percent (25%) percent. Should the actual quantity of an item of work covered by a Contract Unit Price and constructed in conformance with the Plans and Specifications exceed the Bid quantity by more than twenty-five percent (25%), payment for the quantity in excess of one hundred twenty-five percent (125%) of the Bid quantity will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to by the Contractor and the City, or at the option of the Engineer, on the basis of the Extra Work per paragraph (a) above.

2) Decreases of more than twenty-five percent (25%). Should the actual quantity of an item of work covered by a Contract Unit Price, and constructed in conformance with Plans and Specifications, be less than seventy-five percent (75%) of the Bid quantity, an adjustment in payment will not be made unless so requested in writing by the Contractor. If the Contractor so requests, payment will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to by the Contractor and the City, or at the option of the Engineer, on the basis of the Extra Work per paragraph (a) above; however, in no case will payment be less than would be made for the actual quantity at the Contract Unit Price nor more than would be made for seventy-five percent (75%) of the Bid quantity at the Contract Unit Price.

c. Changes to Contract Time

1) The Contract Time may only be changed by a Change Order.

2) All changes in the Contract Price and/or adjustments to the Contract Times related to each change shall be included in Contractor's change order proposal described above. All Change Orders must state that the Contract Time is not changed or is either increased or decreased by a specific number of days. Failure to include a change to time shall waive any change to the Contract Time unless the parties mutually agree in writing to postpone a determination of the change to time resulting from the Change Order. No cost or time will be allowed for cumulative effects of multiple changes.

3) Notice of the amount of the request for adjustment in the Contract Time with supporting data shall be delivered within seven (7) Days after such start of occurrence. No extension of time or additional compensation shall be given for a delay if the Contractor failed to give notice in the manner and within the time prescribed.

4) Float is for the benefit of the Project. Float shall not be considered for the exclusive use or benefit of either the City or the Contractor. Any difference in time between the Contractor's early completion and the Contract Time shall be considered a part of the Project float. Contractor shall not be entitled to compensation, and the City will not compensate Contractor, for delays which impact early completion.

5) Contractor's entitlement to an extension of the Contract Time is limited to City-caused extension of the critical path, reduced by the Contractor's concurrent delays, and established by a proper time impact analysis. No time extension shall be allowed unless, and then only to the extent that, the City-caused delay extends the critical path beyond the previously approved Contract Time.

   (a) Contractor shall not be entitled to an adjustment in the Contract Time for delays within the control of Contractor. Delays attributable to and within the control of a subcontractor or supplier shall be deemed to be delays within the control of Contractor.

   (b) If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions (as determined by the City), Acts of God, acts or failures to act of utility owners not under the control of City, or other causes not the fault of and beyond control of the City and Contractor, then Contractor shall be entitled to an time extension when the affected Work is on the critical path. Such a non-compensable adjustment shall be Contractor's sole and exclusive remedy for such delays. Contractor must submit a timely request in accordance with the requirements of this Article.

6) Requests for Contract Extension: Contractor's justification for entitlement shall be clear and complete citing specific Contract Document references

and reasons on which Contractor's entitlement is based. At a minimum, each request for a time extension must include:

(a) Each request for an extension of Contract Time must identify the impacting event, in narrative form, providing a description of the delay event and sufficient justification as to why the Contractor is entitled to a time extension. Contractor must demonstrate that the delay arises from unforeseeable causes beyond the control and without the fault or negligence of both Contractor and any Subcontractors or Suppliers, or any other persons or organizations employed by any of them or for whose acts any of them may be liable, and that such causes in fact lead to performance or completion of the Work, or specified part in question, beyond the corresponding Contract Times, despite Contractor's reasonable and diligent actions to guard against those effects.

(b) Each request for an extension of Contract Time must include a time impact analysis in CPM format to calculate the impact of the delay event.

7) Contractor's failure, neglect, or refusal to comply with these requirements, or any portion thereof, shall bar Contractor's request for extensions of the Contract Time. Such failure, neglect, or refusal prejudices the City's ability to recognize and mitigate delay, and such failure, neglect, or refusal prevent the timely analysis of requests for extensions of Contract Time, and whether such extensions may be warranted. Contractor hereby waives all rights to extensions of Contract Time due to delays or accelerations that result from or occur during periods of time for which Contractor fails, neglects, or refuses to fully comply with the requirements of this Article.

ARTICLE 44. OCCUPANCY

City reserves the right to occupy or utilize any portion of The Work at any time before completion, and such occupancy or use shall not constitute Acceptance of any part of Work covered by this Contract. This use shall not relieve the Contractor of its responsibilities under the Contract.

ARTICLE 45. RECORD ("AS BUILT") DRAWINGS

a. Contractor shall prepare and maintain a complete set of record drawings (herein referred to as "as-builts") and shall require each trade to prepare its own as-builts. The as-builts must show the entire site for each major trade, including but not limited to water, sewer, electrical, data, telephone, cable, fire alarm, gas and plumbing. Contractor shall mark the as-builts to show the actual installation where the installation varies from the Work as originally shown. Contractor shall mark whichever drawings are most capable of showing conditions fully and where shop drawings are used, Contractor must record a cross-reference at the corresponding location on the contract drawings. Contractor shall give particular attention to concealed elements that would be difficult to measure and record at a later date. Contractor shall use colors to distinguish variations in separate categories of The Work.

b. Contractor shall note related change order, request for information , request for proposals, or Architect's Supplemental Instructions where applicable. Contractor shall organize as-builts into manageable sets, bound with durable paper cover sheets and shall print suitable title, dates and other identification on the cover of each set. Contractor to also provide an electronic version of the as-builts in .pdf or other approved format. The suitability of the as-builts will be determined by the Engineer.

ARTICLE 46. INDEMNIFICATION

Contractor shall defend (with counsel of City Council's choosing), indemnify and hold City, its officials, officers, agents, employees, and representatives free and harmless from any and all claims, demands, causes of action, costs, expenses, liabilities, losses, damages or injuries, in law or equity, regardless of whether the allegations are false, fraudulent, or groundless, to property or persons, including wrongful death, to the extent arising out of or incident to any acts, omissions or willful misconduct of Contractor, its officials, officers, employees, agents, consultants and contractors arising out of or in connection with the performance of the Work or this Contract, including claims made by subcontractors for nonpayment, including without limitation the payment of all consequential damages and attorneys fees and other related costs and expenses. To the fullest extent permitted by law, Contractor shall defend, at Contractor's own cost, expense and risk, with City Council's choosing, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against City, its officials, officers, agents, employees and representatives. To the extent of its liability, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against City, its officials, officers, employees, agents, employees and representatives, in any such suit, action or other legal proceeding. Contractor shall reimburse City, its officials, officers, agents, employees and representatives for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The only limitations on this provision shall be those imposed by Civil Code Section 2782.

ARTICLE 47. RESOLUTION OF CONSTRUCTION CLAIMS

a. Contractor shall timely comply with all notices and requests for additional compensation and extensions of time, including but not limited to all requirements of Article 43, as a prerequisite to filing any claim governed by this Article. The failure to timely submit a notice of delay or notice of change, or to timely a change to the Contract Price or Contract Time, or to timely provide any other notice or request required herein shall constitute a waiver of the right to further pursue the claim under the Contract or at law.

b. **Intent.** Effective January 1, 1991, Section 20104 et seq., of the California Public Contract Code prescribes a process utilizing informal conferences, non-binding judicial supervised mediation, and judicial arbitration to resolve disputes on construction claims of $375,000 or less. Effective January 1, 2017, Section 9204 of the Public Contract Code prescribes a process for negotiation and mediation to resolve disputes on construction claims. The intent of this Article is to implement Sections 20104 et seq. and Section 9204 of the California Public Contract Code. This Article shall be construed to be consistent with said statutes.

c. **Claims.** For purposes of this Article, "Claim" means a separate demand by the Contractor, after a change order duly requested in accordance with Article 49 has been denied by the City, for (1) a time extension, (2) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract, or (3) an amount the payment of which is disputed by the City. A "Claim" does not include any demand for payment for which the Contractor has failed to provide notice, request a change order, or otherwise failed to follow any procedures contained in the Contract Documents.

d. **Filing Claims.** Claims governed by this Article may not be filed unless and until the Contractor completes all procedures for giving notice of delay or change and for the requesting of a time extension or change order, including but not necessarily limited to the procedures contained in Article 49, and Contractor's request for a change has been denied in whole or in part. Claims governed by this Article must be filed no later than fourteen (14) days after a request for change has been denied in whole or in part or after any other event giving rise to the Claim. Any claim must be submitted in writing to the City and shall include on its first page the following in 16 point capital font: "THIS IS A CLAIM." Furthermore, the claim shall include the documents necessary to substantiate the claim. Nothing herein is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims, including all requirements pertaining to compensation or payment for extra work, disputed work, and/or changed conditions. Failure to follow such contractual requirements shall bar any claims or subsequent lawsuits for compensation or payment thereon.

e. **Supporting Documentation.** The Contractor shall submit all Claims in the following format:

1) Summary of claim merit and price, and Contract clause pursuant to which the claim is made.

2) List of documents relating to claim

(a) Specifications

(b) Drawings

(c) Clarifications (Requests for Information)

(d) Schedules

(e) Other

3) Chronology of events and correspondence

4) Narrative analysis of claim merit

5) Analysis of claim cost, including calculations and supporting documents

6) Analysis of time impact analysis in CPM format if a time extensions is requested

7) Cover letter and certification of validity of the claim, including any claims from subcontractors of any tier, in accordance with the Government Code sections 12650 et seq.

f. City Response to Claim.

1) Upon receipt of a Claim pursuant to this Article, the City shall conduct a reasonable review of the Claim and, within a period not to exceed 45 days of receipt of the claim, or as extended by mutual agreement, shall provide a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Any payment due on an undisputed portion of the Claim will be processed and made within 60 days after the City issues its written response.

2) If the City needs approval from City Council to provide Contractor a written statement as set forth above, and City Council does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a Claim, the City shall have up to three (3) days following the next publicly noticed meeting of City Council after the 45-day period, or extension, expires to provide Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim.

3) The City may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the City may have. If additional information is needed thereafter, it shall be provided upon mutual agreement of the City and the claimant. The City's written response shall be submitted 30 days (15 days if the Claim is less than $50,000) after receiving the additional documentation, or within the same period of time taken by the claimant to produce the additional information, whichever is greater.

g. Meet & Confer Conference. If the Contractor disputes the City's response, or if the City fails to respond within the statutory time period(s), the Contractor may so notify the City within 15 days of the receipt of the response or the failure to respond, and demand an informal conference to meet and confer for settlement of those portions of the Claim that remain in dispute. Upon such demand, the City shall schedule a meet and confer conference within 30 Days.

h. Mediation. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion thereof remains in dispute, the City shall provide the Contractor with a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 Days after the City issues its written statement. Any portion of the claim that remains in dispute shall be submitted to nonbinding mediation and the City and the Contractor shall equally share the associated mediator fees. The City and Contractor shall mutually agree to a mediator within 10 business Days after the disputed portion of

the claim has been identified in writing, unless the parties agree to select a mediator at a later time.

1) If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.

2) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

3) Unless otherwise agreed to by the public entity and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

4) The mediation shall be held no earlier than the date the Contractor completes the Work or the date that the Contractor last performs Work, whichever is earlier. All unresolved claims shall be considered jointly in a single mediation, unless a new unrelated claim arises after mediation is completed.

i. **Procedures After Mediation.** If following the mediation, the claim or any portion remains in dispute, the Contractor must file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code prior to initiating litigation. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits his or her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference.

j. **Civil Actions.** The following procedures are established for all civil actions filed to resolve Claims of $375,000 or less:

1) Within 60 Days, but no earlier than 30 Days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties or unless mediation was held prior to commencement of the action in accordance with Public Contract Code section 9204 and the terms of this Agreement. The mediation process shall provide for the selection within 15 Days by both parties of a disinterested third person as mediator, shall be commenced within 30 Days of the submittal, and shall be concluded within 15 Days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court.

2) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1114.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration. In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, (A) arbitrators shall, when possible, be experienced in construction law, and (B) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.

k. **Government Code Claim.**

1) In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, construction claims and/or changed conditions, the Contractor must comply with the claim procedures set forth in Government Code section 900 et seq. prior to filing any lawsuit against the City.

2) Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, construction claims, and/or changed conditions have been followed by Contractor. If no such Government Code claim is submitted, or if the prerequisite contractual requirements are not otherwise satisfied as specified herein, Contractor shall be barred from bringing and maintaining a valid lawsuit against the City.

3) **A Government Code claim must be filed no earlier than the date the Work is completed or the date the Contractor last performs Work on the Project, whichever occurs first. A Government Code claim shall be inclusive of all unresolved claims known to Contractor or that should reasonably by known to Contractor excepting only new unrelated Claims that arise after the Government Code claim is submitted.**

l. **Non-Waiver.** The City's failure to respond to a claim from the Contractor within the time periods described in this Article or to otherwise meet the time requirements of this Article shall result in the claim being deemed rejected in its entirety.

ARTICLE 48. CITY'S RIGHT TO TERMINATE CONTRACT

a. Termination for Cause. City may, without prejudice to any other right or remedy, serve written notice upon Contractor of its intention to terminate this Contract in whole or in part if the Contractor: (i) refuses or fails to prosecute The Work or any part thereof with such diligence as will ensure its completion within the time

required; (ii) fails to complete The Work within the required time; (iii) should file a bankruptcy petition or be adjudged a bankrupt; (iv) should make a general assignment for the benefit of its creditors; (v) should have a receiver appointed; (vi) should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials to complete the work; (vii) should fail to make prompt payment to subcontractors or for material or labor; (viii) persistently disregard laws, ordinances, other requirements or instructions of City; or (ix) should violate any of the provisions of the Contract Documents.

The notice of intent to terminate shall contain the reasons for such intention to terminate. Unless within ten (10) Days after the service of such notice, such condition shall cease or satisfactory arrangements (acceptable to City) for the required correction are made, this Contract shall be terminated. In such case, Contractor shall not be entitled to receive any further payment until the Project has been finished. City may take over and complete The Work by any method it may deem appropriate. Contractor and its surety shall be liable to City for any excess costs or other damages incurred by City to complete the Project. If City takes over The Work, City may, without liability for so doing, take possession of and utilize in completing The Work such materials, appliances, plant, and other property belonging to the Contractor as may be on the Project site.

b. Termination For Convenience. City may terminate performance of The Work in whole or, in part, if City determines that a termination is in City's interest.

The Contractor shall terminate all or any part of The Work upon delivery to the Contractor of a Notice of Termination specifying that the termination is for the convenience of City, the extent of termination, and the effective date of such termination.

After receipt of Notice of Termination, and except as directed by City, the Contractor shall, regardless of any delay in determining or adjusting any amounts due under this Termination for Convenience clause, immediately proceed with the following obligations:

1) Stop Work as specified in the Notice.

2) Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality called for under the Contract Documents.

3) Leave the property upon which the Contractor was working and upon which the facility (or facilities) forming the basis of the Contract Documents is situated in a safe and sanitary manner such that it does not pose any threat to the public health or safety.

4) Terminate all subcontracts to the extent that they relate to the portions of The Work terminated.

5) Place no further subcontracts or orders, except as necessary to complete the remaining portion of The Work.

6) Submit to City, within ten (10) Days from the effective date of the Notice of Termination, all of the documentation called for by the Contract Documents to substantiate all costs incurred by the Contractor for labor, materials and equipment through the Effective Date of the Notice of Termination. Any documentation substantiating costs incurred by the Contractor solely as a result of City's exercise of its right to terminate this Contract pursuant to this clause, which costs the Contractor is authorized under the Contract Documents to incur, shall: (i) be submitted to and received by City no later than thirty (30) Days after the Effective Date of the Notice of Termination; (ii) describe the costs incurred with particularity; and (iii) be conspicuously identified as "Termination Costs Occasioned by City's Termination for Convenience."

7) These provisions are in addition to and not in limitation of any other rights or remedies available to City.

c. Savings Clause. If City terminates Contractor for cause, and if it is later determined that the termination was wrongful, such default termination shall automatically be converted to and treated as a termination for convenience. In such event, Contractor shall be entitled to receive only the amounts payable under this section, and Contractor specifically waives any claim for any other amounts or damages, including, but not limited to, any claim for consequential damages or lost profits.

d. Exception. Notwithstanding any other provision of this Article, when immediate action is necessary to protect life and safety or to reduce significant exposure or liability, City may immediately order Contractor to cease Work on the Project until such safety or liability issues are addressed to the satisfaction of City or the Contract is terminated.

ARTICLE 49. WARRANTY AND GUARANTEE

a. Contractor warrants that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract Documents; and that all Work conforms to the Contract Document requirements and is free of any defect whether performed by the Contractor or any subcontractor or supplier.

b. Unless otherwise stated, all warranty periods shall begin upon the filing of the Notice of Completion. Unless otherwise stated, the warranty period shall be for one year.

c. The Contractor shall remedy at its expense any damage to City-owned or controlled real or personal property.

d. Contractor shall furnish City with all warranty and guarantee documents prior to final Acceptance of the Project by City.

e. City shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. The Contractor shall within ten (10) Days after being notified commence and perform with due diligence all necessary Work. If the Contractor fails to promptly remedy any defect, or damage; the City

have the right to replace, repair, or otherwise remedy the defect, or damage at the Contractor's expense.

f. In the event of any emergency constituting an immediate hazard to health, safety, property, or licensees, when caused by Work of the Contractor not in accordance with the Contract requirements, City may undertake at Contractor's expense, and without prior notice, all Work necessary to correct such condition.

g. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for Work performed and Materials furnished under this Contract, the Contractor shall:

1) Obtain for City all warranties that would be given in normal commercial practice;

2) Require all warranties to be executed, in writing, for the benefit of City; and

3) Enforce all warranties for the benefit of City, unless otherwise directed in writing by City.

This Article shall not limit City's rights under this Contract or with respect to latent defects, gross mistakes, or fraud. City specifically reserves all rights related to defective work, including but not limited to the defect claims pursuant to California Code of Civil Procedure Section 337.15.

ARTICLE 50. DOCUMENT RETENTION & EXAMINATION

a. In accordance with Government Code Section 8546.7, records of both City and the Contractor shall be subject to examination and audit by the State Auditor General for a period of three (3) years after final payment.

b. Contractor shall make available to City any of the Contractor's other documents related to the Project immediately upon request of City.

c. In addition to the State Auditor rights above, City shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including computations and projections) related to negotiating, pricing, or performing the modification in order to evaluate the accuracy and completeness of the cost or pricing data at no additional cost to City, for a period of four (4) years after final payment.

ARTICLE 51. SOILS INVESTIGATIONS

When a soils investigation report for the Project site is available, such report shall not be a part of the Contract Documents. Any information obtained from such report as to subsurface soil condition, or to elevations of existing grades or elevations of underlying rock, is approximate only and is not guaranteed. Contractor acknowledges that any soils investigation report (including any borings) was prepared for purposes of <u>design only</u> and Contractor is required to examine the site before submitting its bid and must make whatever tests it deems appropriate to determine the underground condition of the soil.

ARTICLE 52. SEPARATE CONTRACTS

a. City reserves the right to let other contracts in connection with this Work or on the Project site. Contractor shall permit other contractors reasonable access and storage of their materials and execution of their work and shall properly connect and coordinate its Work with theirs.

b. To ensure proper execution of its subsequent Work, Contractor shall immediately inspect work already in place and shall at once report to the Engineer any problems with the work in place or discrepancies with the Contract Documents.

c. Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by City in prosecution of the Project to the end that Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy at site of the Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project. If simultaneous execution of any contract for the Project is likely to cause interference with performance of some other contract or contracts, the Engineer shall decide which Contractor shall cease Work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously. City shall not be responsible for any damages suffered or for extra costs incurred by Contractor resulting directly or indirectly from award, performance, or attempted performance of any other contract or contracts on the Project site.

ARTICLE 53. NOTICE AND SERVICE THEREOF

All notices shall be in writing and either served by personal delivery or mailed to the other party as designated in the Bid Forms. Written notice to the Contractor shall be addressed to Contractor's principal place of business unless Contractor designates another address in writing for service of notice. Notice to City shall be addressed to City as designated in the Notice Inviting Bids unless City designates another address in writing for service of notice. Notice shall be effective upon receipt or five (5) Days after being sent by first class mail, whichever is earlier. Notice given by facsimile shall not be effective unless acknowledged in writing by the receiving party.

ARTICLE 54. NOTICE OF THIRD PARTY CLAIMS

Pursuant to Public Contract Code Section 9201, City shall provide Contractor with timely notification of the receipt of any third-party claim relating to the Contract.

ARTICLE 55. STATE LICENSE BOARD NOTICE

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within ten (10) years of the date of the alleged violation. Any questions concerning a contractor may be

referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.

ARTICLE 56. INTEGRATION

a. Oral Modifications Ineffective. No oral order, objection, direction, claim or notice by any party or person shall affect or modify any of the terms or obligations contained in the Contract Documents.

b. Contract Documents Represent Entire Contract. The Contract Documents represent the entire agreement of City and Contractor.

ARTICLE 57. ASSIGNMENT

Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this Contract or any part thereof including any claims, without prior written consent of City. Any assignment without the written consent of City shall be void. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or Material supplied for performance of Work called for under the Contract Documents in favor of all persons, firms, or corporations rendering such services or supplying such Materials to the extent that claims are filed pursuant to the Civil Code, the Code of Civil Procedure or the Government Code.

ARTICLE 58. CHANGE IN NAME AND NATURE OF CONTRACTOR'S LEGAL ENTITY

Should a change be contemplated in the name or nature of the Contractor's legal entity, the Contractor shall first notify City in order that proper steps may be taken to have the change reflected on the Contract.

ARTICLE 59. ASSIGNMENT OF ANTITRUST ACTIONS

Pursuant to Section 7103.5 of the Public Contract Code, in entering into a public works contract or subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractor offers and agrees to assign to City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (chapter 2 (commencing with Section 16700) of part 2 of division 7 of the Business and Professions Code), arising from the purchase of goods, services, or materials pursuant to this Contract or any subcontract. This assignment shall be made and become effective at the time City makes final payment to the Contractor, without further acknowledgment by the parties.

ARTICLE 60. PROHIBITED INTERESTS

No City official or representative who is authorized in such capacity and on behalf of City to negotiate, supervise, make, accept, or approve, or to take part in negotiating, supervising, making, accepting or approving any engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the project, shall be or become directly or indirectly interested financially in the Contract.

ARTICLE 61. LAWS AND REGULATIONS

a. Contractor shall give all notices and comply with all federal, state and local laws, ordinances, rules and regulations bearing on conduct of work as indicated and specified by their terms. References to specific laws, rules or regulations in this Contract are for reference purposes only, and shall not limit or affect the applicability of provisions not specifically mentioned. If Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the Engineer in writing and any necessary changes shall be adjusted as provided for in this Contract for changes in work. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall bear all costs arising therefrom.

b. Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 U.S.C. § 12101 et seq.). The Work will be performed in compliance with ADA regulations.

ARTICLE 62. PATENT FEES OR ROYALTIES

The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work. Contractor shall assume all liability and responsibility arising from the use of any patented, or allegedly patented, materials, equipment, devices or processes used in or incorporated with The Work, and shall defend, indemnify and hold harmless City, its officials, officers, agents, employees and representatives from and against any and all liabilities, demands, claims, damages, losses, costs and expenses, of whatsoever kind or nature, arising from such use.

ARTICLE 63. OWNERSHIP OF DRAWING

All Contract Documents furnished by City are City property. They are not to be used by Contractor or any subcontractor on other work nor shall Contractor claim any right to such documents. With exception of one complete set of Contract Documents, all documents shall be returned to City on request at completion of The Work.

ARTICLE 64. NOTICE OF TAXABLE POSSESSORY INTEREST

In accordance with Revenue and Taxation Code Section 107.6, the Contract Documents may create a possessory interest subject to personal property taxation for which Contractor will be responsible.

END OF GENERAL CONDITIONS

SECTION 00750
SPECIAL CONDITIONS

1. SPECIFIC MATERIALS

City has made the following findings as they relate to need for the use of specific material(s), product(s), thing(s), and/or service(s) that must be utilized for the Project:

Pursuant to Public Contract Code Section 3400, the City makes finding (2) In order to match other products in use on a particular public improvement either completed or in the course of completion.

Based on the above described findings, City requires that the following specific product(s), thing(s), and/or service(s) be utilized for the Project:

a. Drinking Fountains shall be Most Dependable Fountains, Inc., model 10155SM

b. Outdoor Exercise equipment shall be per specified type per Greenfields Outdoor Fitness, Inc.

c. Play equipment (Drum and Chimes Rhapsody Equipment) shall be as manufactured by Landscape Structures, Inc.

d. Play equipment (Custom Play Structure with Custom Shade Structure) shall be as manufactured by Landscape Structures, Inc.

e. Play equipment (Swingset) shall be as manufactured by GameTime.12

f. Play equipment (Mast Net) shall be as manufactured by Dynamo.

2. NOT USED

3. STORMWATER SPECIFICATIONS

City has not prepared a SWPPP or other stormwater compliance plan for the Project site. Contractor is responsible for filing the PRDs and for obtaining coverage under the Permit. This includes preparing and implementing a SWPPP for the Project site, and coordinating all submittals with the City's Legally Responsible Person and Authorized Signatory as those terms are defined in the Permit. Before any PRDs, SWPPP, or other Permit related document may be submitted to the State Board or implemented on the Project site, it must first be reviewed by the City, who retains the right to reject or require revisions thereto. If the Project is less than one acre in size, Contractor is still required to develop and implement an Erosion and Sediment Control Plan for the Work site. Contractor must include all costs of compliance with specified requirements in the Contract amount.

4. PRE-CONSTRUCTION MEETING.

After, or upon, notification of Contract Award, the Engineer will set the time and location for the Pre-Construction Meeting. Attendance of the Contractor's management personnel responsible for the management, administration, and execution of the project is mandatory for the meeting to be convened. Failure of the Contractor to have the Contractor 's responsible project personnel

attend the Pre-Construction Meeting will be grounds for default by Contractor. No separate payment will be made for the Contractor 's attendance at the meeting. The Notice to Proceed will only be issued on or after the completion of the Pre-Construction meeting.

5. MODIFICATION OF HOURS OF WORK

The Contractor's activities shall be confined to Monday through Friday, excluding City holidays and weekends. The Contractor's activities shall be confined to the hours between 7:00 a.m. and 5:00 p.m. Working hours on arterial streets, including closure of travel lanes, will be allowed only between the hours of 9:00 a.m. and 3:00 p.m. Deviation from these hours will not be permitted without written request and the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property. In the event of either a requested, or emergency deviation, inspection service fees will be charged against the Contractor. The service fees will be calculated at overtime rates, including benefits, overhead, and travel time. The service fees will be deducted from any amounts due the Contractor.

6. STREET CLOSURES, DETOURS, BARRICADES

Existing electrical systems (traffic signal, highway and street lighting, flashing beacon, sign illumination and other facilities), or approved temporary replacements thereof, shall be kept in effective operation for the benefit of the traveling public during the progress of the work, except when shutdown is permitted to allow for alterations or final removal of the systems. The traffic signal shutdowns shall be limited to normal working hours, or shall be as specified in the special provisions. Lighting system shutdowns shall not interfere with the regular lighting schedule, unless otherwise permitted by the Engineer. The Contractor shall notify the Engineer prior to performing any work on existing systems.

The Contractor shall notify the City prior to any operational shutdown of a traffic signal. The City will:

1. Continue the operation and maintenance of existing electrical facilities.

2. Continue to provide for electrical energy for the operation of existing electrical facilities.

3. Repair or replace existing facilities damaged by public traffic.

4. Pay the cost of electrical energy for the operation of existing or new facilities that are undergoing the functional tests.

The Contractor shall ascertain the exact location and depth of existing detectors, conduits, pull boxes and other electrical facilities before using any tools or equipment that may damage those facilities or interfere with any electrical system.

Where damage is caused by the Contractor's operations, the Contractor shall, at the Contractor's expense, repair or replace damaged facilities promptly in conformance with these specifications. If any existing loop conductor, including the portion leading to the detector handhole or termination pull box, is damaged by the contractor's operations, the Contractor shall immediately notify the Engineer. The affected detectors shall be replaced at the Contractor's expense and as directed

by the Engineer within 24 hours. If the Contractor fails to complete the repairs within this period, the repairs will be made by the City at the Contractor's expense.

Should the Contractor fail to perform the required repairs or replacements, the cost of performing the repairs or replacements will be deducted from any moneys due or to become due to the Contractor.

Where roadways are to remain open to traffic and existing lighting systems are to be modified, the lighting systems shall remain in operation and the final connection to the modified circuit shall be made so that the modified circuit will be in operation by nightfall of the same day.

Temporary electrical installations shall be kept in effective operation until the temporary installations are no longer required for the traveling public.

During traffic signal system shutdown the Contractor shall place "STOP AHEAD" and "STOP" signs to direct vehicle and pedestrian traffic through the intersection. All signal faces shall be covered when the system is shutdown overnight. Temporary "STOP AHEAD" and "STOP" signs shall be either covered or removed when the system is turned on.

"STOP AHEAD" and "STOP" signs shall be furnished by the Contractor and shall conform to the provisions in Caltrans Standard Specification section 12-3.06, "Construction Area Signs." Minimum size of "STOP" signs shall be 30 inches.

One "STOP AHEAD" sign and one "STOP" sign shall be placed for each direction of traffic. For two-lane approaches, 2 "STOP" signs shall be placed. Location of the signs shall be as directed by the Engineer.

Barricades shall be equipped with flashing warning lights. All power required devices shall be operated by batteries, rather than generators.

Street closures will not be allowed, except as specifically permitted by the Engineer. Traffic control shall be approved by the Engineer.

Lane transitions shall conform to the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD).

Temporary traffic channelization shall be accomplished with barricades or delineators. Temporary striping will not be allowed unless specifically permitted by the Engineer. The Contractor shall prepare any plans that may be required for temporary striping to the satisfaction of the Engineer. In no event will temporary striping be allowed on finished pavement surfaces, which are to remain. The Contractor shall prepare any traffic control or detour plans that may be required as directed by the Engineer. The Contractor shall submit Traffic Control Plans for all work on arterial roads, prepared and signed by a California Registered Civil or Traffic Engineer at least ten (10) working days prior to commencing work.

The Contractor shall schedule an employee to police the temporary delineators and barricades within the travel way during weekday, nonworking hours, and over Saturdays, Sundays, and

holidays. Any corrective work required to be done by City forces shall be back charged to the Contractor based on the actual costs, plus City overhead and withheld from the final payment.

All costs to the Contractor for street closures, detours, barricades, and associated plans shall be included in various lump sum contract bid items, and no separate payment will be made therefore.

7. SURVEY CONTROL AND REFERENCE POINTS

Prior to the start of construction, the Contractor (its licensed surveyor or qualified engineer) shall locate all monuments (both of record and not of record), bench marks, and centerline ties within one hundred feet of the construction activity. Additional ties to monuments shall be set when ties are missing (min. four ties per monument). The Contractor shall prepare and submit for review to the City Engineer separate tie sheets and Corner Record sheets (monuments not of record shall have only tie sheets prepared). Corner Records shall conform to the County Engineers' Association of California's "Guide to the Preparation of Records of Survey and Corner Records" document as provided by the County of Orange Land Surveyor's Office and on file in the City of Lake Forest City Engineers Office. Upon review by the City Engineer, the Contractor shall file the Corner Records with the County of Orange Land Surveyor's Office. Certified Corner Records shall be filed with the City Engineer. Prior to final Acceptance by the City, the Contractor shall re-survey all field monuments and centerline ties within the construction zone, prepare tie sheets and corner record sheets as indicated above, and file them with the City Engineer for review. After review by the City Engineer, the land surveyor shall file the corner records with the County Land Surveyors Office, and file certified copies of the corner records with the City Engineer.

All survey monuments removed or altered as a result of construction shall be reset, corner records shall be filed with the County of Orange Land Surveyor's Office, and approved final corner records shall be filed with the City Engineer. Centerline ties removed as a result of construction shall be reset and tie sheets filed with the City Engineer.

Contractor shall provide a letter of certification for all monuments having four or more existing ties which are within 0.02 ft plus or minus of the original City tie sheet records. When several monuments and ties appear on one tie sheet and one of the ties has changed the land surveyor shall re-measure all of the ties and re-file a new ties sheet with the City as required herein.

County of Orange permanent and temporary bench marks within the construction zone shall be located by survey, and the Contractor shall send a written notification of impending construction to the County of Orange Land Surveyor's Office two weeks prior to construction.

8. SUBSTITUTIONS

Whenever materials or equipment are specified or described in the Drawings or Specifications by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, the name shall be deemed to be followed by the words "or approved equivalent" and materials or equipment of other suppliers may be accepted by OWNER if sufficient information is submitted by CONTRACTOR to allow OWNER to determine that the material or equipment proposed is equivalent to that named.

Requests for review of substitute items of material and equipment will not be accepted by OWNER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to OWNER for acceptance of the substitute, certifying that the proposed item will perform adequately the functions called for by the general design, be similar and of equal substance to that specified, and be suited to the same use and capable of performing the same function as that specified. The application shall state whether or not acceptance of the substitute for use in the Work will require a change in the drawings or specifications to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair, and replacement service shall be indicated. The application shall also contain an itemized estimate of all increases or decreases in (1) the cost of, or the time required to perform any part of the Work, and the corresponding adjustments in the Contract Price and the Contract Time, resulting directly or indirectly from evaluation and acceptance of the proposed substitute, including, but not as a way of limitation, costs and delays associated with redesign, or claims of other contractors affected by the resulting substitute; and (2) increases or decreases in operating, maintenance, repair, replacement, or spare part costs, all of which will be considered by OWNER in evaluating the proposed substitute. OWNER may require CONTRACTOR to furnish, at CONTRACTOR's expense, additional data about the proposed substitute. OWNER may charge the CONTRACTOR for the cost of the review by the OWNER's personnel, Design Engineer, Construction Manager and/or other sub-consultants the OWNER may use to evaluate a substitution.

OWNER shall be the sole judge of acceptability, and no substitute shall be ordered or installed without OWNER's prior written acceptance.

CONTRACTOR assumes sole responsibility for verifying that the proposed substitute items are in accordance with the requirements of the Contract Documents, and that the dimensions, arrangement, design and construction details, and all other features of substitute items are suitable for their intended purpose.

In the event that a substitute item differs materially from the specified item of material or equipment, and said difference was not expressly identified in CONTRACTOR's request for the substitution, or the incorporation of the substitute into the Work results in a change(s) to the Work or in the function or general design of the project, which was not expressly identified in CONTRACTOR's request for the substitution, OWNER may require the removal and replacement of the substitute at CONTRACTOR's sole expense.

CONTRACTOR may only requests substitutions of equivalent items prior to the time of Bid as listed on the bid documents. CONTRACTOR must submit data substantiating the substitution request **no less than 2 weeks prior to the bid opening for the following items:**

- **Shade Structures**
- **Pre-fabricated Restroom**
- **Synthetic Turf**
- **Resilient Playground Surfacing**
- **Dog Park Agility Equipment**
- **Lighting**

Under no circumstances shall CONTRACTOR be entitled to an increase in Contract Time as a result of the submission or review of a substitution request.

9. SCHEDULE OF VALUES

Prepare a SCHEDULE OF VALUES for all Lump Sum ("LS") Bid Items included in the electronic Bid Schedule. The following list is of the minimum number of bid items required within your SCHEDULE OF VALUES, however a full listing of subcategories within each major category will be utilized to determine the percentage of work completed for progress payment purposes:

1.0 **MOBILIZATION**
2.0 **GRADING IMPROVEMENT**
3.0 **UTILITY IMPROVEMENTS**
4.0 **EROSION CONTROL**
5.0 **SITE LIGHTING/ ELECTRICAL**
6.0 **HARDSCAPE/ BUILDINGS**
7.0 **FENCING/ METAL WORK**
8.0 **SITE FURNISHINGS**
9.0 **IRRIGATION**
10.0 **LANDSCAPE**
11.0 **90-DAY MAINTENANCE**
12.0 Additive Alternative Lighting (if applicable)

SCHEDULE OF VALUES shall be subject to review and approval of Construction Manager and City. Upon execution of the Agreement, approved SCHEDULE OF VALUES will become a part of the Contract Documents. Each Application for Payment shall include an updated SCHEDULE OF VALUES and will be the basis upon which payments are made.

It is the Contractor's responsibility to construct the entire park as described in the project documents. The SCHEDULE OF VALUES shall include full compensation for furnishing all labor, materials, tools and equipment and for doing all work required to construction the park.

The general intention of the SCHEDULE OF VALUES is to provide a reasonable methodology to make progress payments to the contractor for the work they have performed. In general, a percentage of work completed as described in the SCHEDULE OF VALUES will be used for progress payments. The percentage will be based on actual work performed and agreed upon between the Contractor and the Construction Manager and approved by the City. The City may pay up to 50 percent for materials delivered on-site, but not yet incorporated into the project.

Throughout the Technical Specifications there are various standard measurement and payment clauses. These are intended to define standard practice, however the SCHEDULE OF VALUES as approved by the City will be the basis for payment.

10. CONTRACTOR QUALIFICATIONS

The General Contractor shall have the following qualifications:

a. Have successfully completed not less than three (3) projects, each of a scope equal to or greater than this project, within the last five (5) years.

b. Submit to the Owner, with his formal bid, a list of at least three (3) projects complete with names, addresses and telephone numbers, of the Landscape Architect/Engineer and the Owner's representative. Include a brief description of the park facilities including size and scope, list of subcontractors (if any), and the date of completion.

c. Be capable of furnishing as a separate bid, labor, material, and performance bonds.

d. The Owner will determine if the Contractor is qualified to propose to work on this project and may refuse any bid.

The Contractor, by submitting a bid, acknowledges that he understands the scope and has successfully performed similar work in nature and scale as shown within the bid documents.

END OF SPECIAL CONDITIONS

APPENDIX
INSURANCE REQUIREMENTS

1. WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

Contractor shall maintain Workers' Compensation Insurance (Statutory Limits) and Employer's Liability Insurance (with limits of at least $1,000,000) for Contractor 's employees in accordance with the laws of the State of California, Section 3700 of the Labor Code In addition, Contractor shall require each subcontractor to similarly maintain Workers' Compensation Insurance and Employer's Liability Insurance in accordance with the laws of the State of California, Section 3700 for all of the subcontractor's employees.

Contractor shall submit to City, along with the certificate of insurance, a Waiver of Subrogation endorsement in favor of City, its officials, officers, employees, agents, and volunteers. Company or companies providing insurance coverage shall be acceptable to City, if in the form and coverage as set forth in the Contract Documents.

2. COMMERCIAL GENERAL LIABILITY INSURANCE

a. Contractor shall procure and maintain during the life of this Contract and for such other period as may be required herein, at its sole expense, occurrence form Commercial General Liability insurance coverage, at least as broad as the most current ISO CGL Form 00 01 including but not limited to, premises liability, contractual liability, products/completed operations if applicable, personal and advertising injury which may arise from or out of Contractor's operations, use, and management of the Project site, or the performance of its obligations hereunder. Policy limits shall not be less than $2,000,000 per occurrence, $4,000,000 general aggregate, for bodily injury, personal injury and property damage, including without limitation, blanket contractual liability, and a $4,000,000 completed operations aggregate. Defense costs shall be paid in addition to the limits.

b. Such policy shall comply with all the requirements of this Article. The limits set forth herein shall apply separately to each insured against whom claims are made or suits are brought, except with respect to the limits of liability. Further the limits set forth herein shall not be construed to relieve the Contractor from liability in excess of such coverage, nor shall it limit Contractor's indemnification obligations to City, and shall not preclude City from taking such other actions available to City under other provisions of the Contract Documents or law.

c. Contractor shall make certain that any and all subcontractors hired by Contractor are insured in accordance with this Contract. If any subcontractor's coverage does not comply with the foregoing provisions, Contractor shall indemnify and hold City harmless from any damage, loss, cost, or expense, including attorneys' fees, incurred by City as a result thereof.

d. All general liability policies provided pursuant to the provisions of this Article shall comply with the provisions of the Contract Documents.

e. All general liability policies shall be written to apply to all bodily injury, including death, property damage, personal injury, owned and non-owned equipment,

blanket contractual liability, completed operations liability, explosion, collapse, under-ground excavation, removal of lateral support, and other covered loss, however occasioned, occurring during the policy term, and shall specifically insure the performance by Contractor of that part of the indemnification contained in these General Conditions, relating to liability for injury to or death of persons and damage to property. If the coverage contains one or more aggregate limits, a minimum of 50% of any such aggregate limit must remain available at all times; if over 50% of any aggregate limit has been paid or reserved, City may require additional coverage to be purchased by Contractor to restore the required limits. Any umbrella or excess liability policy shall include the additional insured endorsement described in the Contract Documents.

3. AUTOMOBILE LIABILITY INSURANCE

Contractor shall take out and maintain at all times during the term of this Contract Automobile Liability Insurance at least as broad as ISO CA 00 01 (Any Auto) covering bodily injury and property damage for all activities of the Contractor arising out of or in connection with Work to be performed under these Contract Documents, including coverage for any owned, hired, non-owned or rented vehicles, in an amount not less than $1,000,000 combined single limit for each accident. Such insurance shall be provided in a form and with insurance companies acceptable to City and comply with the provisions of Section 6 below.

4. UMBRELLA OR EXCESS LIABILITY INSURANCE.

Contractor shall obtain and maintain an umbrella or excess liability insurance policy with limits of not less than $4,000,000 that will provide bodily injury, personal injury and property damage liability coverage at least as broad as the primary coverages set forth above, including commercial general liability and employer's liability. Such policy or policies shall include the following terms and conditions:

a. A drop down feature requiring the policy to respond in the event that any primary insurance that would otherwise have applied proves to be uncollectable in whole or in part for any reason;

b. Pay on behalf of wording as opposed to reimbursement;

c. Concurrency of effective dates with primary policies; and

d. Policies shall "follow form" to the underlying primary policies.

e. Insureds under primary policies shall also be insureds under the umbrella or excess policies.

5. NOT USED

6. FORM AND PROOF OF CARRIAGE OF INSURANCE

a. Any insurance carrier providing insurance coverage required by the Contract Documents shall be admitted to and authorized to do business in the State of

California unless waived, in writing, by City's Risk Manager. Carrier(s) shall have an A.M. Best rating of not less than an A-:VII.

b. Insurance deductibles or self-insured retentions must be declared by the Contractor, and such deductibles and retentions shall have the prior written consent from City. At the election of City the Contractor shall either 1) reduce or eliminate such deductibles or self-insured retentions, or 2) procure a bond which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.

c. Contractor shall cause its insurance carrier(s) to furnish City with either 1) a properly executed original Certificates(s) of Insurance and certified original copies of Endorsements effecting coverage as required herein, or 2) if requested to do so in writing by City's Risk Manager, provide original Certified copies of policies including all Endorsements and all attachments thereto, showing such insurance is in full force and effect. All required policies of Commercial General Liability, Automobile Liability insurance shall be endorsed to name the City, its officials, officers, employees, agents and volunteers as additional insureds. For all policies of Commercial General Liability insurance, Contractor shall provide endorsements in the form of ISO CG 20 10 10 01 and 20 37 01 01 (or endorsements providing the exact same coverage) to effectuate this requirement. Further, all policies of insurance shall contain or shall be endorsed to contain the covenant of the insurance carrier(s) that shall provide no less than thirty (30) days written notice be given to City prior to any material modification or cancellation of such insurance.

d. In the event of a material modification or cancellation of coverage, City may terminate or Stop Work pursuant to the Contract Documents, unless City receives, prior to such effective date, another properly executed original Certificate of Insurance and original copies of endorsements or certified original policies, including all endorsements and attachments thereto evidencing coverages set forth herein and the insurance required herein is in full force and effect. Contractor shall not take possession, or use the Project site, or commence operations under these Contract Documents until City has been furnished original Certificate(s) of Insurance and certified original copies of Endorsements or policies of insurance including all Endorsements and any and all other attachments as required in this Section. The original Endorsements for each policy and the Certificate of Insurance shall be signed by an individual authorized by the insurance carrier to do so on its behalf.

e. All required insurance coverages shall contain or be endorsed to waive subrogation against the City, its officials, officers, employees, agents, and volunteers or shall specifically allow Contractor or others providing insurance evidence in compliance with these specifications to waive their right of recovery prior to a loss. Contractor hereby waives its own right of recovery against City, and shall require similar written express waivers and insurance clauses from each of its Subcontractors.

f. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and City's insurance and/or deductibles and/or self-insured

retentions or self-insured programs shall not be construed as contributory. The Contractor shall provide endorsement(s) to this effect at the City's request.

g. City reserves the right to adjust the monetary limits of insurance coverage's during the term of this Contract including any extension thereof-if in City's reasonable judgment, the amount or type of insurance carried by the Contractor becomes inadequate.

h. In the event any policy of insurance required by the Contract Documents does not comply with these specifications or is canceled and not replaced immediately so as to avoid a lapse in the required coverage, City has the right but not the duty to obtain the insurance it deems necessary and any premium paid by City will be promptly reimbursed by Contractor or City will withhold amounts sufficient to pay premium from Contractor payments. In the alternative, City may cancel this Contract, effective upon notice.

i. Contractor acknowledges and agrees that actual or alleged failure on the part of the City to inform Contractor of non-compliance with any requirement imposed no additional obligation on the City nor does it waive any rights hereunder.

j. Requirement of specific coverage or limits contained in this section are not intended as a limitation on coverage, limits, or other requirement, or a waiver of any coverage normally provided by any insurance.

k. Contractor shall be responsible for causing all Subcontractors of any tier working under this Contract to purchase insurance meeting the requirements contained herein, including adding the City its officials, officers, employees, agents and volunteers as Additional Insureds to the subcontractor's policies. All policies of Commercial General Liability insurance provided by Subcontractors shall be endorsed to name the City, its officials, officers, employees, agents and volunteers as additional insureds using endorsement form ISO GC 20 38 04 13 (or an endorsement providing the exact same coverage) to effectuate this requirement. Contractor shall not allow any Subcontractor to commence work relating to these Contract Documents until it has received satisfactory evidence of Subcontractor's compliance with all insurance requirements under this Contract. The Contractor shall provide satisfactory evidence of compliance with this section upon request of the City.

TECHNICAL SPECIFICATIONS

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CITY OF LAKE FOREST
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PORTOLA CENTER PARK

**These Technical Specifications shall apply to site construction only.
See Part II of Special Provisions – Technical Specifications / C.S.I. Format for
Modular Restroom and Electrical Specifications.**

CONSTRUCTION MATERIALS

CONSTRUCTION METHODS

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SECTION 314 TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

PART 4 – ALTERNATE MATERIALS (NO CHANGE)

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CITY OF LAKE FOREST
SPECIAL PROVISIONS
PORTOLA CENTER PARK

CONSTRUCTION MATERIALS

SECTION 200 - ROCK MATERIALS

200-1 ROCK MATERIALS

200-1.1 General [Add the following]:

Aggregate base material for all asphaltic concrete and concrete paving shall be per Project Soils Report prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See Appendix A.

200-1.2 Crushed Rock and Rock Dust

1. General [Add the following]:

Decomposed granite material shall be "Organic-Lock" – Stabilized decomposed granite. Color: "California Gold" by Gail Materials or approved equal. Material shall be premixed with 'stabilizer' organic additive at a rate of 12 lbs/ton. Contractor to contact: David D. at 951-667-6106 to arrange for pre-construction site visit and overview of "Organic-Lock" installation procedures prior to production. Provide 72-hour notice. Submit ½ cu. ft. sample for City review and approval prior to acquisition.

STABILIZED DECOMPOSED GRANITE

A. Decomposed granite shall be derived from the crushing and screening of naturally friable granite. The blending of coarse sand with rock dust is not acceptable. The granite shall be screened to include stone particles of ½" minus. Particles passing the 200 screen mesh as determined by ASTM methodology shall not exceed 18 percent. The sand equivalent shall be a minimum of 30 and the R-value shall be a minimum of 70. See gradation specifications noted below.

1. GRADATION: As determined by ASTM C 136 methodology (Caltrans 202)

Sieve Size	Percent Passing
1/2"	100
3/8"	90 - 100
No. 4	50 - 100
No. 30	25 - 55
No. 100	10 - 20
No. 200	5 – 18

2. SAND EQUIVALENT: As determined by ASTM D 2419 methodology shall have a minimum of 30. (Caltrans 217)

3. R-VALUE: As determined by ASTM D 2488 methodology shall have a minimum of 70. (Caltrans 301)

SECTION 201 - CONCRETE, MORTAR, AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE

201-1.1 Requirements

201-1.1.1 General. The following paragraphs shall be added following paragraph 4:

The cement utilized shall be Type V. No substitution of materials shall be permitted. The Contractor shall furnish the City's Representative with a copy of the mix design to be used and with a legible certified weight-master's certificate for each load of P.C.C. delivered to the project. Portland Cement Concrete delivered to the project site having a water content and/or slump greater than that specified in the mix design shall be rejected and removed from the project site.

Contractor shall retain the services of a qualified State of California licensed civil engineer to provide a concrete mix design for each class of concrete in accordance with UBC Section 1905. Concrete mix design submittals shall bear the stamp and signature of the engineer approving the mix design as being consistent with project specifications and geotechnical report.

201-1.1.2 Concrete specified by class: The strength of concrete shall be 4,500 psi for all concrete not otherwise specified with a maximum slump of four inches (4") for all concrete flatwork, walls, curb, gutter, walks, aprons, footings, foundations, sidewalks, access ramps, curbs and gutters, and cross gutters, mow curbs, columns, thrust blocks, terraced concrete seating, monument signs, etc.

201-1.1.3 The Water Cement Ratio (W/C) shall be 0.45 maximum.

201-1.1.4 Test for Portland Cement Concrete [Add the following]:

1. All material shall comply with the latest editions of the American Concrete Institute (ACI) and Uniform Building Code. Testing of Portland cement concrete shall apply to all site concrete including but not limited to: concrete paving, walls, footing, etc.

2. Product Data:

   a) Submit complete materials list of items proposed for the work. Identify material source.
   b) Submit admixture, curing compound, retarder, and accessory item product data.

c) Submit material certificates for aggregates, reinforcing, and join fillers.

3. Submit concrete delivery tickets to Quality Control Manager. Show the following:

a) Batch number

b) Mix by class or sack content with maximum size aggregate

c) Admixture

d) Air content

e) Slump

f) Time of loading

4. Submit concrete test reports.

5. City will provide field quality control testing and inspection during concrete operations.

6. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist test agency and their representatives in execution of their function.

7. Strength Verification

Contractor should present mix design to City Inspector for approval prior to pour. Contractor shall provide copies of concrete tickets verifying the strength requirements for every truck load of concrete (see also item 3 above).

201-1.1.5 Test for Portland Cement Concrete
Concrete Installer [Add the following]:

Contractor shall provide evidence to indicate successful experience in concrete placement and finishing work similar to that specified herein and who can demonstrate such successful experience through past project documentation and references.

1. Experience Period: Minimum five (5) years' experience.

2 Demonstration of Experience: Ten (10) projects which have been completed within the past twenty-four (24) months utilizing similar products, scope, and complexity.

3. Supervision: Placement and finishing of concrete work shall be performed under the supervision of a person having a minimum of five (5) years' experience in the placement and finishing of products specified herein.

4. Previous projects shall be located in Los Angeles, Orange, Riverside, Ventura or San Bernardino Counties. **A listing of projects and addresses shall be provided with the bid and shall be reviewed and approved by the City prior to award of the bid.** Installer qualifications shall be submitted to construction manager with copies to the Architect for information purposes. Three (3) copies of previous experience shall be provided with the Bid Documents, at time of bid. Failure to provide this information will deem the Bid Submittal unresponsive.

5. **The above prequalifications refer to any and all site / exterior concrete work identified on plans.**

201-1.2 Materials

201-1.2.1 Portland Cement [Add the following]:

1. Lime: ASTM C207, Type S, containing 85% by weight of calcium oxide.

2. Lime Putty: Make from hydrated lime conforming to ASTM C207, pulverized to such fineness that 100% will pass a 50 mesh sieve. Mix lime in water, run through screen into box and age 48 hours.

3. Cement shall be Type V Portland Cement.

201-1.2.4 Chemical Admixtures [Add the following]:

Surface retardant: Surface retarder shall be “top cast” no. 5 surface retarder or approved equal, provided by Dayton Superior. “Top cast” retardant to be applied at specific paving conditions noted on plans and shall utilize Top Cast release agent, as noted on plans. Contractor shall contact Chuck Poole of Dayton Superior Corporation (714) 287-6342 to meet on site to discuss application procedures prior to preparation of concrete samples.

201-1.4 Mixing

201-1.4.3 Transit Mixer [Add the following]:

Mixes

a. Provide ASTM C94 ready-mixed concrete. Batch mixing at site not acceptable.

1. Strength: 4,500 psi minimum at 28 days for all concrete flatwork, curbs, seating, ramps, plaza area, etc.

2. Slump Range: 2” to 4” maximum

b. Coarse aggregate shall consist of 3/4” aggregate - 3/8” aggregate for pump mix.

c. Provide an approved water-reducing admixture in all concrete.

d. Provide an air-entraining admixture in all concrete. Air content 5% to 7%.

e. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specifications requirements.

201-2 STEEL REINFORCEMENT FOR CONCRETE

201-2.2 Reinforcing Steel. [Add the following paragraph immediately after the first paragraph]:

#3 and #4 reinforcing steel shall be 40 grade
#5 reinforcing steel shall be 60 grade
Payment. [Add the following to this section]:

Payment for steel reinforcement shall be included in the lump sum contract price for all related items, i.e., concrete ramps, walks, walls, structures, footings.

201-3.1 Expansion Joint Filler and Joint Sealants

201-3.2 Premolded Joint Filler [Add the following]:

Expansion joint material shall be Deck-O-Foam by W.R. Meadows Corporation or approved equal – 1/4″ in dimension. Install per manufacturers specifications (909) 469-2606.

201-4 CONCRETE CURING MATERIALS

Curing compound shall be ASTM 309 or better. Concrete cure and seal shall be “clear” by Davis Colors, or approved equal.

201-4.4 Concrete Sealer

Concrete sealer shall be Siloxane WB Concentrate sealer. Dilution to be 1:9 minimum to 1:7 maximum. Provided by Mike Davis of Innovative Concrete Products and Marketing, Inc. Phone: (949) 498-7077. Concrete sealer to be applied to all sidewalks and the Monument Sign.

SECTION 202 - MASONRY MATERIALS

202-2 Concrete Block

202-2.1 Masonry Units [Add the followings]:

1. Codes: Materials and work shall conform to the governing building code. In case of conflict between the codes, the more stringent shall govern.

2. Samples: Submit samples of all blocks and rock cobble materials to be used in the work.

3. Protection: Safeguard all materials against injury in transit, delivery, storage, sorting, installation, cleaning, and until final acceptance of the completed work. Store cement and lime in rainproof sheds with elevated floors. Store sand on tightly floored space, protected against mixing with ground or other materials.

4. Quality of construction is the responsibility of the Contractor.

202-2.1.1 Masonry Materials [Add the following]:

1. Concrete Block:

The concrete blocks shall conform to the requirements shown on the plans and shall be nominal size and of uniform color.

202.2.2 Mortar, Grout, and Water

1. Mortar [Add the following]:

Mortar. Mortar for laying masonry units shall consist, by volume, of 1 part Portland cement, ½ part lime putty, 3 parts sand, and shall conform to ASTM C270. If plastic type cement is used, the lime putty shall be omitted. Each batch of mortar shall be freshly prepared and uniformly mixed. Mortar for split face concrete block construction shall be integral color, color to be selected. Mortar for rock cobble construction shall be natural grey.
Mortar shall be colored to match integral color masonry block units. Coloring shall be chemically inert, fade resistant mineral oxide, or synthetic type.

2. Grout. [Replace with the following]:

Grout for filling masonry units shall consist, by volume, of 1 part Portland cement and 3 parts sand. Sufficient water shall be added to create grout of fluid consistency. Grout shall be natural in color.

3. Pea Gravel. Clean, hard, containing not more than 5% by weight of flat, thin, elongated, friable, or laminated pieces; uniformly graded with not over 5% passing a no. 8 sieve to 100% passing a 3/8” sieve.

4. Lime. ASTM C207, Type S, containing 85% by weight of calcium oxide.

5. Lime Putty. Make from hydrated lime conforming to ASTM C207, pulverized to such fineness that 100% will pass a 50 mesh sieve. Mix lime in water, run through screen in to box, and age 48 hours.
Mortar and grout not used within 30 minutes after leaving mixer will not be permitted on the work. Retempering of mix will not be allowed.

202-2.2.2 Sealants

1. Sealants [Add the following]:

a. Stone Veneer: All exposed stone veneer shall receive Glaze 'N Seal Extra Strength Penetrating Sealer as manufactured by Glaze 'N Seal Products Inc., or approved equal. Provide 4′ x 4′ sample mock-up of sealed material for review and approval prior to production applications.

SECTION 203 - BITUMINOUS MATERIALS

203-6 ASPHALT CONCRETE

203-6.1 General. [Add the following to the end of the subsection]:

Asphalt concrete shall conform to the provisions of Subsection 400-1, "Rock Product," and Subsection 400-4, "Asphalt Concrete".

The viscosity grade of paving asphalt shall be PG 64-10. The mix designs and asphalt content shall be as follows:

3/4″ (III-B-3) Base Course	5.6%
1/2″ (III-C-3) Surface Course	5.8%
3/8″ (III-D) Leveling Course, Asphalt Concrete Dike, or Miscellaneous A.C. Placement (sidewalks and driveways)	6.8%

SECTION 206 - MISCELLANEOUS METAL ITEMS

206-5.1 Metal Hand Rails. Add the following subsections:

206-5.1.1 The current rules and practices set forth in the American Institute of Steel Construction's Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings:

Code of Standard Practice shall govern this work, except as otherwise noted or specified. Welding shall be used except where tack welding is specifically shown or permitted.

All measurements shall be verified in the field before fabricating any item. All accessories or incidental items shall be furnished as required to fulfill the intent of the work, whether specifically shown or specified without additional cost to the City.

SECTION 207 - PIPE

207-17 PVC Plastic Pipe

207.17.1 General [Add the Following:]

A. PVC PLASTIC PIPE

A.1 PVC plastic pipe (SCH 40) shall conform to the requirements of Section 207-17 of the Standard Specifications. Pipe class to be referenced in table 207-17.1(A).

PVC plastic pipe shall be constructed to the lines and grads shown on the plans for designated sizes and shall comply with the construction methods set forth in Section 306-12.13 of the Standard Specifications.

A.2 PVC plastic pipe shall be measured and paid for at the contract unit bid price per linear foot for each designated size in accordance with Sections 306-1.2.13 of the Standard Specifications and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in reinforced PVC plastic pipe, complete in place, as shown on the plans, and as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

B. SANITARY SEWER PIPELINE (4” AND 6” PVC)

B.1 Sanitary Sewer (4” And 6” PVC) C installation shall conform to the following standards and specifications.

PVC Pipe -ASTM D-2321

Pipe bedding for PVC sewer pipe shall be ½-inch crushed rock per Section 200-1.2 of the SSPWC.

The material used for construction of gravity sewer collection system shall be new and unused PVC pipe and shall conform to the specifications as set forth in SSPWC Subsection 207-17. All pipe shall conform to ASTM D-3034 and shall have a minimum SDR of 35.

Testing shall conform to SSPWC Sections 306-1.2.12 (Mandrel) and 306-1.4.4 (Air Pressure). Should any section of pipeline fail to pass these tests, the pipe shall be removed and repaired or replaced, and re-tested, until it satisfactorily passes the test.

B.2 Payment for Sanitary Sewer pipe will be in accordance with Subsection 306-1.6 of the SSPWC and additionally shall include fittings, permanent and temporary resurfacing and replacing striping in kind.

Measurement and payment for constructing Sanitary Sewer pipe will be made at the contract unit price per linear foot stated in the bid.

The contract price shall include full compensation for furnishing all materials, labor, tools, equipment, transportation, and other incidentals necessary to satisfactorily complete the work as specified herein and shown on the plans.

C. PRIVATE PVC WATERLINES (1/2" to 3")

C1. Methods and Materials: Installation of PVC SCH40 waterline shall conform to SSPWC subsection 207-17.1 and 306-1.2.13. PVC pipe shall be constructed to the lines and grades shown on the plans for designated sizes.

C.2 Testing shall conform to SSPWC Sections 306-1.2.12 (Mandrel) and 306-1.4.4 (Air Pressure). Should any section of pipeline fail to pass these tests, the pipe shall be removed and repaired or replaced, and re-tested, until it satisfactorily passes the test.

C.3 Measurement and Payment: Payment for PVC water pipe will be in accordance with subsection 306-1.6 of the SSPWC and additionally shall include fittings, permanent and temporary resurfacing.

Measurement and payment for construction PVC water pipe will be made at the contract unit price per linear foot stated in the bid.

The contract price shall include full compensation for furnishing all materials, labor, tools, equipment, transportation, and other incidentals necessary to satisfactorily complete the work as specified herein and shown on the plans.

D. TRENCHES FOR PRIVATE WATER AND SEWER

D.1 This section covers trenching for water and sewer pipes and trenching for any other utility (i.e. drainage pipe) not covered by another Section of the specifications.

Contractor shall locate all known utilities prior to trenching for new pipelines. The Contractor at the Contractor's expense shall repair any damage to existing or new electrical, telephone or communication, gas, sewer, water, and storm drain, and irrigation facilities.

Measurement and payment for trenching will be considered included in the price stated in the bid for the respective utility that requires trenching and no separate payment will be made thereof.

D.2 Trench Safety: Before beginning excavation for a trench five feet or more in depth, the Contractor shall submit to and shall receive the acceptance (approval) of the Engineer of 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. Such plan shall be submitted at least five days before the Contractor intends to begin work on the trench. If such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer. Nothing herein shall be deemed to allow the use of shoring, sloping, or protective system less effective than that required by the Constriction Safety Orders of the Division of Industrial Safety. No excavation shall start until the Engineer has accepted the Contractor's shoring plans and Contractor has obtained a permit from State Division of Industrial Safety and given a copy of the permit to engineer.

The Contractor shall provide and install adequate sheeting, shoring, and bracing, or equivalent method for the protection of life or limb, which shall conform to the applicable safety orders, when applicable. Nothing in these specifications shall be construed as imposing tort liability on the City or any of its employees.

D.3 Measurement and payment for all work required by the contractor in connection with making trenches and excavation safe for workmen, inspectors, and the public shall be considered to be included in the bid item of work for which the trench was required.

E TRENCH BACKFILL

E.1 Imported Trench Backfill

Imported trench backfill shall be required when native trench material has a moisture content greater than 4% above the optimum moisture content as measured in accordance with ASTM 1557, or does not meet the gradation requirements for imported trench backfill given below.

Imported trench backfill shall include material one foot above the pipe up to the existing pavement structural section.

All imported trench backfill material shall be a quarry waste or similar material with 100% passing a 3" screen, no more than 15% passing a #200 sieve and a sand equivalent of 20 minimum using California Test Method No. 217.

E.2 Measurement and payment for imported trench backfill shall be considered to be included in the bid item of work for which backfilling of trenches was required, and shall include full compensation for furnishing all labor, materials, tools, equipment, transportation, and incidentals for imported trench backfill in accordance with the Contract Document.

No adjustment price will be made for any increase or decrease in the quantity of imported backfill used, regardless of the reason for such increase or decrease.

F SANITARY SEPARATION

F.1 Sanitary separation shall be maintained as required in the City and/or State Standard details. The Engineer shall be notified immediately upon discovery of conflicting sewer laterals. A field determination will then be made by the Engineer as to which method of sanitary separation shall be used.

F.2 Measurement and payment for Sanitary Separation shall be considered to be included in the bid item of work for which sanitary separation was required. The above contract unit price shall include full compensation for furnishing all labor, materials, tools, equipment, transportation, and incidentals for constructing sanitary separation in accordance with the Contract Document.

No adjustment of unit price will be made for any increase or decrease in the quantity of sanitary Separation regardless of the reason for such increase or decrease.

SECTION 210 PAINT AND PROTECTIVE COATINGS

210-1 PAINT

210-1.4 Paint Materials. [Add the following information to the end of this section]:

Submittals:

1. Materials List:

   a. The Contractor shall furnish the articles, equipment, materials, or processes specified by name in the drawings and specifications. No substitutions will be allowed without prior written approval of the City.

   b. Complete material list shall be submitted prior to performing any work. Material list shall include the manufacturer, model number, and description of all materials and equipment to be used.

   c. Equipment or materials installed or furnished without prior approval of the City may be rejected and the Contractor required to remove such materials from the site at his own expense.

   d. Approval of any item, alternate, or substitute, indicates only that the products or products apparently meet the requirements of the drawings and specifications on the basis of the information or sample submitted.

210-1.5.1 Metal fabrications: Priming and painting of all metal fabrications shall be as per Section 304-2.3.2.

210-1.6.1 General. [Replace the following]:

The paint for traffic striping and marking shall be as specified in Section 310.

The paint for concrete curbs shall be the following, or an approved equal:

A. J.E. Bauer Company #2133 A-9 Red.

B. J.E. Bauer Company #2134 A-9 Green.

C. J.E. Bauer Company #1864 A-9 Blue.

Thinner shall not be mixed with paint. Paint shall dry "tack-free" within thirty (30) minutes. Paint used for pavement legends and striping shall be a compound of paint and glass beads.

210-1.6.5 Reflective Material. Shall be as specified in Section 310.

210-3 General [Replace with the following]:

All metal fabrications shall be metalized per Section 304.

SECTION 211 - SOILS AND AGGREGATE TESTS

211-2 COMPACTION TESTS

211-2.1 Laboratory Maximum Density [Replace with the following]:

Suitable excavated materials removed to accommodate new construction may be used as fill material subject to Soils Engineer's inspection and approval.

211-2.2 Field Density [Add the following]:
Field density tests will be made by the City's Geotechnical Engineer during the course of construction at the expense of the City. If field density tests indicate that any portion of the compacted subgrade has density lower than that specified, the Contractor shall rework that portion until the specified density is obtained.

Retest of areas which have failed compaction will be performed by the City's Soils Engineer at the Contractor's expense. All fill material and subgrade compaction shall be as noted in project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017 with all related addendums. See appendix A.

CONSTRUCTION METHODS

SECTION 300- EARTHWORK

SECTION 300.1 Clearing and Grubbing. [Add the following prior to the first paragraph]:

300-1.1 GENERAL:

All site grading, earthwork preparation, presaturation, compaction, etc. shall be as outlined in these specifications and the plan documents, and per project soils report prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See Appendix A.

Site Grading

1. Perform grading within contract limits, including adjacent transition areas to new elevations, levels, profiles, and contours indicated. Check subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.

2. Grade surfaces to assure areas drain away from structures and to prevent ponding and pockets of surface drainage. Check subgrade surfaces. Subgrade shall be free from irregular surface changes and as follows:

    a. The subgrade at any point shall not vary more than 0.10 foot above or below the grade established by the Improvement Plans if the structural section indicates placing surfacing on native material.

    b. The subgrade at any point shall not vary more than 0.10 feet above the grade established by the Improvement Plans if the structural section indicates placing an aggregate base or sub-base material on native materials.

    c. Rough Grading: Rough grade surface to be established by others.

    d. Fine Grading: Fine grades shall be set to the grades/elevations established by the improvement plans.

    e. Paved Areas: Shape surface of fine grade areas to line, grade, and cross-section indicated. Check compacted subgrade. Subgrade shall be suitable to receive paving base materials, per Standard Specifications. Subgrade tolerance plus 0, minus 1/2".

    f. Granular Base: Check subgrade surface. Subgrade surface shall be smooth and even, free of voids, to the required subgrade elevation. Compacted subgrade shall be suitable to receive granular base materials per Standard Specifications. Tolerance 1/2" in 10'.

3. Uniformly distribute and spread soil. Provide additional imported topsoil, per Geotechnical Report dated March 8, 2017 in the Appendix to complete the work. Use loose, dry weed-free topsoil. Do not use muddy topsoil. Place during dry weather.

4. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles, and contours of fine grades.

5. Remove stones, roots, weeds, and debris while spreading topsoil materials. Rake surface clean of stones 1" or larger in any dimension and all debris. Provide surfaces suitable for soil preparation provided under lawn and planting work. Contractor shall be responsible for 'rock picking' and removal of all rocks, stones, and boulders one (1) inch in diameter and greater in all areas not requiring concrete paving. Removal of rocks from site shall be in compliance with state and local codes.

6. Perform grading within contract limits, including adjacent transition areas to new elevations, levels, profiles, and contours indicated. Grading and earthwork for the new construction shall include excavation of the existing grade as necessary to "key" in to existing grade the proposed surface. Spoils from such operations shall be relocated and stock piled by the contractor. Provide subgrade surfaces parallel to finished surface grades. Provide uniform levels and slopes between new elevations and existing grades.

300-1.2 Preservation of Property [Add the following]:

Consult the records and drawings of adjacent work and of existing services and utilities which may affect site work operations.

300-1.3.2 Requirement [Add the following]:

Miscellaneous:

In addition to the work outlined in Subsection 300-1 of the Standard Specifications, the following items of work are included under Clearing and Grubbing unless otherwise covered by a specific bid item.

1. Maintain dust control at all times by watering; including developing water supply and furnishing and placing all water required for work done in the contract, including water used for extra work.

2. Provide for traffic control and all signs, barricades, striping and flashers necessary to maintain proper control, per approved Traffic Control Plans (as provided by contractor)

3. Protection and maintenance of utilities, trees. fences, walls, and other facilities within the construction zone, except those specifically directed by the City Representative to be removed or relocated.

4. Other items of work as directed in these Special Provisions.

5. Remove asphalt concrete paving and base material.

6. Remove PCC concrete.

300-3 STRUCTURE EXCAVATION AND BACKFILL

300-3.1 General [Add the following to the first paragraph]:

Footings shall bear on approved undisturbed bearing soil.

300-3.4 Inspection [Add the following after the first paragraph]:

1. Contractor shall provide adequate notice, cooperate with, provide access to their work, obtain samples, and assist testing agency and their representatives in execution of their function.

2. Fill Materials: Contractor shall provide testing of proposed import materials to verify suitability for use, gradation of material, moisture-density relation by ASTM D1557 and percent of organic materials.

3. When, during progress of work, field tests indicate that installed compacted materials do not meet specified requirements, provide additional compaction until specified density is achieved or remove and replace defective materials with new materials as directed by the City Representative. Cost of additional labor, materials, and testing to attain specified density shall be at Contractor's expense.

4. Do not cover or enclose work of this section before obtaining required inspections, tests, approvals, and location recording.

5. Submit reports for testing and inspection of the following, as directed by the City Representative.

    a. Subgrade surfaces
    b. Footing subgrade

300-3.5 Structure Backfill [Add the following]:

1. All fill material is subject to testing and inspection.

2. Fill materials: shall be per project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See appendix A.

3. Granular base: per project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See appendix A.

4. Granular fill: per project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See appendix A.

5. Obtain inspection and approval of subgrade surfaces from the Project Geotechnical Engineer prior to filling operations. Scarify, dry, and compact soft and wet areas; remove and replace unsuitable subgrade materials with an approved compacted fill material. Take corrective measures before placing fill materials.

6. Soil stabilization: When exposed subgrade surfaces become spongy during construction operations and soil stabilization is required, stabilize subgrade materials, as directed by the City Representative.
7. Spread approved fill material per Section 800.

8. Compaction:

   a. Compact subgrade and fill material of all areas shall be as noted on project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See appendix A.

   b. Water settling, puddling, and jetting of fill and backfill materials as a compaction method are not acceptable.

   c. Maintain moisture content of materials, during compaction operations within required moisture range noted on project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017 (see Appendix A) and to the satisfaction of the Project Geotechnical Engineer to obtain indicated compaction density.

   d. Provide adequate equipment to achieve consistent and uniform compaction of fill and backfill materials.

SECTION 301- SUBGRADE PREPARATION, TREATED MATERIALS AND PLACEMENT OF BASE MATERIALS

301-2 UNTREATED BASE

301-2.1 GENERAL
CRUSHED AGGREGATE BASE (CAB)

A. Crushed Aggregate Base shall be placed to the lines and grades shown on the plans and in accordance with the methods of Section 301-2 of the Standard Specifications.

   Crushed Aggregate Base shall be placed to the lines and grades shown on the plans and in accordance with the methods of Section 301-2 of the Standard Specifications.

   Prior to placement of Crushed Aggregate Base, the subgrade soils shall be processed to a minimum depth of 6-inches, moisture-conditioned, per Project Geotechnical Report prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017, and recompacted to a minimum depth of 90 percent relative compaction.

B. Payment

The contract price paid per ton for CRUSHED AGGREGATE BASE shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all work involved to place CRUSHED AGGREGATE BASE, complete in place, including scarify six (6) inches, moisture condition, and prepare subgrade to a 90% compaction, as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

301-6 SOIL STERILANT [Add new subsection]:

301-6.1 General

All areas indicated on the plans to receive asphalt concrete pavement over native material shall be prepared in accordance with Section 300 of the Standard Specifications concerning subgrade preparation. In addition, after the compaction is completed, the Contractor shall apply a soil sterilant to the subgrade. Application shall be by spray equipment which provides good mechanical agitation and even coverage of the area to be treated. Spray equipment shall be calibrated before material is applied, and the City's decision as to effectiveness of the spray equipment shall be final. Great care shall be taken to apply soil sterilant to the designated asphalt concrete areas only. Concrete or asphalt may be placed immediately after placement of soil sterilant. Soil Sterilant shall be Casaron 50W. or approved equal, as supplied by Target Specialty Products, Santa Fe Springs, CA., (800) 352-3870.

301-6.2 Operator's License

The Contractor's operator applying the soil sterilant shall be licensed by the State of California, Department of Food and Agriculture and registered with the Office of the Agricultural Commissioner of Los Angeles County as a pest control applicator.

301-6.3 Application

Any soil sterilant which is approved in writing by a licensed pest control advisor (for the purpose to which it will apply) may be used upon acceptance by the City Representative. The dye shall not stain concrete or masonry. Certification shall be furnished to the City Representative showing the purchase receipt and manufacturer's recommended rate of application of the material.

301-6-4 Payment

The Contractor shall supply all labor, materials, and equipment to apply the soil sterilant and shall include the cost for application in the price quoted for Asphalt Concrete. Payment shall the made as part of the lump sum contract price and no additional compensation will be allowed.

SECTION 302 - ROADWAY SURFACING

302-5 Asphalt Concrete Pavement

302-5.1 General [Replace the last paragraph with the following]:

Asphalt Concrete shall conform to the requirements of Subsection 203-6.1 as modified by these Special Provisions.

302-5.4 Tack Coat

Tack coat material shall be Grade SS-1h emulsified asphalt

302-5.5 Distribution and Spreading. [Delete the sixth paragraph and add the following]:

The depositing, distributing, and spreading of the asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled mechanical spreading and finishing strike-off assembly capable of being accurately regulated and adjusted to distribute a layer of the material to a definite predetermined thickness. The machine shall be equipped with automatic screed controls. The automatic screed controls require a reference system for the automatic system to follow. This reference can be the base on which asphalt concrete is being placed, the lane next to the material being placed, or a string line. The automatic screed control can also follow a traveling reference system. A traveling reference system may be a ski attached to a control arm, which notes changes in base contours and adjust the screed automatically to compensate. A string line or traveling reference system shall be used to allow the automatic control to adjust screed height as necessary to maintain proper longitudinal (length-wise) grade of the pavement. To maintain proper transverse (width-wise) grade, the automatic screed control shall use a pendulum system attached to a beam running between the two screed pull arms.

When paving is of a size of in a location that use of a self-propelled machine is impractical, the City Representative may waive the self-propelled requirement.

At those location where new asphalt concrete pavement overlay joins existing asphalt pavement, the Contractor shall rake out all aggregate 3/8 inch or larger and feather the new paving to form a smooth transition to join the existing pavement.

302-5.6 Measurement and Payment [Add the following]:

Asphalt Concrete payment shall be included in the square foot contract price. Payment shall include full compensation for soil sterilants per subsection 301.6, where required.

302-6 PORTLAND CEMENT CONCRETE PAVEMENT

302-6.4 CONCRETE FINISHES [Add the following]:

1. General. Unless otherwise specified in this Subsection, retardant finish, broom, and steel trowel finish concrete used in the hardscape areas shall be constructed of concrete prepared as prescribed in Subsection 201-1. Portland Cement Concrete Pavement shall

be constructed in accordance with Section 302-6 “Portland Cement Concrete Pavement’” except as modified herein.

2. Job Sample. Contractor shall pour and finish a 6' X 6' square sample of each concrete finish and color using the specified materials and construction techniques. Each sample shall include final finish color as specified, sawcut joints with crack chaser, expansion joints, and shall meet with the City's approval prior to placing any production concrete. Production pours are not acceptable as field samples. Sample 6’ X 6’ concrete panels shall be prepared by Contractor for Owner’s review three weeks prior to scheduled production pours. Samples not meeting with Owner’s satisfaction shall be repoured and finished at no cost to City. Preparation of ‘top cast’ no. 5 finish samples (see Section 201-1.2.4) shall be prepared per supplier’s specifications.

3. Subgrade Preparation: All soil material used as compacted fill or material processed in place or used to backfill trenches should be moistened, dried, or blended as necessary to achieve the optimum moisture content for compaction, and densified with relative compaction as determined by ASTM Test Method D 1557 per project Geotechnical Report dated March 8, 2017 and subsequent addendum dated March 21, 2017 (Appendix A).

   The subgrade under any sidewalks and flatwork shall be scarified to a depth of at least eight (8) inches or as recommended by the Project Soils Report (See Appendix A), and moisture shall be applied to maintain free water on the surface for at least 24 hours prior to placing concrete and the subgrade shall then be prepared without compactive effort.

   Preparation. Subgrade shall be compacted and prepared in accordance with project soils report as prepared by Geocon Inc., dated March 8, 2017 and subsequent addendum dated March 21, 2017. See appendix A.

302-6.8 Measurement and Payment. Payment for all concrete work will be made as part of the square foot contract price and no additional compensation will be allowed.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-1 CONCRETE STRUCTURES

303-1.1 General [Add the following paragraphs]:

Concrete structures shall conform to the provisions of the Standard Specifications and herein.

Reinforcing steel shall be Grade 60 billet steel conforming to ASTM A615.

The surfaces of all concrete structures shall receive a smooth trowel finish, unless otherwise specified on plans.

The Contractor shall furnish all labor, tools and materials to construct reinforced Portland Cement Concrete structures and appurtenant work to grades and dimensions shown on the Plans or staked in the field. The Contractor shall submit method and sequencing for placement of P.C.C. for the City's Representative approval at least ten (10) working days prior to commencement of work.

Unless otherwise specified, transverse construction joints shall be placed in all reinforced sections at intervals of not less than ten (10) feet or more than fifty (50) feet. The joints shall be in the same plane for the entire structure and, for concrete thickness greater than 6-inches, shall be keyed as directed by the City's Representative.

303-1.3 Forms [Add the following paragraphs]:

Forms shall be braced to withstand the pressures developed and shall be tight to prevent the loss of mortar. Formed wall surface shall be free of any unevenness greater than 1/4-inch when checked with a 10-foot straight edge.

Concrete in walls with side slopes flatter than 3/4:1 shall be placed on suitable material which has been overfilled, compacted, and trimmed to true grade. Backforms shall be used where the side slope is 3/4:1 or steeper.

A clear non-staining form release agent which will not discolor nor affect the surface texture of the concrete and does not react with any ingredients of the concrete shall be used. The cost of Furnishing and Placing Form Release agent shall be included in the cost of Portland Cement Concrete.

All form work for concrete construction (mow curbs, paving, concrete curbs, gutters, walls, etc) shall be reviewed and approved by Owner prior to pouring of concrete.

303-1.7 Placing Reinforcement.

303-1.7.1 General [Add the following paragraph]:

Aluminum and plastic supports for reinforcement shall not be used.

Bars shall be accurately spaced as shown on the Plans and spacing of first bar immediately adjacent to transverse construction joint shall be one-half the required spacing shown on the Plans. In no case shall the clear distance between parallel bars be less than 2-1/2 diameters of the bar, or a minimum of 2-inches. Unless otherwise shown on Plans, embedment of reinforcing steel (other than stirrups and spacers) shall be 1-1/2 inches clear depth for #8 bars or smaller, and shall be 2-inches clear for #9 bars and larger. Where placement of reinforcing steel requires alternate bars of different size embedment, requirements shall be governed by the larger bar. Stirrups and spacers shall be embedded not less than 1-inch clear depth.

Measurement of embedment shall be from the outside of the bar to the nearest concrete face. Tack welding or butt welding of reinforcing bars will not be permitted.

303-1.7.2 Splicing. [Add the following paragraph]:

Reinforcing bars may be continuous at locations where splices are shown on the plans, at the option of the Contractor. The location of splices, except where shown on the Plans, shall be determined by the Contractor, based upon using available commercial lengths where applicable.

Splices shall consist of placing the reinforcing bars in contact and wiring them together in such a manner as to maintain the alignment of the bars and to provide minimum clearances.

No lapped splices will be permitted at locations where the concrete section is not sufficient to provide a minimum clear distance of 2-inches between the splice and the nearest adjacent bar. The clearances to the surface of the concrete shall not be reduced. Length of lapped splices shall be as noted on drawings.

Splices of tensile reinforcement at points of maximum stress shall be avoided; however, any deviation from splices shown on the Plans shall be approved by the City's Representative.

303-1.8 Placing Concrete

303-1.8.1 General [Add the following paragraph]:

The Contractor shall exercise caution in placement of concrete in walls and congested areas to ensure proper consolidation and that there are no voids, and protection of waterstops in position. Adequate provisions shall be made for visual inspection of concrete placement, consolidation and waterstop protection. Pouring of walls in lifts, use of smaller maximum aggregate sizes, or other methods as necessary may be proposed by the Contractor and will be permitted only after evaluation by the City Representative.

303-1.9.2 Ordinary Surface Finish. [Add the following paragraph]:
Ordinary Surface Finish shall not apply to rock pockets which, in the opinion of the City Representative, are of such extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement. In such cases, the City Representative may declare the concrete defective and require the removal and replacement of the structure affected.

303-1.10 Curing. [Amend first paragraph with the following]:

Exposed concrete surfaces shall be sprayed with Type 2 curing compound at a uniform rate of one gallon per 150 square feet.

Concrete sealer shall be Siloxane WB Concentrate sealer. Dilution to be 1:9 minimum to 1:7 maximum. Provided by Mike Davis of Innovative Concrete Products and Marketing, Inc. Phone: (949) 498-7077. See manufacturer recommendations.

303-1.11 Payment [Replace paragraph one with the following]:

Portland Cement Concrete structures shall be included in the square foot contract price and shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work required to construct the structure in conformity with the plans and specifications.

Should the Contractor request and obtain permission to use admixtures for his own benefit, he shall furnish such admixtures and incorporate them in the concrete mixture at his expense, and no additional compensation will be allowed therefore.

Should the City Representative direct the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications, furnishing the admixtures and adding them to the concrete will be paid for as Extra Work a provided in Subsection 3-3, as amended by these Special Provisions.

303-4.1.1 General [Add the following paragraph]:

Sealants

1. Sealants

   All exposed stone veneer shall receive Glaze 'N Seal Extra Strength Penetrating Sealer as manufactured by Glaze 'N Seal Products Inc., or City approved equal. Application shall be per manufacturer specifications. Provide 4′ x 4′ sample mock-up of sealed material for review and approval prior to production applications.

303-5 CONCRETE CURBS, CONCRETE PAVING, CONCRETE SEATING, WALKS, GUTTERS, ACCESS RAMPS, AND DRIVEWAYS.

303-5.1 Requirements

303-5.1.1 General [Add the following paragraph]:

1. Concrete curbs, ramps, and walks shall conform to the Standard Specifications and supplied herein in conjunction with Construction Document Plans and Details.

303-5.2 Forms

303-5.2.1 Standard Form [Add the following]:

1. Use flexible metal, 1" lumber or plywood forms to form radius bends.

2. Install, align and level forms, stake, and brace forms in place. Maintain following grade and alignment tolerances except where accessibility concerns would bring non-compliance if tolerances were allowed.

a. Top of Form: Maximum 1/8” in 10’0”.

b. Vertical Face: Maximum 1/8” in 10’0”.

3. The Contractor shall include all fine grading and compaction with regard to setting forms during concrete placement.

4. The Contractor shall notify City a minimum of 36 hours in advance of scheduled form board review. All form work for hardscape construction (mow curbs, concrete paving, curbs, gutters, walls, etc.) shall be reviewed and approved by Owner prior to pouring of concrete. Modifications in formwork necessary for alignments to be straight, true to line with well transitioned radial, curved sections shall be provided by the contractor at no additional cost to the contractor.

303-5.4 Joints

303-5.4.1 General [Add to the first paragraph]:

1. Provide expansion joints using pre-molded joint filler at concrete work abutting curbs, walks, and other fixed objects.
   a. Locate expansion joints as indicated. When not indicated, provide joints at maximum 24’-0” on center for curbs and walks. Align expansion joints in abutting curbs and walks. Expansion joint material shall be as noted on drawings and shall extend to full depth of concrete section.

   b. Install expansion joint fillers full-width and depth of joint. Recess top edge below finish to receive sealants as indicated on the details.

   c. Provide joint fillers in single lengths for the full slab width, whenever possible. Fasten joint filler sections together when multiple lengths are required.

   d. Where intersecting joints occur join top edge and continue any spliced joints without deviation of form line or direction.

   e. Protect the top edge of the joint filler during concrete placement.

   f. Control joints shall be provided to a depth equal to 1/3 the thickness of the concrete pour.

303-5.9 Measurement and Payment [Add the following to this section]:

Payment for concrete work will be made as per shown on Bid Schedule and no additional compensation will be allowed.

SECTION 304 - METAL FABRICATION AND CONSTRUCTION FOR ALL ORNAMENTAL METAL FENCING, GATES, GUARD RAILS, AND HANDRAILS

304-2.3 Ornamental Metal

304-2.3.1 General. The materials for ornamental metal items.

304-2.3.2 Fabrication:

1. Miscellaneous metal work which will be exposed to view shall only be fabricated with materials that are smooth and free of surface blemishes, including, but not limited to, pitting, seam marks, trade names, and roughness. Remove such blemishes by grinding or by welding and grinding prior to cleaning, treating or applying surface finishes.

2. Shop Assembly: Work shall be fitted, shop assembled, and ready for erection when identified on construction schedule.

3. Workmanship: Form metals to shape and size with sharp lines and angles, and with smooth surfaces and faces free from distortion. Mill fastening to a close fit. Do all fitting true to line. Bend or form all tubing, pipe, and other members to continuous and true curves with all joints flush and neatly fastened together. All fabrications shall be square, plumb, straight, and true.

4. Jointing and Connections: Jointing and intersections shall be accurately made in true planes and tightly fitted to hairline joints. Connections shall be welded. Do not use screws unless specifically shown or required - if used, screws shall be countersunk with a metal compatible with the members being joined.

5. Welding: Welding shall conform to the requirements of the "Structural Welding Code" ASW D1.l. Where welds are exposed to views, bevel members prior to welding and weld full. Grind welds flush, smooth, level with the adjacent surfaces. Grind welds at intersecting members to sharp lines.

6. Holes: Accurately space to centers such that boles are not poorly or carelessly seamed.

7. Anchorage: Fabricate and space anchoring devices to provide adequate support for intended use.

8. Insulation of metals from contact with masonry and different metals from contact with each other shall be provided where necessary to prevent corrosion.

9. Debur and grind smooth all welds and rough spots.

10. All ornamental metal fabrications shall be abrasive blasted per SSPC-SP6 Commercial blast cleaning prior to the application of the zinc thermal spray. Surface must be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and other foreign matter.

11. Shop Applied – High Performance Coating System:

    a. Primer: All ornamental metal fabrications shall receive 2 to 4 mil. zinc thermal sprayed metalized primer per ANSI/AWS C218.93, ASTM C633, ASTM B833-93, and SSPC-CS Guide 23.00, June 1, 1991. Contact: Zinc Nation, Inc. Contact: Whitney Blakeslee. Phone: 714-239-6190. Contractor shall submit sample of metalizing for review and approval prior to metalizing ornamental metal items. Sample shall be prepared by Zinc Nation or approved equal. Following metalizing, Contractor shall provide "Certification of Metalizing" by Zinc Nation to city prior to delivery of metal works to site. Certification shall note specific project name, location, Owner and a list of elements which were metalized (gates, fencing, handrails, guardrails, etc.) Failure to provide certification will require Contractor to return subject project elements to **Zinc Nation** for sand blasting, metalizing and subsequent application of specified coating (Tnemec Coating, See Sections 210 and 304) at no cost to Owner.

    b. Intermediate & Finish Coats: Epoxy/Polycarbamide, as provided by **Tnemec Company** Incorporated, or approved equal, 417 East Weber Avenue, Compton, CA 90222. Phone 310-637-2363. Fax 310-637-4161. Web Site www.tnemec.com/tpc. Equivalent materials of other manufacturers may be substituted only by approval of the architect. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information, solids by volume, recommended film thicknesses, performance criteria and a list of five projects where each product has been used and rendered satisfactory service. No request for substitution shall be considered that would decrease the film thickness or offer a change in the generic type of the coating.

    c. Intermediate: Tnemec Series L69 Hi-Build Epoxoline DFT 3.0 to 5.0 mils.

    d. Finish Coat: Tnemec Series 750 UVX, (Semi-Gloss) DFT 2.5 to 4.0 mils.

    e. Total DFT: 7.5 to 13.0 mils. (Including zinc metalizing)

    f. Color: To be selected by City

304-2.3.3 Installation:

1. Ornamental metal items and fencing shall be erected in accordance with the plans. All work shall be erected square, plumb, straight, and true. Perform all

required cutting, drilling, and filling. Accurately set and properly secure. Attach work in true planes, in alignment, properly reinforced and stiffened.

2. Embedded Items: Provide miscellaneous metal items to be embedded or installed in concrete.

3. Coordination with Related Work: Provide all anchors, sleeves, bolts, and connecting members necessary for securing metal work to other adjacent or adjoining work. Provide and install angles and other reinforcement. Do all cutting, puncturing, drilling, tapping, or modifying of adjacent or adjoining work where necessary for proper installation. Furnish all sockets, bolts, anchors, and other portions of this work to the various trades where needed that are to be built into the structure and be responsible for their accurate spacing and setting.

4. Expansion and Contraction: Assemble and install work with adequate provisions to prevent objectionable distortion and overstressing from expansion and contraction. Construct to be weather-tight where exposed to the weather.

5. Touch-up Painting: Immediately after erection of Ornamental metal items and fencing, all bare steel areas including welds shall be thoroughly cleaned per SSPC-SP11 Power-Tool cleaning to white metal and spot primed with Tnemec Series 94-H2O Hydro-Zinc at 2.5 to 3.5 mils DFT. All other areas that the shop applied coating system has been damaged, abraded, or needs repair, shall be re-coated with the intermediate epoxy and polycarbamide finish coat to match all existing surfaces. If the ornamental metal includes nuts and bolts, these will need to be prepared prior to field painting by power tool cleaning per SSPC-SP3 and coating with the epoxy & polycarbamide coating to match existing structure.

6. Miscellaneous Steel Items: Provide all necessary steel items required which are not specified elsewhere. All necessary supports, guides, brackets, etc., shown or required shall be provided.

7. Provide a minimum 2 gallons of the epoxy and 1 gallon of the polycarbamide for field touch up paint to City for their on-going use.

304-2.3.4 Measurement and Payment:

1. Payment for ornamental metal items and their painting shall be made as part of the lump sum contract price and no additional compensation will be allowed.

SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS

306-1.1.1 General [Delete the first paragraph and substitute the following]:

For the purpose of shoring or bracing, a trench is defined as an excavation in which the depth is greater than five feet.

[Delete the last sentence of the third paragraph and substitute the following]:

Removal of ground water shall be performed to a level sufficiently below the structure subgrade to ensure a firm and stable subgrade for the construction of structures. All costs for such dewatering shall be included in the prices bid for the various items of work except as may be otherwise specified in the General Specifications.

306-1.1.6 Bracing Excavations. [Add the following]:

Trench safety and shoring of excavations shall comply with the requirements of the General Specifications. The Contractor shall be required to supply a copy of any permit required by the Division of Industrial Safety at the time of the pre-construction meeting.

The cost of furnishing and installing bracing or other provisions required for worker protection shall be borne by the Contractor. All material used for protection shall be removed from the project unless it has been approved to remain in place by the City Representative.

[Add the following Subsection]:

306-1.1.7 Dewatering

The Contractor shall provide and maintain at all times during construction, ample means and devices to promptly remove and properly dispose of all water entering the excavations or other parts of the work. No concrete footing or floor shall be laid in water, nor shall water be allowed to rise over them until the concrete or mortar has set at least eight (8) hours. Water shall not be allowed to rise unequally against a wall for a period of twenty-eight (28) days.

Dewatering for the structures and pipelines shall commence when ground water is first encountered and shall be continuous until such time as water can be allowed to rise in accordance with the above paragraph. Dewatering shall be accomplished by well points or some other method which will ensure a dry hold and preservation of final lines and grade of the bottoms of excavation, all subject to the approval of the City Representative.

Disposal of water from dewatering operations shall be the sole responsibility of the Contractor.

Payment for removal of water shall be included in the items of work which require the dewatering, and no additional compensation will be allowed therefore.

306-1.3.4 Compaction Requirements. [Replace with the following]:

All trench backfill shall be densified to 90% minimum relative compaction. Jetting will not be permitted unless specifically approved in advance by the City Representative.

306-1.5.2 Permanent Resurfacing [Add the following]:

All testing of underground installation at any given point shall be completed before the surface course is placed at that point.

306-1.6 Measurement and Payment

Underground conduit construction shall be included in the lump sum contract price to include full compensation for furnishing and installing the pipe, including all trenching, bedding, backfill, temporary surfacing, handling and appurtenances, and utility protection, and no additional compensation will be allowed.

SECTION 310 - PAINTING

310-5 PAINTING VARIOUS SURFACES

310-5.4 Painting Metal Guard Rails [Add the following]

a. All exposed metal railings shall receive a protective coating as manufactured by International Protective Coatings, available from Dunn Edwards Paints, or approved equal. Apply per manufacturer's specifications. Submit colors to City for review.

b. First coat Interseal 670 HS primer (color to match top coat).

c. Second coat Interthane 990 HS top coat (color per plan).

310-5.6 Painting Traffic [and Parking Lot] Striping, Pavement Markings, and Curb Markings.

310-5.6.1 General. The third paragraph shall be deleted and replaced with the following paragraphs:

Unless otherwise shown on the plans, transitional traffic lane striping for detours shall conform to City Standard Plans. No lane shall encroach within five feet of an open excavation or within two feet of a longitudinal curb.

310-5.6.4 Geometry, Stripes and Traffic Lanes; and 310-5.6.5 Traffic Stripes and Markings.

The following paragraph shall preface these Subsections:

TRAFFIC SIGNING, STRIPING, MARKINGS, AND MARKERS

Description - This work consists of placing traffic signs, raised pavement markers, traffic striping, pavement legends, and markings as shown on the plans in conjunction with traffic signal work.

All work shall conform to these specifications, City Standard Plans and Specifications, and to any supplementary standards or specifications which may be referred to herein.

Materials - Traffic paint shall be fast dry solvent borne conforming to Section 84-3, Painted Traffic Stripes and Pavement Markings, of the Caltrans Standard Specifications. All paint shall be reflective and shall conform to requirements of the South Coast Air Quality Management District.

Reflective raise pavement markers shall conform to Section 85, Pavement Markers, of the Caltrans specifications and to the applicable provisions of the Caltrans Standard Plans.

Sign face reflective sheeting shall be high intensity grade with protective overlay.

Construction - Application of traffic striping shall conform to applicable provisions of Section 310-5.6 of the "Standard Specifications" and Caltrans Standard Specifications. All traffic striping shall consist of two coats of paint. A minimum of seven days shall be provided between coats and/or as directed by the Engineer.

Installation of traffic signs shall conform to applicable provisions of Section 56-2, Roadside Signs, of Caltrans specifications.

Installation of reflective pavement markers shall conform to Section 85, Pavement Markers, of the Caltrans Standard Specifications and to the applicable provisions of the Caltrans Standard Plans. Old raised pavement markers shall be removed as directed by the Engineer.

Stencils shall conform to the Caltrans Standard Plans.

No striping work will start until the Engineer has approved the spotted or "cat-tracked" markings. No section of any street shall be left without the proper striping for more than 24 hours, or over weekends or holidays.

Traffic striping and markings shall conform to City Standard Plans, the Caltrans Traffic Manual, the Caltrans Maintenance Manual, American Disabilities Act and Title 24 unless otherwise shown on the plans.

Measurement - Measurement of traffic markings, striping, and raised pavement markers shall be by the lump sum.

Payment - The contract lump-sum price bid for signing, markings, striping, and raised pavement markers shall be considered full compensation for furnishing all labor, materials, tools, equipment, and incidentals to accomplish all the work specified herein and no additional compensation will be allowed thereafter.

310.5.6.7 Layout, Alignment, and Spotting. The first sentence of the first paragraph shall be deleted and replaced with the following:

The Contractor shall furnish the necessary control points for all striping and markings, and shall be responsible for the completeness and accuracy thereof to the satisfaction of the City Representative.

The following paragraph shall be added following paragraph two:

Spotting shall be completed prior to the removal of any existing stripes. Existing striping and markings shall be removed prior to painting, but in no case shall any section of street be left without the proper striping for more than 24 hours, or over weekends or holidays.

310-5.6.8 Application of Paint. Delete the third and fourth paragraphs and replace with the following:

Traffic and parking lot stall stripes and pavement markings on new surfacing shall be applied in two (2) coats, except where otherwise shown on the plans. The first coat of paint shall have dried for two (2) weeks before application of the second coat on existing surfacing, traffic stripes and pavement markings may be applied in one coat.

Add the following paragraphs:

The completed pavement markings shall have clean and well-defined edges and shall conform to the dimensions shown on the plans, except that minor variations may be accepted by the City Representative.

Drips, overspray, improper markings, and paint tracked by traffic shall be immediately removed from the pavement surface by blast cleaning or other methods approved by the City Representative. All such removal work shall be at the Contractor's expense.

SECTION 313 – PLAYGROUND EQUIPMENT INSTALLATION

The Contractor shall install the following equipment per the manufacturer's recommendation and per the plan. Play equipment shall be as manufactured by Landscape Structures, Inc. (No Substitutions) and as provided by Coast Recreation, contact: Chad Barry (714) 619-0100. The Contractor will supply to the City, State, and Federal installation guidelines, standards, and recommendations. The letter will be submitted prior to release of final payment. Minimum guarantees and terms of the guarantee shall be reviewed and approved by City staff prior to modifications and new installations occurring. The Contractor will also supply to the City a letter from the playground manufacturer stating that all installed equipment complies with ADA and CPSC Guidelines and Standards. Playground manufacturer to provide insurance certificate naming the "City of Lake Forest", its agents and employees as additionally insured with respect to the manufacturing and installation of PORTOLA CENTER PARK play equipment." Playground equipment installation must be performed by a Landscape Structures "Certified" Installer. Contact Landscape Structures for a list of certified installers.

Play equipment (Drum and Chimes Rhapsody Equipment) shall be as manufactured by Landscape Structures, Inc. (No Substitution is permitted). Contact: Chad Barry. Phone: (714) 619-0100.

Play equipment (Custom Play Structure with Custom Shade Structure) shall be as manufactured by Landscape Structures, Inc. (No Substitution is permitted). Contact: Chad Barry. Phone: (714) 619-0100.

Play equipment (Swingset) shall be as manufactured by GameTime (No Substitution is permitted). Contact: Tyler Kyriopoulos. Phone: (800) 453-2735. Install per Manufacturer's recommendations and by Certified Installer.

Play equipment (Mast Net) shall be as manufactured by Dynamo Playgrounds (No Substitution is permitted). Contact: Jaclyn Vanderzon. Phone: (800) 790-0034. Install per Manufacturer's recommendations and by Certified Installer.

Play Equipment as specified on the plans.

313-1 RESILIENT PLAYGROUND SURFACING

1. The Contractor shall provide all services and products to ensure a complete installation of resilient playground surfacing.

2. The resilient surfacing shall conform to ASTM-F-1292-91, ASTM-F-35586 Class A Flame spread, ASTM E108.

3. Thickness of resilient surfacing must match fall heights of proposed play equipment per Consumer Product Safety Commission.

4. Sub-base preparation, concrete base, thickened edges, and drainage including any necessary excavation will be the sole responsibility of the Contractor and shall be included in the square footage cost for resilient surfacing.

5. Concrete curbing must be installed below grade to confine the resilient surfacing and will be installed per plans.

6. Concrete sub-base shall be installed under all resilient surfacing as specified on plans and details.

7. Compaction of sub-grade material shall be at 90% minimum.

8. Compacted sub-grade shall be graded as noted on civil plans.

9. Resilient surfacing will be poured in place and its intended use will be for a shock absorbing surface under and around playground equipment.

10. The resilient surfacing will be porous, seamless, and capable of installing at various thicknesses.

11. Resilient surfacing is a two layer system consisting of a cushion layer covered by a weather resistant wearing layer.

12. Cushion Course: per specifications of "Surface America." The resilient surfacing shall be a minimum installed thickness as specified below: Finish surface of wearing course shall be level.

Overall Thickness	Critical Fill Height
3"	7"

13. Wearing course per Specifications of "Surface America." The wearing course shall be an installed thickness of 3/8". The binder for rubber particles shall be aliphatic.

14. Wearing course shall be hand troweled to produce an even, uniform surface. All edges to be transitioned to a beveled or flush condition.

15. A five-year guarantee against defects in materials and workmanship must be provided in writing, by the Contractor, to the City prior to project completion.

16. Install "Surface America." Resilient surfacing available from:

    Coast Recreation
    Contact: Chad Barry
    Phone: (714) 619-0100

    No Substitutes.
    Submit 2' x 2' sample and specifications for consideration a minimum of ten (10) days prior to bid opening.

LANDSCAPING AND IRRIGATION

SECTION 800 - MATERIALS

800-1 LANDSCAPE MATERIALS

800-1.1 Topsoil [No change to "Greenbook"]

800-1.2 Soil Fertilizing and Conditioning Materials

800-1.2.3 Commercial Fertilizer [Add the following paragraphs]:

Commercial Fertilizers shall be delivered in sacks with the manufacturer's label showing weight and analysis attached to each sack.

The following commercial fertilizer and soil preparation shall be for bid purposes only. Exact quantities and recommendations may be determined by the soil fertility and agricultural suitability test to be prepared by Waypoint Analytical. (714) 282-8777 or approved equal testing facility. Tests shall be provided by the Contractor at no additional cost to the City and shall be included in the base bid. Test shall be performed after final grading has been completed and approved by the City. All areas to be landscaped with a slope of 3:1 or less shall be cross-ripped or otherwise tilled to a depth of 18 to 24 inches. Uniformly spread and cultivate amendments thoroughly by means of mechanical tiller into top 6" of soil in all planting areas. Application rate per 1,000 square feet:

Commercial Fertilizer 6-20-20	25 pounds
Soil Sulphur	20 pounds
Granular Gypsum	100 pounds
Nitrogen stabilized sawdust ("Greenbook" – Type I Organic Amendment)	6 cubic yards

Planting Tablets: Provide slow-release type with potential acidity of not more than 5 percent by weight containing the following percentages by weight of nutrients listed; 20-nitrogen, 10-

phosphoric acid, 5-potash, 2.6 combined calcium, 1.6-combined sulfur 0.35-iron (elemental) from ferrous sulfate. Provide in 21 gram tablets manufactured by Agriform, or other approved.

Landscape areas with gradients greater than 3:1 shall receive a uniformity broadcast application of the following:

300 lbs/Acre Nitroform (38-0-0, WIN 27%)
600 lbs/Acre 6-20-20

800-1.2.4 Organic Soil Amendment.

Paragraph 1 shall be deleted and replaced with the following: Organic Soil amendment material shall conform to Type 1 unless otherwise designated. Delete paragraph references to Type 2 and Type 3 soil amendments.

800-1.2.5 Mulch.

Sentence one of paragraph one shall be deleted and replaced with the following:

Mulch: Provide 'forest floor' (0″- 4″) as supplied by Aguinaga Company, (949) 786-9558, or approved equal. Submit sample for review and approval by City Inspector prior to material delivery on-site.

The following subsection shall be added:

800-1.2.6 Soil Herbicide.
Landscape areas:

A commercially manufactured non-selective herbicide ("Round-up" or approved equal) for total control of vegetation products shall meet all federal and state regulations pertaining to the use of such substances. Application and rate of application shall follow manufacturer's recommendation. Application shall not be made until obtaining written approval from the City. Following City approval of Contractor herbicide, Contractor shall apply herbicide to all landscape areas. Such application shall be performed in consideration of overall construction schedule and operation so as not to disrupt or interfere with the project schedule and time line.

800-1.4 Plants
800-1.4.1 General. Subsection 800-1.4.1 shall be deleted and replaced with the following:

A representative number of plants may be inspected and approved at the nursery by the City Representative prior to shipment to the planting site. Prior to such visit, Contractor shall submit 3" x 5" color photographs of all proposed tree and shrub material for City's review. Photos shall be submitted seven (7) calendar days prior to specified plant material review at nursery site. Plants shall be inspected for size and condition of root growth, insects, injuries and latent defects. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name. The City reserves

the right to reject entire lots for plants represented by defective samples. Plant condition shall be in accordance with the American Standard for Nursery Stock (ANSI Z60.1-1996). All plants shall have a growth habit normal to the species and shall be sound, healthy, vigorous, and free from insect pest, plant diseases, sun scalds, fresh bark abrasions, excessive abrasions, or other objectionable disfigurements. Tree trunks shall be sturdy and well hardened off. All plants shall have normal well-developed branch systems, and vigorous and fibrous root systems which are neither root nor pot-bound and are free of kinked or girdling roots. Other than the normal side pruning during the growth period, no pruning shall be done prior to inspection at the nursery. The size of the plants will correspond with that normally expected for species and variety of commercially available nursery stock, or as specified in the drawings. The minimum acceptable size of all plants, measured before pruning with the branches in normal position, shall conform with the measurements, if any, specified on the drawings in the list of plants to be furnished. Plants larger in size than specified may be used with the approval of the City, but the use of larger plants will make no change in contract price. Bare root plantings in publicly maintained areas shall be done only with special approval of City.

Quantities and Types. 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 drawings. The landscape Contractor is to verify all sizes and quantities on plans. Installation and use of substitute items shall not be made until the Contractor is in receipt of written approval from the City. **Substitution Proposals for plant material must be accompanied by substantive written proof of non-availability of material originally specified prior to bid opening.**
Add the following subsection:

800-1.4.2.1.9 Fertilizer.

A. Root Growth Stimulant: Stimulant shall be Vitamin B-l as manufactured by Cal-Liquid, Cooke, Chican, Ortho, or other approved equal.

B. Fertilizer will not be used at time of planting. After four months, use a light application of 20:10:5 approximately 1/2 lb. nitrogen per tree cultivated into soil.

800-1.4.5 Sod (turf grass) [Add the following after the last paragraph]:

Turf Sod shall be Tifway II Bermuda Grass, provided by West Coast Turf (888) 893-8873.

800-1.5.3 Tree Stakes. The first paragraph shall be replaced with the following;

Tree stakes shall be sharpened 2" diameter, 12′ long lodgepole pine, treated in accordance with Section 204-2.2. Stake shall be one piece and free from splits. Trees installed as 36” box and larger shall be installed with guy anchors (3/tree).

The third paragraph shall be replaced with the following:

Deadman stakes shall be duckbills or 2 x 4 inch redwood 18 inches long. Covers for wire shall be 3/4-inch Class 200 PVC pipe - 3 feet long.

The following paragraph shall be added at the end of the subsection:
A minimum of two (2) supporting tree ties or three (3) guy anchors shall be used for each tree. Tree ties shall be V.I.T. twist brace Model TB24.

800-1.5.4 Jute Mesh

All irrigated slopes at gradient of 4:1 and steeper shall be covered with "Geojute" or approved equal, as provided by Ben Meadows, Co. or approved equal (800) 241-6401. Install per manufacturer's specifications. Planting through 'Geojute" slope stabilizing mesh shall be in accordance with planting recommendations provided by Geojute.

800-1.5.5 Root Barriers

Root barriers shall be 24″ deep and as provided by DeepRoot Corp. (800) 458-7668, or approved equal. Installation shall be per manufacturer's specifications.

800-1.5.6 Arbor Guards

All trees planted in turf areas shall be planted with continuous, secured Arborgard+ protective sheath at base of trunk, or approved equal. Install per manufacturers specifications. Available from: Gemplers (800) 382-8473.

800-1.6 Decomposed Granite Paving

800-1.6.1 Manufacturers and Suppliers. The following Subsection shall be added:

Decomposed Granite Paving where indicated on plans shall be "Organic-Lock" provided by: Gail Materials, 10060 Dawson Canyon Road, Corona CA 92883, Contact: David Dzwilewski Tel: 951.667.6106, Fax 951.667.6102 www.gailmaterials.net

800-1.6.2 Submittals. The following Subsection shall be added:

Provide ½ cubic foot sample of specified material for review and approval prior to acquisition and delivery. Submittal material to meet passing Sieve Analysis and Sand Equivalency per supplier specifications.

The Contractor shall provide the City's Representative with copies of all material invoices from the Contractor's material supplier, showing material weight and specifications, as verification of all materials supplied for the contract

800-2 Irrigation System Materials

800-2.1.1 General. The following paragraph shall be added at the end of the subsection:

The manufacturer's directions and detail drawings shall be followed unless directed by the City Representative or shown differently in the plans and specifications.

800-2.1.3 Plastic Pipe for Use With Solvent Weld Socket or Threaded Fillings. Add the following before the first paragraph:

General. Use only new materials of brands and types noted on drawings specified herein, or approved equals.
Paragraph 2 shall be deleted and replaced with the following:

PVC Pressure Main Line Pipe and Fittings shall be Class 315 PVC with bell and gasket-type pipe for pressure main pipes 2 inches and larger.

PVC schedule 40 with solvent welded joints for pressure main piping of lesser diameter. PVC schedule 40 solvent welded piping shall be used for all non-pressure lateral line piping.

The following paragraphs shall be added at the end of the subsection:

All PVC pipe must bear the following markings:

1. Manufacturer's name
2. Nominal pipe size
3. Schedule or class
4. Pressure rating in P.S.I.
5. NSF (National Sanitation Foundation) approval
6. Date extrusion
7. U.P.C. shield logo (IAPMO approval)

All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S. schedule and NSF seal of approval

Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type recommended by the manufacturer, and shall follow installation methods prescribed by the pipe manufacturer.

800-2.2.2 Gate Valves. The text of this subsection shall be deleted and replaced with the following:

All valves shall be as identified on the Construction Documents and per City review and approval.

800-2.2.4 Remote Control Valves. Add the following after paragraph number one:

Remote control valve manufacturer and sizes shall be as indicated in plans and legend.

800-2.2.6 Quick-Coupling Valves and Assemblies. The text of this subsection shall be deleted and replaced with the following paragraph:

Quick-coupling valves shall have a brass two-piece body designed for working pressure of 150 PSI. The quick-coupling valve shall have a built-in flow control and self-closing valve and shall be supplied in 3/4-inch (19) size unless otherwise required. The valve shall be equipped with a locking green rubber or vinyl cover. When a quick-coupler assembly is specified, it shall consist of the valve, quick-coupler connection, and hose swivel.

800-2.2.7 Valve Boxes. Delete the first paragraph and replace with the following:

Valve boxes and lids shall be as detailed on the Plans. The boxes shall be covered with an etched polyethylene face with an ultraviolet inhibitor. The lid shall be plastic, lockable, and embossed with the valve station number on its topside. Sizes and manufacturer of the valve boxes and lids shall be as indicated on the Standard Drawings.

800-2.2.8 Master Control Valves.

The master control valve manufacturer and size shall be as indicated on plan and legend.

800-2.3 Backflow Preventer Assembly

Add the following after paragraph number one:

Unless otherwise instructed by the City Inspector, backflow assemblies shall consist of a brass reduced pressure/backflow prevention device with “Wye” strainer and 60 mesh screen as detailed and called out on the Project Plans.

800-2.4 Sprinkler Equipment

The text of this subsection shall be deleted and replaced with the following:

Irrigation bodies and nozzles shall be as indicated on plan and legend. Substitutions shall not be allowed unless by written authorization from the City of Lake Forest.

Irrigation bodies and nozzles shall feature low head drainage, pressure regulating, and pressure compensating features. Unless otherwise approved, all pop-ups and fixed riser assemblies shall consist of plastic and stainless steel materials.

Smaller radii turf irrigation equipment shall consist of 6-inch pop-ups. All smaller radii shrub and groundcover irrigation equipment shall consist of 12-inch pop-ups, unless otherwise approved by the City. Smaller radii equipment are those components which irrigate within and under a radius of 22 feet.

800-3 ELECTRICAL MATERIALS

800-3.2.1 Conduit. [Replace paragraph with the following]:

Conduit shall be Schedule 40 PVC pipe as called out on the plans. Install per plans. Conduit shall conform to the applicable provisions of subsection 800-2.1.3.

800-3.2.2 Conductors [Add the following paragraph]:

The electrical system shall be installed in accordance with the National Electrical Code most recently adopted by the City. Connections between the automatic controllers and the electric control valves shall be made with direct burial copper wire AWG-U.F. 600 volt. Pilot wires shall be a different color wire for each automatic controller. Common wires shall be white with a different color stripe for each automatic controller. Install in accordance with valve manufacture's specifications and wire chart. In no case shall wire size be less than #14.

Wiring shall occupy the same trench and shall be installed along the same route as pressure supply or lateral lines wherever possible. Install wires inside Schedule 40 Conduit anywhere it is not possible to place in pipe trench, or where wires must go under pavement. Conduit size shall be large enough to contain all necessary wires. Minimum conduit size shall be 2".
Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of ten (10) feet.

An expansion curl should be provided within three (3) feet of each wire connection and at least every one hundred (100) feet of wire length on runs more than one hundred (100) feet in length and also at each change of direction. Expansion curls shall be formed by wrapping at least five (5) ruins of wire around a one-inch diameter pipe, then withdrawing the pipe.

All splices shall be made with 3M - DBY wire connector, or approved equal.
Use one splice per connector sealing pack.

Field splices between the automatic controller and electrical control valves will not be allowed without prior approval of the City.

SECTION 801 - INSTALLATION

801-1 GENERAL

The following paragraphs shall be added at the end of the subsection:

Inspection will be required for the following parts of the work:

a. At completion of rough grade prior to incorporation of soil amendments.

b. Irrigation coverage test prior to initiating planting operations.

c. At completion of incorporation of soil amendments and fine grading.

d. Prior to digging plant pits for trees and shrubs.

e. During backfilling of plant pits with amended backfill.

f. Maintenance period shall not begin until final installation inspection is made, and establishment is verified. City inspector shall approve commencement date of maintenance prior to the commencement of said maintenance.

g. Final review and acceptance at the end of the maintenance period.

801-2 EARTHWORK AND TOPSOIL PLACEMENT

801-2.1 General. The following paragraph shall be added at the end of the subsection:

The Contractor shall apply water as necessary to provide ideal moisture content for tilling and for planting as, herein specified.

801-2.2 Trench Excavation and Backfill. The second and last paragraph shall be deleted and the following added:

The depth of cover over pipelines and conduits shall be per Drawings.

The trenches shall not be backfilled until all required tests are performed. A fine granular material used for bedding and backfill will be placed on all lines. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, or other approved materials, free from large clods of earth or stones.

The finished surface shall be restored to the grade established prior to excavation. All mounding and divots shall be graded smooth to the satisfaction of the City Representative.

If settlement occurs, and subsequent adjustments in pipe, valves, valve/utility boxes, sprinkler heads, lawn or planting, or other construction are necessary, the Contractor shall make all required adjustments.

801-2.2.1 Trenching and Backfilling Under Paving. The following subsection shall be added:

Where irrigation lines are called for on the plans to be placed within a sleeve the PVC sleeve to be provided for such work shall be Schedule 40 PVC sleeve.

801-2.2.2 Trenching Adjacent to Existing Trees. The following subsection shall be added:

Where it is necessary to excavate adjacent to existing trees, the Contractor shall use all possible care to avoid injury to trees and tree roots. Excavation in areas where two (2) inch and larger roots occur shall be done by hand. All roots two (2) inches and larger in diameter, except directly in the path of pipe or conduit, shall be tunneled under and shall be heavily wrapped

with burlap, to prevent scarring or excessive drying. Where a ditching machine is run close to trees having roots smaller than two (2) inches in diameter the wall of the trench adjacent to the tree shall be hand trimmed, making clean cuts through. Trenches adjacent to trees should be closed within twenty-four (24) hours; and where this is not possible, the side of the trench adjacent to the free shall be kept shaded with burlap or canvas.

801-2.3 Topsoil Preparation and Conditioning

801-2.3.2 Fertilizing and Conditioning Procedures. The first paragraph of the subsection shall be deleted and replaced with the following:

The planting areas shall be brought to rough grade whereupon Fertilizer and Soil Conditioning required for the native soils for the intended landscape planting shall be added based upon the recommendations of Soils Fertility and Agricultural Suitability Report. (See Section 800) The Contractor, at no additional cost to the City, shall make two additional soils tests for agricultural fertility and suitability and fertilizer and amendment recommendations of all planting areas upon completion of excavation, topsoil backfilling, and grading. The Contractor shall amend it as necessary to comply with the soils test report at no additional cost to the City.

801-2.3.3 Weed Control. The following subsection shall be added:

Kill and remove all existing weeds from site areas utilizing post-emergent herbicide.

Upon completion of the irrigation system and after all designated shrub and ground covers, existing weeds and growth have been removed from the planting areas. All areas shall be watered four (4) times daily until weed seeds have germinated for approximately 21 days or unless otherwise directed by the Engineer. Thereafter, watering shall cease for three (3) days to be followed by the spraying of a systemic herbicide containing the active ingredient glyphosate (Roundup-Pro, or approved equal). Spraying shall be at the labeled rate compatible with the eradication rate for the target weed species and shall be performed under the direction of a registered pest control advisor. After allowing sufficient time for the herbicide to kill all remaining weeds (2 weeks minimum), the areas to be landscaped shall be raked or hoed as directed by the Engineer to remove any remaining weed stubble. All areas shall be watered for an additional 14 (fourteen) day period and then receive an additional application of the systemic herbicide per manufacturer's recommendation.

801-2.4 Finish Grading. The following shall be added to the last sentence of the second paragraph.
…except where water is designed to flow over the same.

The following paragraphs shall be added following paragraph two:

Finish grades shall be those indicated on the drawings or as may be controlled by existing installations. Grades not otherwise indicated shall be uniform, and straight graded between points where elevations are noted. Minor modeling of the ground surface may be required. Landscape areas to receive turf shall be rolled with a water drum in a north/south and then

east/west direction. Low spots and high spots in the terrain shall be backfilled and tamped or bladed and spread. The resultant grade shall be smoothly, evenly contoured and compacted to 85%. The gradient shall be as noted on plans.

Grading shall provide for the natural run-off of water without low spots or pockets. Flow lines shall be set by instrument and shall be the maximum gradient possible.

801-2.5 Decomposed Granite Paving

Decomposed Granite Paving Installation.

801-2.5.1 Mock-up. The following subsection shall be added:

1. Install 6-foot by 6-foot by 3-inch depth area of Decomposed Granite Paving ("Organic-Lock")
2. Mock-up shall be prepared under the direction and oversight of product representative: Dave Dzwilewski / Gail Materials
3. Install Decomposed Granite Paving over moistened compacted aggregate base or moistened compacted sub grade soil, as indicated on plans and details.
4. Install pre-approved edging as temporary restraints along the edges.
5. Use equipment to be used on remainder of work in construction the mock-up.
6. Perform initial compaction and final compaction as would be performed for full-scale construction.
7. Make observations during mock-up construction regarding the depth of placement required to achieve finished pavement thickness and elevation after initial and final compaction.
8. Demonstrate compaction procedures during mock-up construction that eliminate roller marks and provide a uniform surface texture without tearing or displacing the pavement mixture, and use lighter weight compaction equipment if required to meet specifications requirements without tearing or displacing the Decomposed Granite Paving.
9. If mock-up fails to meet specification requirements, make necessary adjustments to the construction procedures.
10. Construct as many mock-ups as necessary to achieve and accepted paving depth, surface finish, and surface density over the entire surface of the mock-up at no additional cost to the Owner.
11. Mock-ups which are completely or partially finished incorrectly will be rejected.
12. Remove rejected mock-ups immediately from the site at no additional cost to the Owner.
13. The Mock-up, when accepted, shall become the project standard for compaction, aggregate consolidation, tolerances and appearance.

801-2.5.2 Preparation. The following subsection shall be added:

a. The finished sub grade shall be uniform and free of deleterious debris such as organic materials, nails, stones and loose soil.
b. Make necessary corrections to furnish a firm and stable base as shown and specified on drawings.
c. Pre-soak base material with water to the correct moisture level prior to installing Decomposed Granite Paving as needed to compact base.

801-2.5.3 Blending:

"Organic-Lock" Paving by Envirobond is a manufacturer's proprietary blend supplied by Gail Materials.

Survey Requirements:

Lines and Levels: Establish lines and levels. Locate and lay out by instrumentation and similar appropriate means for "Organic-Lock" Paving finished surface grades.

801-2.5.4 Curbing and Edging. The following subsection shall be added:

a. Curb ledging per plans.

b. If utilized, compacted "Organic-Lock" Paving should not be more than 1/16-inch below the top of the curbing or edging.

801-2.5.5 Installation of "Organic-Lock" Paving. The following subsection shall be added:

a. Trail or pathway applications shall have a crown or minimum cross slope of 1.5-percent and shall be compacted to minimum of 90-percent.

b. Placement:

1. Place mix using a continuous self-propelled mechanized spreading and finishing machine designed for that purpose.
2. Spread "Organic-Lock" Paving to a loose depth of +/- 4-inches, or a specified on drawing of final grade.
3. Compact with a 1 to 3-ton roller to achieve the specified compaction.
4. Do not use the vibration mode on the roller drums as this may cause the binder to separate from the aggregate and stick to the roller drum and discolor the "Organic-Lock" Paving.
5. If material is sticking to the roller drums, lay sheets of 6-millimeter plastic liner and compact with the roller drum.

6. A light misting of water may also aid in the compaction sticking of “Organic-Lock” Paving to the roller.
7. Compact material making a minimum of 8 passes and up to 10 passes.
8. In small areas that are difficult to access with large equipment use a .5-ton reversible plate compactor making a minimum of 8 passes and up to 10 passes.
9. Once compaction of the “Organic-Lock” Paving is completed allow for 24-hours as to allow the “Organic-Lock” Paving to cure. Prevent moisture from coming in contact with the “Organic-Lock” Paving during this the first 24-hours of this stage.

801-2.5.6 Tolerances. The following subsection shall be added:

a. Finished “Organic-Lock” Paving Compaction versus Detail Drawing Thickness: +/- 3/16-inch.

b. Finished surface shall be uniform and solid with +/- 3/16-inch variation from a 10-foot long straight edge laid parallel to the center path except at grade breaks. Loose materials or ruts shall not be present on the surface.

801-2.5.7 Maintenance. The following subsection shall be added:

a. In areas of vehicular use and/or with continued exposure to dirt and debris, surface darkening may occur.

b. Scarifying the surface 1/8-inch with a nail drag and roller drum will quickly clean the surface and expose fresh underlying “Organic-Lock” Paving material.

c. This procedure will become less frequent over time.

801-2.5.8 Repairs. The following subsection shall be added:

a. In areas of repair, remove the damaged “Organic-Lock” Paving material.

b. With a shovel, square the corners and edges of the area to be repaired.

c. Scarify the area to be repaired with a rake or nail drag to prevent a poor interface of existing “Organic-Lock” Paving material and fresh “Organic-Lock” Paving material.

d. Fill in the area of repair with “Organic-Lock” Paving material and compact as instructed in section 2.7 INSTALLATION OF “ORGANIC-LOCK” PAVING.

801-3 HEADER INSTALLATION

The following subsection shall be added:
801-3.1 Concrete Headers. Concrete headers shall be constructed where shown on the plans and specifications. All concrete work shall conform to the requirements of subsections 201-1 and 301-1 and per Project Plans.

801-4 PLANTING

801-4.3 Layout and Plant Location. The following paragraph will be added at the end of the subsection:

Quantities for shrubs and groundcovers shown on the legend are for estimate purposes only. Final quantities for plant materials installed shall be governed by the indicated plant spacing. Quantities for trees shall be verified in bid documents and discrepancies between the planting plans and the bid schedule shall be noted on bid schedule by Contractor at the time of bid submittal.

In the event that designated plant location is found in conflict with underground utility or structure during the planting operation an alternate location will be selected by the City. The Contractor shall be responsible to notify utility companies for the spotting of underground facilities prior to plant acquisition and to make precautionary potholes where conflicts would be indicated on the plans or by field notations by utility representatives. The cost for utility notification and potholing shall be included in the other work items and no additional compensation will be allowed therefore.

Proposed tree locations, as indicated on plans shall be staked by contractor for review and approval by city prior to digging of plant pits for planting. Stakes shall minimum of 6' in length and color coded to indicate variety of proposed tree planting at each of the staked locations. Review and approval of provided color-coded stake locations, with modifications/adjustments as necessary shall be provided by city prior to commencement of tree planting operations.

Container shrubs and groundcovers shall be placed on finish grade at locations indicated on planting plans for review and approval prior to planting. Contractor shall notify City 48 hours prior to scheduled review of containerized shrubs and groundcovers on grade

801-4.4 Specimen Planting [Insert before first paragraph]:

The planting pits for trees shall be excavated twice the diameter and the depth of the rootball.

Set the tablets to be used with each plant on the top of the root ball while the plants are still in their containers so the required number of tablets to be used in each hole can be easily verified.

3 tablets per 15 gallon
4 tablets per 24 inch box
5 tablets per 30 inch box
6 tablets per 36 inch box
7 tablets per 42 inch box
8 tablets per 48 inch and larger boxes

Planting shall be governed by the following requirements:

801-4.5 Tree and Shrub Planting

The Contractor shall amend backfill as necessary per the soils test report at no additional cost to the City. (Refer to Sections 800 and 801-2.3.2). **The following soil amendments and fertilizer guidelines shall be used for bid purposes only.** Fill holes with backfill mixtures as specified below:

1. The following material shall be thoroughly blended and used as a backfill mix in the surface 12" around trees and shrubs, and the backfill soil, 12" below finish grade should be amended if specified by the soil test report with only gypsum and / or iron sulfate. No mixing for individual planting holes will be permitted. Mix planting soil prior to backfilling and stockpile at the site. The iron sulfate should not contact cement surfaces since severe staining could occur.

   8 parts by volume screened on-site soil
   2 parts by volume Nitrogen Stabilized Organic Amendment
   1 ½ lbs. Iron Sulfate per cu. yd. of mix
   1 lb. 12-12-12 per cu. yd. of mix
   5 lb. gypsum per cu. yd. of mix

2. Place plants near respective pits. Set the tablets to be used with each plant on the top of the root ball while the plants are still in their containers so the required number of tablets to be used in each hole can be easily verified.

   1 tablet per 1-gallon container
   2 tablets per 5-gallon container
   3 tablets per 15-gallon container

3. Remove all plants from their containers and set in plant pits.

4. Fill to proper height with amended backfill to receive the plant and thoroughly tamp the mixture before setting the plant.

5. Set plant in upright position in the center of the hole and compact the backfill mixture around the ball or roots.

6. Thoroughly water each plant when the hole is one-half filled. After water has completely drained, place planting tablets per detail. The remainder of the hole shall then be backfilled.

7. After watering, tamp the soil in place until the surface of the backfill is level with the surrounding area and the crown of the plant is at the finished grade of the surrounding area. Do not backfill around trunks or stems.

8. After backfilling, an earthen basin shall be constructed around each plant. Each basin shall be of a depth sufficient to hold at least six inches of water. Basins shall be the same size as the container size of each individual plant. The basins shall be constructed

of amended backfill material. This berm shall be leveled to finished grade alter the 60th day of the maintenance period, and prior to the ground cover hydroseeding.

9. Immediately after planting, apply water to each tree and shrub by means of a hose. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.

10. Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas moist at all times, wet below the root system of grass and plants. Generally, water once each day for 7 days in cool seasons, for 14 days in hot weather. Berms around shrubs and trees in slopes shall be maintained for 60 days following tree planting and then removed.

11. Pruning - Pruning shall be limited to the minimum necessary to remove injured twigs and branches and to compensate for loss of roots during transplanting, but never to exceed one-third of the branching structure. Upon approval of the City Representative, pruning may be done before delivery of plants but not before plants have been inspected and approved by the City.

12. No trees shall be planted within 6 feet of paved surfaces, unless specifically indicated on plans. Those trees noted on plans to occur within 6' of curbs and/or paving shall receive continuous root barriers per Section 800-1.5.5.

801-4.6 Planting Staking and Guying. The text of the entire subsection shall be deleted and replaced with the following paragraph:

All staking and guying shall be in accordance with the Plans, Details, and Specifications.

801-4.7 Ground Cover and Vine Planting. The second paragraph shall be deleted and replaced with the following:

Ground cover shall be planted in moist soil and spaced as indicated on the plant legend.

801-4.8 Lawn Planting

801-4.8.1 General. This section includes the following, as noted on plans:

801-4.9 Wood Mulch Installation

Mulch installation shall consist of placing 3″ thick layer 'forest floor' material equal to or supplied by Aquinaga Company (949) 786-9558 over designated planter areas. See plans for areas of installation. Submit sample prior to purchase and/or placement for approval.

801-5 IRRIGATION SYSTEM INSTALLATION

801-5.l General. The following paragraphs shall be added after paragraph three:

Contractor shall be responsible to notify the City prior to start of construction to coordinate on-site inspections.

Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which maybe required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions.

The work shall be installed in such a manner as to avoid conflicts between planting and architectural features, etc.

All work called for in the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.

The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that unknown obstructions, grade differences, or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the City Representative. In the event this notification is not performed, the Irrigation Contractor shall assume full responsibility for any revisions necessary and shall perform such at his own expense.

The fourth paragraph shall be deleted and replaced with the following paragraphs:

The location of connection points shown is approximate. The Contractor shall contact the utility companies and coordinate the installation of the required electrical and water services. Following coordination with the utility companies, the Contractor shall make all necessary provisions to make the service connections called for on the plans at the places indicated or to the nearest acceptable point thereto as approved by the utility companies and the City Representative. Verification of the point of connections with the utility companies and the City Representative shall be obtained by the Contractor prior to the start of work.

All costs for making the service connections shall be paid for by the Contractor, with the exception of any utility company fees and permit fees which are reimbursable by the City, as per Section 7-5 "Permits" of the General Provisions.

The following paragraph shall be added at the end of the subsection:

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.

801-5.2 Irrigation Pipeline Installation

801-5.2.l General. The following sentences shall be added at the end of paragraph four:

A minimum of twelve (12) inches clearance shall be maintained between “recycled” irrigation pipelines and non-irrigation pipelines/conduits.

The following paragraphs shall be added at the end of the subsection:

PVC Sleeves shall be required under areas where all hardscape materials shall be installed. Sleeving shall be done per detail on Project Plans (Minimum sleeve dimension shall be twice the diameter of pipe size.

801-5.2.3 Plastic Pipeline. The following shall be added to the end of paragraph one: PVC to metal connections shall only be accomplished by PVC male adapters screwed into metal fittings. Teflon tape shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints.

The following paragraph shall be added following paragraph four:

Handling of PVC Pipe and Fittings. The Contractor is cautioned to exercise care in handling, loading, unloading, and storing of PVC pipe and fittings. All PVC pipe are to lie flat and not to be subjected to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and, if installed, shall be replaced with new piping. Pipe and fittings shall not be stored in direct sunlight.

801-5.3 Installation of Valves, Valve Boxes, and Special Equipment

Paragraphs three, four, five, and six shall be deleted.

801-5.4 Sprinkler Head Installation and Adjustment.

801-5.4.2 Location, Elevation, and Spacing.

The third paragraph shall be amended to read as follows:

Sprinkler heads shall be installed 6 inches from the adjacent vertical elements projecting above wade such as walls, planter boxes, curbs, and fences in shrub areas. Sprinkler heads shall be installed 4 inches from adjacent vertical elements projecting above grade such as walkways, walls, planter boxes, curbs, and fences in turf areas.

801-5.6 Flushing and Testing.

801-5.6.1 General. The following paragraph shall preface the subsection:

Flushing of the lines shall be done before quick coupling valves and remote control valves are in place. All open ends shall be piped (temporarily to exhaust flushing water up and out of the trenches.)

No water will be permitted to fall into the trench. Flushing procedure will be to first open the ports nearest the source, then recap, and move progressively towards the end of the line, with only one open port flushing at anyone time.

Amend the last sentence of the first paragraph by adding “and approved in writing” by the Senior Landscape Planner at the end of the sentence.

Add the following paragraph to the end of the subsection:

When the irrigation system is completed, a coverage test shall be performed by City Staff to determine if the water coverage for planting areas is complete, adequate, and avoids overspray onto walks, roadways, and buildings as much as possible. The Contractor shall furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from the Drawings, 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 City inspector. This test shall be accomplished before any ground cover is planted.

The Contractor shall request the presence of the City in writing at least forty-eight (48) hours in advance of testing. The Contractor shall flush and adjust all sprinkler heads for optimum performance and to prevent overspray onto walks, roadways, and buildings as much as possible.

801-5.6.2 Mainline and Lateral Pipeline Pressure Test. Pressure test at the end of the first paragraph shall be amended to read: Mains 6 hrs at 150 PSI. Laterals 2 hours at 100 PSI.

801-6 MAINTENANCE AND PLANT ESTABLISHMENT

801-6.1 General

The following paragraph shall be added following paragraph six:

The Contractor shall be responsible for detecting diseases and pests (including rabbits, gophers, groundhogs, rodents) as soon as they are present and shall take immediate action to identify, control, and remove the disease or pest. Pest control programs of all mammals shall be done without extermination and as approved by the City’s Authorized Representative. Plants shall be maintained in a disease and pest free condition. A licensed pest control operator shall be maintained to recommend and apply pesticide, herbicides, and fungicides. Contractor shall be responsible for removal of gophers and moles from site and repair any and all damage attributed to their presence. Damaged plant material due to vertebrate pests (rabbits, gophers, groundhogs, etc.) shall be replaced immediately by Contractor at no cost to City. Dead dying and damaged plant material shall be removed at no cost to the City.

Maintain all planting starting with the planting operations and continuing for 90 calendar days after all planting is complete and approved by the City in writing. The maintenance period will not commence until all planting has been approved in writing by the City.

Maintenance shall include, but not be limited to, all watering, irrigation repair, weeding, mowing, edging, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition and to keep the planted areas neat and attractive throughout the maintenance period.

The lump sum price paid for the maintenance period shall include all costs for water (from the new water meter installed only), watering, irrigation repair, weeding, mowing, edging, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition and to keep the plant areas neat and attractive throughout the maintenance period. Upon the 60th day or thereafter, dirt berms around trees and shrubs shall be leveled.

Provide all equipment and means for proper application of water to those planted areas not equipped with an irrigation system.

Protect all planted areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards.

During the maintenance period, all plants and planted areas shall be kept properly watered and weed-free at all times. Irrigation schedule shall comply with AB325 and Certified Irrigation Auditor's parameters.

In order to expedite the plant establishment work, the Contractor shall maintain a sufficient number of men and adequate equipment to perform the work herein specified from the time any planting is done until the end of the final maintenance period.

The Contractor will be relieved from maintenance work when the plant establishment and maintenance work has been completed to the satisfaction of the City.

Damage to planting areas shall be replaced immediately when seen by Contractor. Damage observed by the City shall be replaced within 24 hours of notification to the Contractor.

Depressions caused by vehicles, bicycles, or foot traffic, are to be filled and leveled. Replant damaged areas.

Apply a pelletized fertilizer blend of 15-15-15 at the beginning and at every 30-day maintenance interval at the rate 350 lbs. per acre until the designated end of the maintenance period. A 90-day maintenance program shall consist of three fertilizer periods.

Apply 25 lbs Gro-Power Plus per 1,000 square feet at 25th and 55th day of 90 day maintenance period.

Contractor shall be responsible for removal of rodents, slugs, snails, and cutworms from site as required and repair damage as above.

All paved areas will be broom cleaned and/or washed and maintained in a neat and clean condition at all times, as directed by the City. AQMD and WQMP practices shall be observed. Air blowers shall not be allowed.

Replacements. At the end of the maintenance period, all plant material shall be in a healthy growing condition.

During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace that plant with a new and healthy plant of the same type and size without additional cost to the City.

All trees shall be guaranteed by the Contractor to live and grow in an acceptable upright position for a period of one year after completion and final acceptance by the City.

The Contractor, within ten (10) days of notification by the City, shall remove and replace all guaranteed plant materials which for any reason fail to meet the requirements of the guarantee. Replacement shall be made with plant materials as indicated or specified for the original planting, and all such replacement materials shall be guaranteed as specified for the original guaranteed materials.

Clean-Up. Upon completion of the work in this section, the Contractor shall clean-up and remove from the area all unused materials and debris resulting from the performance of the work as directed by the City.

801.6.2 Charts, Manuals, and Drawings

Subsection is hereby added to subsection 801-6 of the Standard Specifications as follows:

801-6.2.1 As-Built Drawings

Contractor shall provide City Representative with Landscape Architect signed “as-built” heavy weight drafting film originals of all project construction document plans, reflecting all “as-built” conditions for all project elements and two (2) sets of edge bound plots at the completion of the project at no additional cost to the City.

Contractor shall provide two (2) sets of surveyed electronic files in CAD and PDF format. One (1) set shall be delivered to the City for permanent recordkeeping purposes.

Contractor shall dimension from two (2) permanent points of reference, building corners, sidewalk or road intersections, etc., the location of the following items:

1. Gate valves
2. Sprinkler control valves
3. Routing of control wiring
4. Rain gauge
5. Quick coupling valves

6. Point of connection components (meters, backflow preventors, etc.)

7. Other related equipment as directed by the City

8. Significant changes in routing of lateral lines from those indicated on the plans

Delivery. On or before the date of the final inspection, the Contractor shall deliver the corrected and completed design documents to the City. Delivery of the final heavy weight drafting film will not relieve the Contractor of the responsibility of furnishing required information that maybe omitted from the prints.

801-6.2.2 Controller Charts

As-built drawings shall be approved by the City before the Contractor prepares the controller charts.

Provide two (2) controller charts for each controller supplied.

The chart shall show the area controlled by the automatic controller and shall be the maximum size which the controller door will allow.

The chart is to be a reduced drawing of the actual “as-built” system. However, in the event the controlled sequence is not legible when the drawing is reduced, it shall be enlarged to a size that will be readable when reduced.

The chart shall be a blackline or blueline print and a different color shall be used to indicate the area of coverage for each station.

When completed and approved, the Contractor shall hermetically seal the chart between two pieces of plastic, each piece being a minimum of 10 mils thick.

These charts shall be completed and approved prior to final inspection of the irrigation system.

801-6.2.3 Manuals of all Equipment and Certificate of Substantial Completion

Operation and Maintenance Manuals. Prepare and deliver to the City within ten calendar days after substantial completion of the project, three hard cover binders with three rings containing the following information:

1. Index sheet stating Contractor's and subcontractor’s license numbers, address, and telephone number and list of equipment with name and address of al local supplier’s and manufacturer's representatives.

2. Catalog and specification ‘cut’ sheets materials for all hardscape and softscape and equipment installed under this contract.

3. Guarantee statement. The guarantee for the sprinkler irrigation system shall be made in accordance with the enclosed form. The Contractor shall file a complete copy of all substantial completion forms and irrigation guarantee prior to the acceptance of project by the City.

   The guarantee shall be included in the operations and maintenance manual of all equipment throughout the park.

The guarantee shall be typed onto the Contractor's letterhead.

4. Complete operating and maintenance instructions on all major equipment.

In addition to the above mentioned maintenance manuals, provide the City's maintenance personnel with instructions for major equipment and show evidence in writing to the City at the conclusion of the project that this service has been rendered.

801-6.3 EQUIPMENT

801-6.3.1 Loose Equipment to be Furnished. The following subsection shall be added (confirm each item with the City Inspector prior to actual turn-over):

The Contractor shall supply as a part of this contract the following tools:

1. Two (2) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.

2. Two (2) five foot valve keys for operation of gate valves.

3. One (1) quick coupler key and matching hose swivel for every five (5) of each type of quick coupling valve installed.

4. Six (6) spray nozzles of each type specified on the legend.

5. One case of spray bodies of each manufacturer specified on the legend.

6. One case of rotors of each manufacturer specified on the legend.

7. Two (2) gate valves - line sized - as specified on the legend.

8. Two (2) keys each for controller and controller enclosure doors.

    a. One RainMaster remote for each controller

The above-mentioned equipment shall be turned over to the City at the conclusion of the project. Before final inspection can occur, evidence that the City has received material must be shown to the City Representative.

801-7 GUARANTEE

The text of the subsection shall be deleted and replaced with the following:

The guarantee period shall begin upon written notice by City of substantial compliance with plans and specifications has been achieved by Contractor.

Upon acceptance, all construction shall be guaranteed by the Contractor for a period of one year against defects in materials and workmanship.

Any settling of backfill trenches which may occur during the one year guarantee period shall be backfilled, compacted, and transitioned smoothly with adjacent gradients to the City's satisfaction by the Contractor without expense to the City, including the complete restoration of damaged planting, paving, or other improvements of any kind.

The Contractor, within ten (10) days of notification by the City Representative, shall remove and replace all guaranteed plant materials which, for any reason, fail to meet the requirements of the guarantee. Replacement shall be made with plant materials as indicated or specified for the original planting and all such replacement materials shall be guaranteed as specified for the original guaranteed materials.

GUARANTEE FOR IRRIGATION SYSTEM

We hereby guarantee that the 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 accepted. We agree to repair or replace any defects in material or workmanship, including settling of backfilled areas below grade which may develop during the period of one year from date of acceptance and also to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the City. We shall make such repairs or replacements within 72 hours after receipt of written notice. In the event of our failure to make such repairs upon written notice from the City, we authorize the City to proceed to have said repairs or replacements made at our expense and we will pay the costs and charge therefore upon demand.

PROJECT:

LOCATION:

AGENCY:

SIGNED:
(Contractor)

ADDRESS:

PHONE:

DATE OF ACCEPTANCE:

801-8 PAYMENT [Add prior to first paragraph]

The payment for the irrigation system and all appurtenant installations indicated on the drawings and described in these specifications shall be included as part of the Lump Sum Contract Price in the Proposal Bid Form.

The payment for the installation of turf shall be made as part of the Sum Contract Price.

The payment for maintenance of the work per the drawings and the specifications shall be made as part of the lump sum Contract Price 90-day Maintenance.

The payment for the planting and installation of trees, shrubs, and ground cover shall be included in the Contract Lump Sum Contract Price. The cost of soil amendments, fertilizing and soil conditioning, weed control, and finish grading shall be included in the Lump Sum Contract Price.

PART II – SECTION A
C.S.I. FORMAT
SPECIFICATIONS FOR:

- Synthetic Grass Outdoor Surface
- Site Electrical

SECTION 02795

SYNTHETIC GRASS OUTDOOR SURFACE SPECIFICATIONS: K9GRASS CLASSIC

1.01 DESCRIPTION OF WORK: The contractor shall provide all labor, materials, equipment and tools necessary for the complete installation of a “no in-fill” synthetic grass dog surface with a stable draining base. The complete synthetic grass system shall consist of, but not necessarily be limited to the following:

A. Area of construction with the extent of artificial turf work as shown on the drawings.

B. Subgrade, base, and drainage construction as specified in Section 2 and Section 3 of this document.

C. Quality synthetic grass product manufactured in the USA according to specifications in Section 2 of this document. Product shall be a knitted synthetic grass product (not tufted) and contain an antimicrobial agent while meeting or exceeding all guidelines as established herein. For characteristics not specifically stated, shall meet or exceed all guidelines published by the Synthetic Turf Council.

D. The synthetic grass surface shall be specifically designed, manufactured and installed for the intended use as a commercial/high use dog surfacing solution.

E. Plastic perimeter boards (typically 2” x 4” set vertically) are to surround the entire area for anchoring of the turf. The top edge of this surface is to be a minimum of 1/2” below any adjacent solid surfaces where there could be foot traffic.

F. Stainless steel staples, 1” in length, are to be used to anchor the synthetic turf to the perimeter boards.

1.02 SYSTEM PERFORMANCE: Contractor shall ensure that products for pet/dog system meet the following performance requirements:

A. The components, as well as the installation methods utilized, shall be designed and executed in a manner to hold up to the unique challenges dogs present. The materials as hereinafter specified shall withstand full climatic exposure in the location of the play yard/dog run, be resistant to insect infestation, rot, fungus, mold and mildew, shall also withstand ultra-violet rays and extreme heat, and allow the free flow of water vertically through the surface and into the drainage system below.

B. The seams of all system components shall provide a permanent, tight, secure, and hazard free surface.

C. The installed synthetic grass and drainage system shall allow for drainage and water flow through the system at a rate of not less than 300 inches per hour.

1.03 SERVICE AND QUALITY ASSURANCE: Synthetic grass vendor shall provide ongoing service quality assurance and warranty consisting of, but not necessarily be limited to, the following:

A. The synthetic grass vendor must provide competent workmen skilled in this type of dog surface installation. The synthetic grass vendor shall provide a qualified installation foreman to coordinate and review the component parts of the synthetic grass system. Foreman shall be introduced to owner or owner's representative prior to start of construction.

B. The synthetic grass vendor and installer must be experienced with no less than six completed commercial dog installations (2500sf or greater) where a knitted synthetic grass surface was installed. Installer must be competent in the installation of this material, including attachment of seams and proper trimming and attaching techniques prior to the start of turf installation.

C. The synthetic grass vendor shall submit its manufacturer's warranty, which warrants the synthetic grass product:

1. Provide coverage of synthetic grass for a minimum of eight (8) years from the date of substantial completion.
2. Warrant that the materials installed meet or exceed the product specifications.
3. Be from a single source (certified by manufacturer) covering workmanship and all materials.
4. Assure the availability of exact or substantially the same replacement materials for the synthetic grass system for the full warranty period.
5. Include general wear and damage caused by UV degradation. The warranty may specifically exclude vandalism and Acts of God beyond the control of the manufacturer or installer.

1.04 SUBMITTALS:

A. Synthetic grass vendor must submit the following to owner or owner's representative with the official bid package:

1. One (1) copy of the most recent installation reference list for projects of similar scope to this project completed in last five years.
2. One (1) 12"x12" loose sample of proposed synthetic grass product.
3. One (1) of the product warranty for proposed synthetic grass product.
4. One (1) copy of their maintenance instructions. These instructions will include all necessary instructions for the proper care and maintenance of the newly installed synthetic turf system.

5. One (1) copy of edge details of proposed installation and terminations of synthetic grass playground system.
6. One (1) copy of a signed letter from synthetic grass vendor certifying that the proposed synthetic grass product is manufactured in the USA.
7. One (1) copy (if requested) of independent laboratory test reports on system or components.
8. Recommend there is drainage / water permeability test of sub base.

2 PRODUCTS

2.01 SYNTHETIC GRASS SYSTEM:

A. Synthetic grass – ForeverLawn K9Grass Classic

- Pile Weight: 72 oz/sy
- Face Yarn Type: Primary: Polyethylene; Secondary: Heat set textured nylon monofilament containing antimicrobial agent
- Yarn Count: Primary 5,000/4; Secondary 4,200/8
- Pile Height (knitted): 3/4 inch
- Color: Primary: Summer Green; Secondary: Turf Green
- Construction: Knitted
- Antimicrobial Protection: AlphaSan (manufactured into yarn)
- Tufting Gauge: N/A – knitted product
- Backing: Flow-through knitted backing with light acrylic coating
- Seaming: Turf Adhesive
- Total Product Weight: 87 oz /sy (+/- 2 oz)
- Finished Roll Width: 15 feet (4.6 m)
- Finished Roll Length: Up to 150 feet (45.72 m)

The synthetic grass shall be delivered in 15-foot-wide rolls. The rolls will be laid out and installed as specified in the site layout and equipment placement drawings.

All seams shall be installed and secured with approved turf adhesive. Seams secured with stitching alone shall not be acceptable.

No Infill material is to be used.

B. Base and Attaching Components: Base is to be prepared using plastic 2” x 4” plastic board and secured using 1” length 1/4” crown stainless steel staples. Turf is to be secured around all edges.

3 EXECUTION

3.01 BASE AND DRAINAGE CONSTRUCTION: The synthetic grass base contractor shall strictly adhere to the installation procedures outlined under this section and by the engineer’s drawings. Any variance from these requirements must be accepted in writing,

by the synthetic grass vendor, and submitted to the owner or owner's representative, verifying that the changes do not adversely affect the performance or warranty.

A. Excavation: Existing ground cover shall be excavated to the depth established on the excavation plan. The subgrade shall also be compacted to a minimum of a 90% compaction rate.

B. Plastic nailer board: The synthetic turf perimeter fastening structure shall be installed before the drainage aggregate.

1. Install a synthetic nailer board around perimeter and all penetrating objects. Nailer board shall be flush to grade (or as specified in site detail drawings) when adjacent to soft surface (i.e. natural grass, mulch). Nailer board shall be 1/2" below grade when adjacent to hard surface (i.e. concrete or tile).

   This shall be the responsibility of the synthetic turf base contractor. See synthetic turf edge attachment detail.

C. Base Drainage Aggregate: Installation of the free draining base aggregate of 3/8" to 5/8" clean compactable angular stone (any mix with fines in excess of 20% must be approved by manufacturer), shall follow procedures provided. If the sub-base does not permit liquids to freely percolate, auxiliary drainage is required. Base material must be installed to a minimum depth of 3 ½ inches. The drainage network and its existing elevations shall not be disrupted through ground pressures from trucks, dozers or by any other means.

1. The stone shall be left firm and compacted while allowing the porosity and drainage capabilities of the aggregate profile.
2. The free draining base course should be designed to meet local soil and weather conditions. It must be installed to a minimum depth of 3 1/2"with an overall compaction rate of at least 90%.

3.02 SYNTHETIC GRASS SYSTEM INSTALLATION: After a final inspection of the stone base by the synthetic grass contractor and the Owner's Representative, the synthetic turf installation shall begin. The synthetic grass product shall be delivered in 15-foot-wide rolls.

A. Synthetic grass rolls shall be joined via adhesive bond seaming and reinforced with specialty turf adhesive where necessary.

1. Seams shall be flat, tight and permanent with no separation or fraying.
2. Grass rolls must be installed with pile leaning the same direction.

B. Synthetic Turf Perimeter Attachment:

1. After final layout and seaming of the synthetic grass product, the synthetic turf material shall at a minimum be secured to the top of plastic nailer board firmly anchored to sidewalk, curb, wall or by re-bar making up the perimeter of the synthetic turf area. As an alternate installation method the

synthetic turf may be wrapped over the edge of the curb nailer board and secured the full depth of the nailer board.

2. The turf shall be attached to plastic nailer board by stainless steel staples, screws, and/or nails.
3. Soil or surfacing material outside of the defined synthetic turf area shall be backfilled against turf wrapped perimeter edge and have zero transition edge to synthetic turf unless otherwise specified.
4. Concrete and solid surfaces should be 1/2” higher than the top of the board.

C. Infill Application:
It is imperative that no in-fill is utilized with synthetic turf used with dogs.

3.03 CLOSEOUT

A. The synthetic grass vendor must verify that a qualified representative has inspected the installation and that the finished surface conforms to the manufacturer's requirements.

B. Extra materials: Owner shall be given option to retain and store excess materials such as excess turf for project, but not installed.

3.04 CLEAN UP

A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items.

B. During the contract and at intervals as directed by the owner or owner’s representative and as synthetic grass system installation is completed, clear the site of all extraneous materials, rubbish, or debris and leave the site in a clean, safe, well-draining, neat condition.

C. Surfaces, recesses, enclosures, etc. shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the owner.

END OF SECTION

PART II – SECTION B
SPECIFICATIONS FOR:

- Modular Restroom Building

SECTION 13000

PREFABRICATED RESTROOM BUILDING

A. General, Specifications and Clarification of Prefabricated Building and Site Installation

1. This portion of the bid specifications does not follow the CSI standard format as the prefabricated structure in this bid is an ***offsite constructed "product"*** and not "typical" general construction.
2. The ***installation of the product on site is general construction***, which must be coordinated between the general contractor and the subcontractor. Specifications for the building foundation/pad shall be provided herein by the specified design/build subcontractor. Due to the responsibility of the specified building subcontractor for architecture, engineering and a five-year warranty, the site pad/foundation must meet the subcontractor's design so the pad and building can be considered from a single source for warranty purposes. The subcontractor must accept the pad and compactions tests before they take responsibility for the entire system under their warranty.

B. Architectural Design/Engineering and Insurance Responsibility

1. While the City of Lake Forest has provided bid specifications and a design for the building, the building design/build subcontractor remains legally responsible for architecture, engineering, and all applicable building, safety, health, fire, and accessibility code compliance. Since they hold professional design responsibility to the owner, the building subcontractor must furnish certification that they provide product liability insurance in the amounts required by the general specifications ***to cover property damage and personal injury***. Final drawings shall be stamped by a California engineer and California Department of Housing and Community Development, suitable for local permitting.

C. Errors and Omissions Insurance

1. The building design/build subcontractor must also provide an additional Professional Architectural and Engineering Errors and Omissions insurance, in the minimum amount of $2,000,000, ***to cover claims against the owner or the general contractor for State and Federal ADA handicapped accessibility and other design/engineering code issues***. This Errors and Omission Policy must remain in effect for 5 years from the completion and owner acceptance of the project. Product liability insurance (since it does not cover professional design responsibility only) will be insufficient for this bid and will be cause for rejection of the bidder.

D. Insurance for the Building offsite, while in transit, and/or on site until turn over and final owner acceptance

1. The subcontractor may request invoicing for a percentage of building completion in-plant, monthly. Under UCC law, this means that the subcontractor is turning over responsibility for the portion invoiced to the owner yet the building will not be on the owner's property and may not be covered by the owners insurance. Therefore, the building subcontractor must provide a separate insurance policy insuring the owner and general contractor as additionally insured for liability, damage and/or vandalism to the building while in the

manufacturing facility, while in transit, and/or while in storage at a certified bonded storage facility or at the final project site for up to $200,000 for each prefabricated building module, until the building is final accepted by owner.

E. General Contractor Coordination with Design/Build Subcontractor

1. The specified prefabricated public restroom building require coordination between the General Contractor (who prepares the site pad and delivery access for the prefabricated building) and the prefabricated restroom building subcontractor (who completes the architectural design, engineering, off-site building construction, delivery and installation on site.) The specified prefabricated restroom building specifications include unique components/systems which are custom to the restroom building subcontractor. Since the restroom subcontractor is responsible for design, additional insurance requirements for errors and omissions is required.

F. General Contractor, General Scope of Work

1. The general contractor for this project is responsible for the site survey and staking the building locations, finished slab survey elevations and marking on site, construction and compaction of the required building pads; access to the site for a large crane and tractor trailers delivering the prefabricated building; providing water, sewer, and power at a point of connection (POC) within 6 feet of the building and at the depth required by the building subcontractor and local code; and the installation of any sidewalks outside the building footprint.

2. The general contractor is responsible for verification to the building subcontractor design/build firm that there are no unanticipated site delivery issues such as overhead wires, trees, tree roots, or existing grade changes and that prevent a clear path of travel between a roadway and the final site exists for a tractor trailer and crane to expedite delivery. The design/build subcontractor requires that the general contractor certify that the required delivery crane must be able to set the building modules within 35’ distance from the center of the building to the center of the crane hoist.

G. Prefabricated Restroom Building, General Scope of Work:

1. The prefabricated restroom building specialist will provide to the general contractor final building design architectural drawings and engineering calculations under the responsibility of a licensed structural engineer, in compliance with all local, state and federal codes. The design/build subcontractor shall construct the building offsite as a permanently relocatable building, transport it to the final required destination, and install the building turnkey, on a general contractor prepared pad per the drawings included in this bid.

H. Licensing:

The subcontractor must comply with all the State of California; Department of Housing and Community Development, prefabricated “Commercial Modular Requirements” as follows:

1. The building *manufacturer* must be licensed by the State of California, Department of Housing and Community Development as a manufacturer.

2. The selling dealer (if applicable) must be a California licensed dealer and present their license for verification with the bid.
3. The licensed dealer must also possess a State of California Contractors License Board Class B License and present their license for verification with the bid.

I. Bid Standard for the Prefabricated Restroom Building

1. The City of Lake Forest understands that there are several firms who design and build various types of public restroom building in varying quality and architectural styles, using similar or different construction methods and materials. For the purpose of this bid, the owner has selected:

   Public Restroom Company, 2587 Business Parkway, Minden, NV 89423 and specifies herein that this firm is the standard for architectural design (safety, green design, code compliance, and site specific compatibility.) PRC is also the standard of building performance and quality for the 50 year building design-life with low-maintenance based upon the longevity of the materials selected. Other firms quoting "or equal" whose criteria and standards do not comply will be rejected. PRC contact information is (888-888-2060 telephone, and 888-888-1448 fax.)

J. "Or Equal Restroom Design/Build Subcontractors"

1. The City of Lake Forest may also allow other firms to become qualified to bid, but any firms so authorized to bid must fully comply with these bid documents, or be subject to post bid rejection. **See Section 00750, Special Conditions, Item 8 Substitutions for specifics.**

   a) Or Equal applicant shall provide **per time designated in Section 00750, Special Conditions, Item 8 Substitutions**, scaled floor plans and elevations, to show general architectural design criteria is met.
   b) Or Equal applicant shall provide **per time designated in Section 00750, Special Conditions, Item 8 Substitutions**, a written list of each and every deviation from the published bid specifications/plans. Lack of specificity to each deviation from the bid specifications will be cause for rejection.
   c) Or Equal applicant shall provide **per time designated in Section 00750, Special Conditions, Item 8 Substitutions**, manufacturer's certification of test compliance from a national independent testing laboratory (within the past year) to support the claim for absorption resistance of the slab type that will be used in their proposed restroom. The written report must state the concrete compressive strength (minimum of 7,000 PSI) and absorption resistance (not greater than 3%) per ASTM standard #C39 and #C642, respectively.
   d) Or Equal applicant must provide a list of every building they designed and built over the last 3 years utilizing the same building materials/systems design criteria as published in this bid. Provide date of building bid, date of completion, and most knowledgeable owner contact.

e) Or equal applicant shall provide certification of the special insurance required in this bid.
f) Or Equal applicant shall be responsible for and bear all cost for architecture, plan checks, design and structural engineering and all fees in obtaining approvals and permits from applicable agencies.

2. City of Lake Forest or their consultant will be solely responsible for the decision to accept or reject the "or equal" submission.

J. Certificate of Off-site Inspection and Construction Compliance, Provision for Maintenance Manuals, and Warranty

1. The off-site restroom construction requires that a licensed third party inspection firm provide the owner and the local building official with certification and compliance for the building with the approved plans and specifications. A certificate of compliance shall be issued by this inspector to the local building official to provide certification that the building meet and or exceed the approved plans and applicable codes.

2. At the project conclusion, the building subcontractor shall furnish two sets of complete maintenance manuals including a trouble shooting guide, location of manufacturers of key components for replacement parts together with final as-built plans, and a **five (5) year warranty** to the owner or general contractor.

K. Site Scope of Work by General Contractor

The general contractor shall prepare the restroom building subgrade to receive the prefabricated building in accordance with the bid subgrade preparation drawings or foundation plan.

1. The building subgrade/footings shall be constructed per the bid drawings
2. The General Contractor shall provide water point of service at 30" below finished building slabs; sewer at 24" below the finished building slabs; and electrical at 36" below the finished building slabs or other per bid plans.
3. General Contractor shall coordinate with restroom subcontractor to provide full site delivery access for a 70' tractor-trailer and hydro crane to the final building sites.
4. If the final site access is over existing sidewalks, utilities, or landscaping, the General Contractor shall be responsible for plating and or tree trimming, utility line removal, or other to protect any existing conditions.
5. The hydro crane must be able to locate no greater than 35' from the center point of the building to the center point of the crane.
6. The utilities shall be furnished per bid site plans at specified points of connection (POC) nominally 6' from the building lines.
7. General contractor shall furnish and install final grading, landscaping and sidewalks.

M. Connection to Utilities

1. The restroom subcontractor will stub-out: Electrical, Water, and Sewer at the proper POINT OF CONNECTION AND AT THE PROPER ELEVATION BELOW GRADE, for this project. Restroom subcontractor shall provide final hook up of the water from building to POC; sewer hookup to POC; and electrical sleeve from building panels to POC

only. Final utility connections shall be by General Contractor or others. General contractor shall flush the water lines thoroughly before making final water connection to the building. **Thoroughly flushing the water lines for AT LEAST 30 MINUTES is critical to ensure that the new code required low-flow fixtures and flush valves that are extremely sensitive to particulate matter in the water, will not malfunction.**

N. Concrete Slab, Required Independent Testing Laboratory Certification:

1. The prefabricated building slabs special concrete technology claims to be water and urine resistant for life due to special additive technology. The building subcontractor must furnish a test certification of compliance from a national independent testing laboratory to support the claim for absorption resistance. The written report must state the concrete compressive strength (minimum of 7,000 PSI) and absorption resistance (not greater than 3%) per ASTM standard #C642 and #C39 respectively. Since this non-absorbency capability is so significant, the design/build subcontractor must provide a general certification of compliance.

O. Prefabricated Restroom Building:

1. The City of Lake Forest has evaluated several prefabricated restroom building subcontractors. This bid requires such building be used in lieu of site-built traditional construction because of the unique built-in advantages guaranteed by the design/build firm. This technology includes many new innovations such as non-absorbent concrete; anti-microbial components to reduce health risks; built in vandal resistance design; lowered maintenance and long term warranties that reduce owner risk for failure. The specifications below are written around this new technology.

P. Mat Engineered Concrete Building Slab/Foundation:

1. The mat engineered 8” thick slab/foundation shall be engineered and constructed to withstand the transportation weight of the building without cracking and to resist absorption from any liquids deposited on the surface. The concrete slab shall be constructed inside a steel angle curb, reinforced with dual mats (tension and compression,) and poured with a custom concrete formula with special admixtures to create a finished slab that is water proof for life.
2. The building slab/foundation will include the area under the covered entry.
3. Perimeter Steel Curb: 5/16” 50,000 kip steel 6” X 6” welded continuous angle.
4. Rebar Steel Mat: Two layers of 40,000 tensile steel rebar in varying sizes per engineers requirements, including a perimeter structural continuous grade beam design inside the exterior steel angle and at any other location deemed by the engineer of record as required for the use intended. In coastal locations or when required for corrosion resistance rebar shall be epoxy coated or fiberglass to resist permanent corrosion. Rebar mats shall be wire tied to code with a minimum of three turns of the wire and overlaps shall be minimum of 15 diameters for any connection.
5. All slab openings shall be surrounded with two layers of steel collars as required by the engineer of record to stop corner cracking and to reinforce the openings for lifting.
6. 1” thick by 3” minimum length threaded nuts shall be welded to the steel perimeter frame with continuous ¼” fillet welds. Nuts shall be welded to common steel plates per the engineer of records design and attached to the interior steel rebar structural mats.

7. The engineer of record shall provide lifting locations with sufficient reinforcement to allow the safe lifting of the entire designed weight of the structure with dual 1" steel bolts and washers at each lifting location. The number of lifting locations with each location fitted with removable ¾" 8" X 8" 50,000 tensile strength steel angles shall be determined by the engineer of record.
8. The slab shall be poured over a 1" thick steel plate table. The concrete mix design shall not exceed a 3" slump and shall be stinger vibrated for maximum consolidation. All floors shall slope to any floor drains within each room and if no floor drain is present the floor should not slope. The surface shall be a very light broom that should meet a coefficient of friction on the surface of .06. Birdbaths shall be cause for rejection.
9. The steel perimeter angle will remain below the concrete surface by nominal two inches to prevent corrosion. After the site concrete sidewalks are poured, the joint shall be full flow sealed with self-leveling grey urethane caulk to prevent penetration of water into the joint.
10. The building shall be designed for future relocation and shall provide protection for the lifting openings in the mat slab so that the threaded openings will be available for future use if needed.
11. The building systems shall be designed for placement on a general contractor site prepared class 2 building pads/and or footings as required by code, per the bid drawings, suitable for 1500 pounds soil bearing capacity minimum. Any soils survey (if necessary) shall be by owner or engineer of record.

Q. Exterior & Interior Masonry Block Walls

1. The block walls shall be nominal 8" x 16" CMU. All CMU shall be custom fabricated with an enlarged interior hole for placement of the grout and vertical rebar. All CMU shall be custom fabricated with an enlarged interior hole for placement of the grout and vertical rebar. The exterior walls shall be 4" thickness per State of California codes or engineering for wind and seismic. The interior walls shall be 4" block to nominally 7'-4" above finished floor and framed with applicable required finishes above for pony and gable walls. A structural steel tubular .188 wall cap beam shall be welded to 5/16" 40,000 kip steel plate embeds, at intervals per the engineer of record, within the masonry wall. Cap beam shall be ZRC primed and painted, color to be selected by owner.
2. The 8" mat engineered concrete slab shall be cured a minimum of 7 days. Holes for vertical dowels shall be drilled into the mat engineered slab avoiding any grade beams or other structural reinforcement. Once the holes are drilled, blow out the remaining material and using two part structural epoxy, wet set the #3 or #4 vertical rebar (as specified on the engineering calculations into holes drilled to the depth per the engineer of record requirements. Each rebar shall be held vertical to allow equal epoxy support to each dowel during the drying period. Engineering calculations require that rebar shall be installed in each concrete block center void or every block hole. The engineered uplift on each rebar shall be sufficient to restrain any load imposed on the masonry block wall for vertical rebar pull out from the concrete mat engineered slab.

R. Roof System

1. The roof structure shall be 2" x 6" wood rafters at 24" on center with 5/8" OSB sheathing and ice and water shield membrane with 26 gauge standing seam metal roof panels, color to be selected by owner from manufacturers brochure. Building roof rake and fascia shall

be wrapped with 14 gauge formed metal, primed and painted. Color to be selected by owner.

2. The roof design shall exceed compliance with local code at 20 PSF live load and wind load "C".
3. The restroom ventilation screens (described in a following section) shall be attached to the gable truss frames and vandal resistant. Roof color shall be determined by owner and selected from the color chart by restroom supplier.

S. Interior Wall/Floor Finish:

1. Interior precision CMU block masonry walls (Restroom) shall be smoothed to a pebble grain finish with 2-4 mil layers of 7-day curing block fillers and painted with two additional 4 mil layers of industrial high solids (white) industrial grade enamel. Walls shall be painted white with industrial high solids enamel.
2. Interior restroom floor finish shall be a two-part epoxy coating, color to be grey.

T. E

xterior Wall Finish, Masonry and Gable

1. The building exterior finish shall be precision 8" x 16" CMU to wall height per the exterior elevations in the bid plans. The precision block shall be covered with acrylic stucco (light sand finish) and painted with elastomeric paint in a color to be selected by Owner. The gable area finish shall be fiber-reinforced cement backer board, with acrylic stucco (light sand finish) and painted with elastomeric paint, color selected by owner. There shall be a rock veneer ledgestone wainscot to 32" above finish floor with a masonry water table and masonry base trim, per plans.

U. Gable Ventilation System (Restroom)

1. Shall be woven ¼" X 1" X 1", 316T, stainless steel wire mesh set in welded stainless steel angles attached to the masonry wall with vandal resistant stainless steel screws, per plans.

V. Doors and Gates

1. The restroom entry doors shall be 7'-0" high, custom fabricated, 14 gauge steel; reinforced with 14 gauge concealed steel ribs welded at 6" intervals on each face; reinforced with a welded plate for door closer mounting; hung on a single continuous, 1 million cycle, aluminum gear hinge with stainless steel vandal resistant screws at nominal 4" on center. The doors shall weigh nominally 176 lbs each for a 36" X 84" door. Custom fabricated 14 gauge steel door jambs with 4" steel heads shall be welded to the steel cap beam and be solid filled with 3000 psi masonry grout mix. Doors and gates shall be primed and painted in a color selected by owner.
2. Restroom entry doors shall have a magnetic door locking system. See electrical section below.
3. Stainless steel vandal resistant fasteners shall be used on all hardware.

W. Specialties

1. All specialty washroom equipment shall be commercial grade stainless steel fastened securely to walls with vandal resistant stainless steel screws to avoid removal by vandals as follows:

2. Toilet paper holders shall be, covered, three-roll, 18 gauge stainless steel with lock. Toilet paper holders shall be attached to block walls with 4 epoxy bedded vandal resistant stainless steel fasteners.
3. Stainless steel grab bars to code shall be 1-¼" minimum exposed fastener vandal resistant design and installed at each accessible water closet.
4. Cast Aluminum California Title-24 compliant signage shall be recessed into block surface flush with masonry exterior and door sign shall be blind fastened with epoxy adhesive and stainless steel fasteners. Wall signs shall have raised pointed Braille tips and be designated as "All Gender Restroom."
5. Baby changing stations shall be Koala KB-200, located in each restroom

X. Plumbing:

1. Building shall be fully compliant with current with the following codes:
   a) All applicable State of California Building Codes. Latest edition applicable.
   b) California Plumbing Code. Latest edition applicable.
2. GENERAL: All components and fabrications shall be designed to reduce life cycle maintenance, be compatible with current maintenance spare parts, and shall be listed in a spare parts/maintenance manual (two copies) delivered in utility chase of building.
3. WATER PIPING: Shall be type L copper soldered per code above grade and type K with silver solder below grade. All water piping shall be designed and constructed with high and low point drain fittings. All piping shall be mounted on Uni-strut wall brackets with neoprene isolators, to code.
4. WATER PRESSURE GAUGE/VALVE COMBO: install three commercial grade industrial water pressure gauges (one on incoming line, one at pressure regulator valve and one after water filter), isolation ball valves, 150 PSI pressure regulator with wye strainer, 10-micron water filter with clear canister, and check valve.
5. PLUMBING FAUCETS, ISOLATION VALVES AND ACTUATORS: All fixtures except those with flush valves shall be isolated with ball valves for each fixture, concealed antimicrobial impregnated flush handle valves, and metered push-button lavatory faucets.
6. DWV PIPING: DWV piping shall be concealed behind the wall. DWV piping shall be PVC DWV, solvent welded, for all concealed piping. A cast iron no hub DWV vent pipe with a cast iron roof mounted vandal cap vent shall be required, through the roof.
7. REMOVABLE PIPE TRAPS: all floor drain, sink drain, and waste traps shall be removable for maintenance. Floor drains shall be trapped behind the wall in the utility chase using a combination waste and vent system. Floor drains shall be increased two pipe sizes over standard to allow code use. Trap primers for restroom floor drains shall not be used as restroom maintenance is hose-down. All surface mounted utility chase piping shall be mounted on Uni-strut with plastic isolators to code. Sink drain traps shall be concealed behind the utility chase walls where maintenance staff can access all plumbing.
8. PLUMBING FIXTURES: Plumbing fixtures shall be 14 gauge stainless steel manufactured by Acorn. Toilets shall be wall hung, rear discharge, with concealed, ADA-compliant, lever-type, flush valves. Toilet seats shall be black solid core plastic, non-flammable construction with continuous stainless steel concealed self-checking hinges. Lavatories shall have concealed remote traps behind the mechanical wall. Schedule of fixtures:
   a. Water Closets: Acorn Penal-Ware, 1675-W-1-HET-FVBO-9-ADA-PFS

b. Water Closet Flush Valve: Zurn ZH6152AV-HET-7L-BG
c. Lavatories: Acorn Penal-ware 1652LRB-1-DMS-03-M-H1

9. FLOOR GRATES: Removable 350 lbs per square foot pultruded fiberglass non-skid floor grates shall be installed over every opening in the utility chase for OSHA compliance.
10. HOSE BIB: There shall be one Woodford 24B hose bib provided in the utility chase.
11. HOSE REEL: There shall be one commercial grade Rapid Reel hose reel (1041-GH) with a 75' commercial grade hose.

Y. Electrical:

1. GENERAL: Electrical system and components shall be commercial grade or better and piping conduits shall be installed on commercial Uni-strut wall hangers. Interior electrical lighting fixtures in public areas shall provide lifetime manufacturer's warranty.
2. PANEL/WIRING: One 100 amp, 120/240v, single-phase, industrial grade Panel Board, Square "D" QO series with 100 amp main circuit breaker, shall be mounted in the utility chase in the restroom building. All breakers shall be snap-on type, minimum 10,000 A.I.C. RMS (Sym). Wiring shall be copper wire #12 min in EMT piping with compression fittings.
3. PIPING: All piping shall be surface mounted to the masonry block walls with minimum of 2" fastener penetration. EMT conduit shall be compression type. Main panel shall maintain a 30" X 36" safety code required clear space, floor to 6' above finished floor.
6. HAND DRYERS: Shall be Dyson Airblade V, Nickel finish
4. WATER HEATER: Shall be tankless, Stiebel-Eltron DHC-8/10-E Water heater shall be located in the utility chase. There shall be a tempering valve servicing the restroom lavatories.
5. EXTERIOR LIGHTING: Per bid plans and installed on-site by others.
6. INTERIOR LIGHTING: Luminaire SWP610, 15 watt, LED, vandal resistant high-impact polycarbonate lens fixtures shall be installed in the restrooms per plans (one in each restroom). The chase shall have one 4' double-tube, 36 watt LED fixture, suitable for wet locations, with a single switch at door entry.
7. LIGHTING CONTROL: All interior restroom lighting shall be controlled by a time clock mounted in the utility chase and 2 bypass switches (one for interior lighting and one for exterior lighting), so maintenance staff can check operation during daylight hours. A single photo cell, roof mounted, and shall control all exterior lighting.
8. ELECTRICAL OUTLETS: One (1) commercial spec grade duplex outlet shall be located in the utility chase adjacent to the panel.
9. MAGNETIC DOOR LOCKING SYSTEM: Securitron Magnalock Model M62 magnetic time clock controlled lock system shall be furnished for each public entry door. An illuminated button (in both English and Spanish) shall be installed adjacent to each door for emergency egress in the event that the system magnetic lock engages. System shall also remain operating for a minimum two-hour power out cycle by a self-charging battery backup.

Z. Shipping Protection

The building, while traveling over roads to the destination may encounter inclement weather or road grime that could require substantial cleaning when it arrives on site. The building shall

be shrink-wrapped before transportation and sufficiently strong to arrive at the owner site intact for exterior finish protection. Materials removed on site shall be disposed of and recycled by restroom building install staff.

AA. Certifications

Building shall be certified in compliance with the plan approval by the State of California, Department of Housing and Community Development. The building shall be delivered with an applied insignia; in compliance with all State regulations. The local building authority shall provide site inspections for the underground mechanical piping and final connections, footings, and access issues outside the restroom footprint. Restroom building subcontractor shall also furnish 5-year warranty, certifications for the concrete slab specification compliance, and maintenance manuals for the building and components.

END OF SECTION

ELECTRICAL 16000

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SECTION 16010

ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:

1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
2. General provisions and requirements for electrical work.
3. Division-1.

B. Organization of the Specifications into Divisions, Sections and Articles, and arrangement of Drawings shall not control the CONTRACTOR in dividing the Contract Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.2 GENERAL SUMMARY OF ELECTRICAL WORK

A. The Specifications and Drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the CONTRACTOR from providing such additional labor and materials.

B. Refer to the Drawings and Shop Drawings of other trades for additional details, which affect the proper installation of this work. Diagrams and symbols showing electrical connections are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.

C. Before submitting a bid, the CONTRACTOR shall become familiar with all features of the Building Drawings and Site Drawings, which may affect the execution of the work. No extra payment will be allowed for failure to obtain this information.

D. If there are omissions or conflicts between the Drawings and Specifications, clarify these points with the OWNER'S Representative before submitting bid and before commencing work.

E. Provide work and material in conformance with the Manufacturer's published recommendations for respective equipment and systems.

1.3 LOCATIONS OF EQUIPMENT

A. The Drawings indicate diagrammatically the desired locations or arrangements of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structure conditions encountered.

B. In the event changes in the indicated locations or arrangements are necessary, due to developed conditions on the site or in the building construction or rearrangement of furnishings or equipment, such changes shall be made without cost to the Contract, providing the change is ordered before the conduit runs, etc., and work directly connected to same is installed and no extra materials are required.

C. Coordinate and cooperate in every way with other trades in order to avoid interference and assure a satisfactory job.

D. The location of the existing utilities, building, equipment and conduit shown on the Drawings is approximate. Verify exact locations and routing of existing systems by potholing all trench routes prior to digging the trench. Pothole at least 100 feet ahead of the actual trenching to allow space to alter the new conduit routing to accommodate existing conditions.

E. The locations of existing underground utilities, where shown on Drawings, are shown diagrammatically and have not been independently verified by the OWNER, the OWNER'S Representative, the Architect/Engineer. The OWNER, the OWNER'S Representative, and the OWNER'S Architect/Engineer are not responsible for the location of underground utilities or structures, whether or not shown or detailed and installed under this or any other Contracts. The CONTRACTOR shall identify each existing utility line prior to excavation and mark the locations on the ground of each existing utility line.

1.4 POWER, TELEPHONE AND OTHER SIGNAL SERVICES

A. Telephone, cable television, power, street lighting service and metering facilities shall conform to the requirements of the serving Utility Companies. CONTRACTOR shall verify service locations and requirements, and shall pay all costs levied by the serving Utility Companies for rendering utility services to the Contract without additional cost to the OWNER. Service information will be furnished by the serving utilities.

B. Conform to all requirements of the serving Utility Companies including electrical power, telephone and CATV. Location of transformer pad and or manholes and pull boxes and routing of service conduits indicated on the Drawings are approximate and shall be verified with the serving Utility Company prior to installation. Installation of service shall not begin until approved Drawings have been received from the serving Utility Company.

C. Within 30-calendar days of Receipt of Notice that the Contract Award has been made, the CONTRACTOR shall notify the New Business Departments of the District Office of the serving Utility Companies concerning the Project Contract and shall provide information as to the total lighting, power, telephone, and signal requirements of the Contract. The CONTRACTOR shall furnish at the same time information as to the estimated completion date of job or the date when the respective Utility Company circuits, will be ready for installation, energizing and activation of the respective services.

D. In Addition to the requirements of the serving Utility Companies, all power, telephone and signal service conduits for Utility Company circuits, shall be completely surround and encase in concrete on all sides, top and bottom. The concrete shall be red mix color and extend a minimum of 3-inches past the conduit on all sides on the conduits.

E. CONTRACTOR shall submit electrical utility metering and electrical service entrance equipment Shop Drawings to the Electric Utility Company supplying the project for review and approval by the serving Utility Company. The submittal and acceptance by the Utility shall occur prior to submitting of Shop Drawings to the OWNER'S Representative or A/E for review. Copies of the serving Electrical Utility approval of the service entrance equipment shall be included in the Shop Drawings submittals to the OWNER'S Representative and A/E.

1.5 PERMITS

Take out and pay for all required Permits, Inspections and Examinations without additional cost to the OWNER.

1.6 QUALITY ASSURANCE

A. Work and materials shall be in full accordance with the latest Rules and Regulations as follows. The following publications shall be included in the Contract Documents requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the requirements describing the more restrictive provisions shall become the applicable Contract definition:

1. California Code of Regulations Title 24.
2. California Part 3 "California Electrical Code" CEC, Title 24 and Title 8 "Division of Industrial Safety".
3. California Building Code – CBC.
4. The National Electrical Code.
5. The National Life Safety Code.
6. The Uniform Building Code – UBC.
7. National Fire Protection Agency – NFPA.
8. Underwriter's Laboratory – UL.
9. Other applicable State and Local Government Agencies laws and regulations.

10. Electrical Installation Standards

    National Electrical Contractors Association (NECA) and National Electrical Installation Standards (NEIS):

    a. NECA/NEIS-1: Standard of Practices for Good Workmanship in Electrical Contracting
    b. NECA/NEIS-101: Standard for Installing Steel Conduit (Rigid, IMC, etc.)
    c. NECA/NEIS-111: Recommended Practice Installing Nonmetallic Raceways
    d. NECA/NEIS-305: Standard for Fire Alarm System Job Practice
    e. NECA/NEIS–331: Standards for Installing Building and Service Entrance Grounding
    f. NECA/NEIS-400: Recommended Practice for Installing Switchboards
    g. NECA/NEIS-407: Recommended Practice for Installing Panelboards
    h. NECA/NEIS-409: Recommended Practice for Installing and Maintaining Dry-Type Transformers
    i. NEIS/NECA and IESNA-500: Recommended Practice for Installing Indoor Commercial Lighting Systems
    j. NEIS/NECA and IESNA-501: Recommended Practice for Installing Exterior Lighting Systems
    k. NECA/BICSI-568: Standards for Installing Commercial Building Telecommunications System

B. All material and equipment shall be new and shall be delivered to the site in unbroken packages. All material and equipment shall be listed and labeled by Underwriters Laboratories or other recognized testing laboratories, where such listings are available. Comply with all installation requirements and restrictions pertaining to such listings.

C. Work and material shown on the Drawings and in the Specifications is new and included in the Contract unless specifically indicated as existing or N.I.C. (not in Contract).

D. Keep a copy of all applicable Codes and Standards available at the job site at all times for reference while performing work under this Contract. Nothing in plans or Specifications shall be construed to permit work not conforming to the most stringent of Building Codes.

E. Where a conflict or variation occurs between applicable Codes, Standards and/or the Contract Documents, the provisions of the most restrictive provision shall become the requirement of the Contract Documents.

1.7 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General

1. Review of CONTRACTOR'S submittals is for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the Plans

and Specifications. CONTRACTOR is responsible for quantities; dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of work with that of all other trades and satisfactory performance of their work.

2. The CONTRACTOR shall review each submittal in detail for compliance with the requirements of the Contract Documents prior to submittal. The CONTRACTOR shall "Ink Stamp" and sign each item of the submittal with a statement "CERTIFYING THE SUBMITTAL HAS BEEN REVIEWED BY THE CONTRACTOR AND COMPLIES WITH ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS". The CONTRACTOR shall clearly and specifically identify each individual proposed substitution, substitution of equal or proposed deviation from the requirements of the Contract Documents with a statement "THIS ITEM IS A SUBSTITUTION".
   The burden of research, preparation of calculations and the furnishing of adequate and complete Shop Drawings information to demonstrate the suitability of CONTRACTOR'S proposed substitutions and suitability of proposed deviations from the Contract Documents is the responsibility of the CONTRACTOR.
3. Departure from the submittal procedure will result in resubmittals and delays. Failure of the CONTRACTOR to comply with the submittal requirements shall render void any acceptance or any approval of the proposed variation. The CONTRACTOR shall then be required to provide the equipment or method without variation from the Contract Documents and without additional cost to the Contract.
4. The CONTRACTOR at no additional cost or delays to the Contract shall remove any work, material and correct any deficiencies resulting from deviations from the requirements of the Contract Documents not approved in advance by the OWNER prior to commencement of work.
5. Shop Drawings submitted by the CONTRACTOR, which are not specifically required for submittal by the Contract Documents, or CONTRACTOR Shop Drawings previously reviewed and resubmitted without a written resubmittal request to the CONTRACTOR, will not be reviewed, considered, or commented on. The respective Shop Drawing submittal/resubmittal will not be returned to the CONTRACTOR and will be destroyed without comment or response to the CONTRACTOR. The respective submittal shall be considered null and void as being not in compliance with the requirements of the Contract Documents.
6. Refer to Division-1 for additional requirements.

B. Material Lists and Shop Drawings:

1. Submit material list and Equipment Manufacturers for review within 35 days of award of Contract. Give name of Manufacturer and where applicable, brand name, type and/or catalog number of each item. Listing of more than one Manufacturer for any one item of equipment, or listing items "as specified", without both make and model or type designation, is not acceptable. Shop Drawings shall not be submitted before review completion of Manufacturers list. The right is reserved to require submission of samples of any material whether or not particularly mentioned herein.

2. After completion of review of the Material and Equipment Manufacturers list, submit Shop Drawings for review. Shop Drawings shall be submitted in completed bound groups of materials (i.e., all lighting fixtures or all switchgear, etc.). The CONTRACTOR shall verify dimensions of equipment and be satisfied as to fit and that they comply with all code requirements relating to clear working space about electrical equipment prior to submitting Shop Drawings for review. Submittals, which are intended to be reviewed as substitution or departure from the Contract Documents, must be specifically noted as such. The requirements of the Contract Documents shall prevail regardless of the acceptance of the submittal.
3. Shop Drawings shall include catalog data sheets, instruction manuals, Dimensioned Plans, elevations, details, wiring diagrams and descriptive literature of component parts where applicable. Structural calculations and mounting details, signed by a Structural ENGINEER registered by the State of California, shall be submitted for all equipment weighing over 400-pounds, and shall be in compliance with Title 21 of the California Code of Regulations.
4. Each Shop Drawing item shall be identified with the Specification Section and paragraph numbers, lighting fixture types and Drawing sheet numbers; the specific Shop Drawing is intended to represent. Shop Drawings 11-inches x 17-inches or smaller in size shall be bound in three-ring binders. Divider tabs shall be provided in the three-ring binders identifying and separating each separate Shop Drawing submittal item. Shop Drawings larger than 11-inches x 17-inches, Shop Drawing pages/sheets submittals shall be sequentially numbered with unique alphanumeric numbering system to facilitate correspondence referencing identification of individual sheets.
5. The time required to review and comment on the CONTRACTOR'S submittals will not be less than 14 calendar days, after receipt of the submittals at the office of FBA Engineering. The review of Contractor submittals and return to CONTRACTOR of submittals with review comments will occur in a timely manner conditioned upon the CONTRACTOR complying with all of the following:

    a. The submittals contain complete and accurate information, complying with the requirements of the Contract Documents.
    b. CONTRACTOR'S submittals are each marked with Contractor's approval "Stamp", and with Contractor signatures.
    c. The submittals are received in accordance with a written, Shop Drawing submittal schedule for each submittal. The Contractor distributes the schedule not less than 35-day calendar days in advance of the Shop Drawing Submittals, and the schedule identifies the calendar dates, the CONTRACTOR will deliver the various submittals for review.

6. Shop Drawings shall include the Manufacturers projected days for shipment from the factory of completed equipment, after the CONTRACTOR releases the equipment for production. It shall be the responsibility of the CONTRACTOR to insure that all material and equipment is ordered in time to provide an orderly progression of the work. The CONTRACTOR shall notify the OWNER'S

Representative of any changes in delivery, which would affect the Project completion date.

7. Submittal Identification

   a. Each submittal shall be dated: with submittal transmission date; sequentially numbered and titled with submittal contents identification and applicable Specification/Drawing references *(i.e., Submittal dated: 9/12/07 Submittal #4 Contents: Branch circuit panelboards Sheet #E5.1 and transformers Specification Section 16050 Paragraph 2.11, etc.).*
   b. Each resubmittal shall be dated: with original submittal date and resubmittal transmission dates; sequentially numbered with original submittal number and sequential resubmittal revision number and titled with submittal contents identification and applicable Specifications/Drawing references *(i.e., Original Submittal Date: 9/12/07 Resubmittal Date: 11/12/07 Original Submittal #4 resubmittal Revision R2 Contents: Transformer resubmittal Specification Section - 16050 Paragraph 2.11, etc.).*

C. The CONTRACTOR shall be responsible for incidental, direct and indirect costs resulting from the CONTRACTOR'S substitution of changes to; the specified Contract Materials and Work.

D. The CONTRACTOR shall pay, upon request by the OWNER'S Representative, a fee for the OWNER'S Representative time involved in the review of substitution submittals and design changes resulting from the CONTRACTOR'S requested substitutions. The fee shall be not less than $125.00 per hour but, in no case, less than stated in Division-1, whichever is greater.

E. Maintenance and Operating Manuals

   1. The CONTRACTOR shall furnish three copies of typewritten maintenance and operating manuals for all electrical equipment, fire alarm equipment, sound system equipment, etc., to the OWNER.
   2. Instruct OWNER'S Personnel in correct operation of all equipment at completion of Project.
   3. Maintenance and operating manuals shall be bound in three-ring, hard-cover, plastic binders with table of contents. Manuals shall be delivered to the OWNER'S Representative, with an itemized receipt.

F. Portable or Detachable Parts: The CONTRACTOR shall retain in his possession, and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks, adapters, locking clips, and inserts until final completion of Contract Work. These parts shall then be delivered to the OWNER'S Representative with an itemized receipt.

G. Record Drawings (Additional Requirements)

1. Provide and maintain in good order a complete set of Electrical Contract "Record" prints. Changes to the Contract to be clearly recorded on this set of prints. At the end of the Project, transfer all changes to one set of transparencies to be delivered unfolded to the OWNER'S Representative.
2. The actual location and elevation of all buried lines, boxes, monuments, vaults, stub-outs and other provisions for future connections shall be referenced to the building lines or other clearly established base lines and to approved bench marks. If any necessary dimensions are omitted from the Record Drawings, the CONTRACTOR shall, at the Contractor's own expense, do all excavation required to expose the buried work and to establish the correct locations.
3. The CONTRACTOR shall keep the "Record" prints up to date and current with all work performed.
4. Refer to Division-1 for additional requirements.

1.8 CLEANING EQUIPMENT, MATERIALS, PREMISES

All parts of the equipment shall be thoroughly cleaned of dirt, rust, cement, plaster, etc., and all cracks and corners scraped out clean. Surfaces to be painted shall be carefully cleaned of grease and oil spots and left smooth, clean and in proper condition to receive paint finish.

1.9 JOB CONDITIONS - PROTECTION

Protect all work, materials and equipment from damage from any cause whatever and provide adequate and proper storage facilities during the progress of the work. Provide for the safety and good condition of all the work until final acceptance of the work by the OWNER and replace all damaged or defective work, materials and equipment before requesting final acceptance.

1.10 EXCAVATION, CUTTING, BACKFILL AND PATCHING ADDITIONAL REQUIREMENTS

A. General

1. Perform excavation, cutting, backfill, core drilling, directional boring, and patching of the construction work required for the proper installation of the electrical work.
2. Patching shall be of the same material, thickness, workmanship and finish as existing and accurately match surrounding work to the satisfaction of the OWNER'S Representative.

1.11 IDENTIFICATION

A. Equipment Nameplates

1. Panelboards, terminal cabinets, circuit breakers, disconnect switches, starters, relays, time switches, contactors, push-button control stations, and other apparatus used for the operation or control of feeders, circuits, appliances, or equipment shall be properly identified by means of descriptive nameplates or tags permanently attached to the apparatus and wiring.
2. Nameplates shall be engraved laminated phenolic. Shop Drawings with dimensions and format shall be submitted before installation. Attachment to equipment shall be with escutcheon pins, rivets, self-tapping screws or machine screws. Self-adhering or adhesive backed nameplates shall not be used.
3. Provide black-on-white laminated plastic nameplates engraved in minimum ¼-inch high letters to correspond with the designations on the Drawings. Provide other or additional information on nameplates where indicated.

B. Plates: All cover and device plates shall be furnished with engraved or etched designations under any one of the following conditions (minimum character size not less than 0.188 inch. Engraving shall indicate circuits and equipment controlled or connected):

1. Switches in locations from which the equipment or circuits controlled cannot be readily seen.
2. Manual motor starting switches.
3. Where so indicated on the Drawings.

C. For Equipment and Access Doors or Gates to equipment containing or operating on circuits of more than 240 volts nominal, provide red-on-white laminated warning signs engraved in ½-inch high letters to read: "DANGER - 480 *(or applicable voltage)* VOLTS KEEP OUT AUTHORIZED PERSONNEL ONLY".

D. Wire and Cable Identification

1. Provide identification on individual wire and cable including signal systems, fire alarm, electrical power systems (each individual phase, neutral and ground), empty conduit pull ropes, and controls circuit.
2. Permanent identification shall be provided at each termination location, splice location, pullbox, junction box and equipment enclosure.

    a. Individual wire and cable larger than #6 AWG or 0.25 inch diameter, shall be provided with polypropylene identification tag holders, with yellow polypropylene tags interchangeable black alphanumeric characters, character height 0.25 inch. Attach identification tags with plastic “tie” wraps, minimum of two for each tag. As manufactured by Almetek Industries-“EZTAG” series; or TECH Products - “EVERLAST” series.
    b. Individual wire and cable #6 AWG and smaller or smaller than 0.25 inch diameter, shall be provided with water and oil resistant, flexible, pressure sensitive machine embossed plastic tags that wrap a minimum of 360 degrees around the wire/cable diameter. The entire tag shall then be covered with a

clear flexible waterproof plastic cover wrapped a minimum of 540 degrees around the wire/cable diameter and completely covering the identification.

c. Each identification tag location shall indicate the following information: circuit number, circuit phase, source termination and destination termination equipment name (or outlet number as applicable).

3. Install permanent identification after installation/pulling of wire/cable is complete, to prevent loss or damage to the identification.

E. Cardholders and Cards shall be provided for circuit identification in panelboards. Cardholders shall consist of a metal frame retaining a clear plastic cover permanently attached to the inside of panel door. List of circuits shall be typewritten on card. Circuit description shall include name or number of circuit, area, and connected load.

F. Junction and Pull Boxes shall have covers stenciled with box number when shown on the Drawings, or circuit numbers according to panel schedule. Data shall be lettered in a conspicuous manner with a color contrasting to finish.

1.12 TESTING

A. The CONTRACTOR shall obtain an independent Testing Laboratory that will provide all instrumentation and tests on the electrical system and equipment as hereinafter described and further directed by the OWNER'S Representative. The test shall be performed after the completion of all electrical systems included in the Contract Scope of Work. All tests shall be recorded and documented and submitted to the OWNER'S Representative for review.

1. Test for Phase to Ground and Neutral Condition:

a. Open main service disconnects.
b. Isolate the system neutral from ground by removing the neutral disconnects link located in the service switchboard.
c. Close all submain disconnects.
d. Close all branch feeder circuit breakers.
e. Turn all switches to "on" position, unplug all portable equipment from outlet receptacles.
f. Measure the resistance of each phase to ground and phase to neutral. A properly calibrated "megger" type test instrument shall be used. The test voltage shall be a nominal 500 volts.
g. Record all readings after one minute duration and document into a complete report.

2. Isolating Grounds: In the event that low resistance ground neutral connections are found in the system, they shall be isolated and located by testing each circuit individually as outlined above. Make proper corrections to restore the resistance values to an acceptable value.

B. Method of Obtaining Ground Resistance shall be in accordance with the latest edition of the James G. Biddle (Plymouth Meeting, Pennsylvania) manual published on this subject.

1. Perform "fall-of-potential" 3-point tests on the main grounding electrode of system per IEEE Standard No. 81, Section 8.2.1.5. when suitable locations for test rods are not available, a low resistance dead earth or reference ground shall be utilized.
2. Perform the two-point method test per IEEE Standard No. 81, Section 8.2.1.1, to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.

C. All equipment and Personnel required for testing shall be furnished by the CONTRACTOR.

D. The testing, calibrating and setting of all ground and ground fault equipment circuit breakers, device protection relays, and meters adjustable settings shall be by an independent Testing Laboratory. Set as recommended by the respective Manufacturer and coordination study so as to be coordinated with other protection devices within the electrical design. Bound and tabulated copies of the test and settings shall be sent to the OWNER'S Representative.

E. State of California Title-24 Compliance Testing

1. Mandatory California Title-24 Building Energy Code, Part-6 acceptance testing. Shall insure that respective systems properly installed and functioning, all in conformance with Title-24.
2. Refer to Process Guide to Acceptance Testing, published by the State of California, complete the testing and documentation.
3. Perform California Title-24 Testing and Certification. Submit the completed Certification of Acceptance documentation to the AHJ and OWNER'S Representative.

F. The Contractor shall complete the following work before any electrical equipment is energized:

1. All equipment shall be permanently anchored.
2. All bus connections shall be tightened per Manufacturer's instructions and witnessed by the OWNER'S Representative.
3. All ground connections shall be completed and identified. Perform and successfully complete all required megger and ground resistance tests.
4. All feeders shall be connected and identified.
5. The interiors of all electrical enclosures including busbars and wiring terminals shall be cleaned of all loose material and debris, paint, plaster, cleaners or other abrasive's overspray removed and equipment vacuumed clean. The OWNER'S Representative shall observe all interiors before covers are installed.

6. All dry wall work and painting shall be completed within areas containing electrical equipment prior to installation of equipment.
7. All doors to electrical equipment rooms shall be provided with locks in order to restrict access to energized equipment.
8. Electrical rooms shall not be used as a storage room after power is energized.
9. The electrical system time current coordination and ARC-Flash studies shall be complete for circuit breakers, ground relays sets, and circuit relay sets, fuses; set-up, tested and calibrated accordingly. Protection settings for all devices shall be completed and tested.

1.13 COMMISSIONING - CX

A. General

1. The Commissioning shall verify the electrical systems for the term of the Contract, by observation; and by calibration; and by testing. The Commissioning shall ensure the electrical systems perform interactively and correctly, according to the Contract and Operational requirements.
2. Commissioning shall provide startup, testing and documented confirmation of the Contract constructed systems, materials and work, functions in compliance within the criteria set forth in the Contract Documents to the satisfaction of the OWNER'S needs. The Commissioning Scope shall encompass each system identified as requiring "Commissioning" by the Contract Documents, including but not limited to:

    a. Electrical circuits' protection, short circuit, overcurrent, ground fault devices and electrical grounding.
    b. Electrical circuits monitoring and metering.
    c. Light fixtures, lamps and ballasts.
    d. Lighting control devices, equipment and lighting control systems.
    e. Additional systems described in the Contract Documents.

3. Commissioning process shall review all of the Shop Drawing submittals, including:

    a. Controls, operation and maintenance requirements.
    b. Facility performance testing compliance.
    c. Project Contract requirements compliance.
    d. Compliance with basis for design and operational descriptions provided in the Contract.

4. Commissioning shall be the process of ensuring all the systems described in the Contract Documents comply with the Contract Document design; all systems are installed properly; all systems are functional, tested and capable of being operated and maintained to perform within the Contract requirements and design intent.
5. Functional setup, recalibration, correcting deficiencies, retesting and the associated costs, for system(s) that fail Commissioning, shall be the responsibility of the

Contractor. The CONTRACTOR shall include all Commissioning costs in the Contract Scope of Work.

6. Complete all Commissioning functions prior to the occupancy of the facility by the OWNER, unless directed otherwise by the OWNER'S Representative.
7. Submit six copies of Commissioning Documentation to OWNER'S Representative.

B. Commissioning Procedures

1. Prepare a Commissioning Matrix identifying components and systems included in the Commissioning Scope; the status; actions completed and actions to be completed.
2. Verify CONTRACTOR compliance with Contract Document requirements, Manufacturer's recommendations and approved Shop Drawings.
3. Perform startup, functional tests, reports, and document results.
4. Evaluate and document the setup parameters, operating condition and performance of each system at the time of functional test completion. Document and record each performance parameter and condition, in the Commissioning Report.
5. Schedule testing and prepare descriptions of testing.
6. Describe measures performed to correct deficiencies.
7. Verify that instructions to OWNER'S Representatives, operations and maintenance manuals comply with Contract Documents.
8. Prepare warranty matrix identifying the start dates, expiration dates, routine preventative maintenance dates and the OWNER’S responsibility for performing preventative maintenance and keeping logs for each maintenance function and warranty claims.
9. Confirm completion of all punch list items that have been acceptably accomplished and a list of what has not been acceptably completed.
10. Describe uncorrected deficiencies accepted by the OWNER.

C. Commissioning Phasing

The Commissioning Phases of work shall include the following activities:

1. SDQ – Shop Drawing Qualification shall verify complete and correct Shop Drawings have been submitted.
2. IQ – The Installation Qualification of Contract Work shall verify systems are correctly and properly installed.
3. OQ – Verify systems interfaces and software is correctly and properly operational.
4. ITM – Verify the Contract Inspection, Testing and procedures for Maintenance are complete.
5. PQ – Performance Qualification complete the functional performance testing to validate each building system.

1.14 SERIES RATED EQUIPMENT

Circuit protective Devices identified as "Series Rated" or "Current Limiting" (i.e., SR - Series Rated CLCB - Current Limiting Circuit Breaker; CLF - Current Limiting Fuse, etc.) shall be Series Rated and Tested (UL 489 and CSA5) by the Manufacturer with all equipment and circuit protective devices installed downstream of the identified Series Rated or Current Limiting Device. Provide nameplates on all equipment located downstream, including the SR, CLCB and CLF devices, to comply with N.E.C. paragraphs 110-22 and 240-83 "CAUTION SERIES RATED SYSTEM - NEW DEVICE INSTALLATIONS AND REPLACEMENTS SHALL BE THE SAME MANUFACTURER AND MODELS".

1.15 INDEPENDENT TESTING LABORATORY

A. The Testing Laboratory shall meet Federal OSHA criteria for accreditation of Testing Laboratories Title 29 Part 1907.

B. Membership in the National Electrical Testing Association shall constitute proof of meeting said criteria, for testing of electrical systems.

1.16 SPARE FUSES

Provide three spare fuses for each size and type to match the installed fuses where the fuses are provided as part of the Contract. Provide spare fuse holders on inside door of each respective fuse compartment. Provide engraved nameplate on front of fuse access door indicating fuse type/catalog number ampere rating and Manufacturer of fuse.

1.17 EQUIPMENT SEISMIC REQUIREMENTS

A. Equipment Supports and Anchorage’s Provided as Part of the Contract shall be designed, constructed and installed in accordance with the earthquake regulations of the California Building Code, Title 24, Section 1632A, and the Uniform Building Code (UBC).

B. Provide Equipment Anchorage Details, Coordinated with the Equipment Mounting Provision, prepared, signed and "Stamped" with PE registration by a Civil or Structural Engineer licensed as a Professional Engineer (PE) in the State of California.

C. Mounting Recommendations shall be provided by the Manufacturer based upon approved shake table tests used to verify the seismic design of that type of equipment.

D. The Equipment Manufacturer shall certify that the equipment can withstand, and function following the seismic event, including both vertical and lateral required response spectra as specified in California Title 24 and the UBC. Alternatively, the Manufacturer's certification may be based on an approved detailed structural analysis of the assembly, as specified in California Title 24 and the UBC.

E. The Equipment Manufacturer shall document the details necessary for proper seismic mounting, anchorage, and bracing of the equipment for back installation location.

F. Seismic Qualification shall be considered achieved when the capability of the provided equipment, as described by the test response spectra, meets or exceeds the required response spectra as specified in California Title 24 and the UBC, for all equipment natural frequencies up to 35Hz.

G. The Seismic Requirements are typical for each equipment item exceeding 100 pounds, including but not limited to the following:

1. Switchboards
2. Lighting equipment

1.18 ELECTRICAL WORK CLOSEOUT

A. Prepare the following items and submit to the OWNER'S Representative before final acceptance.

1. Two copies of all test results as required under this Section.
2. Two copies of local and/or State Code Enforcing Authorities' Final Inspection Certificates.
3. Copies of Record Drawings as required under the General Conditions, pertinent Division One Sections and Electrical General Provisions.
4. Two copies of all receipts transferring portable or detachable parts to the OWNER'S Representative when requested.
5. Notify the OWNER'S Representative in writing when installation is complete and that a final inspection of this work can be performed. In the event any defect or deficiencies are found during this final inspection they shall be corrected to the satisfaction of the OWNER'S Representative before final acceptance can be issued.
6. List of spare fuses and locations identified by equipment name and building designation.
7. Prior to energizing, retighten to the proper torque, each circuit conductor lug landing, each bus bar (phases, neutral and ground) and circuit protection device threaded connections in all switchboards, switchgear, motor control centers, transformers, busways, disconnect switches, motor starters, motor terminals and panelboards, after the equipment is installed/connected and prior to energizing the equipment. The torque values shall comply with Manufacturer's recommendations.

END OF SECTION 16010
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SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
2. General provisions and requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data sheets for all Outlet Boxes, floor boxes, wiring devices, device plates, relays, contactors, timeswitches, transformers, and disconnect fuses.

B. Submit Detailed Shop Drawings including Dimensioned Plans, elevations, details, schematic and point-to-point wiring diagrams and descriptive literature for all component parts for relays, time clocks, and photocells.

C. Submit material list for outlet boxes.

PART 2 – PRODUCTS

2.1 OUTLET AND JUNCTION BOXES

A. General

1. Provide boxes of proper Code size for the number of wires or conduits passing through or terminating therein, but in no case shall box be less than 4.0 inches square by 2.125 inch deep, unless specified elsewhere or noted otherwise on the Drawings. Two and a half inch minimum depth for box widths exceeding 2-gang.
2. Increase the minimum outlet box size to 4.69 inches square by not less than 2.125 inches deep, where one or more of the following conditions occurs:

a. More than two conduits connect to the outlet box.
b. Conduit “homerun” connects to outlet box.

3. Boxes installed in masonry or concrete shall be UL "concrete-tight" approved for installation in concrete, and shall allow the placing of conduit without displacing reinforcing bars.
4. Provide fixture-supporting device in outlet boxes for surface mounted fixtures as required.

B. Surface Outlet Boxes

1. Surface mounted outlet boxes, cast iron Type FS or FD, with threaded hubs as required. Box interior dimensions and interior volume capacity not less than required for “press steel boxes”, and “sheet steel boxes”. Provide plugs in all unused openings. Provide weatherproof gaskets for all exterior boxes.

2.2 PULL BOXES

A. Sizes as Indicated on the Drawings and in no case of less size or material thickness than required by the Governing Code. Exercise care in locating underground pull boxes to avoid installation in drain water flow areas.

1. General purpose sheet steel pull boxes: Install only in dry protected locations with removable screw covers. Manufacturer's standard baked enamel finishes.
2. Weatherproof sheet steel pull boxes: Fabricate of code gauge, hot-dip galvanized steel with gasketed weathertight cover of same material. Manufacturer's standard baked exterior enamel finish.
3. Concrete pull boxes: Furnish complete with pulling irons, hot-dip galvanized traffic cover with hot-dip galvanized frame and four galvanized cable racks with porcelain blocks. The box to be set on a pea gravel base 12-inches thick and as large as the bottom. Install a ¾-inch by 10-feet copper clad ground rod for grounding all metal parts. After cables have been pulled and inspected, seal box between cover and frame with a mastic compound similar to Parmagum or Dukseal. Construction equal to prefabricated pull boxes as manufactured by Jensen or Brooks Products. Refer to Drawings for size. Box covers shall comply with Federal ADA, UL, State and Local AHJ for slip resistance. Provide bead weld on cover to pull box to indicate services within pull box (i.e., "480/277-VOLT, 3-PHASE, 4-WIRE ELECTRICAL" OR "SIGNAL/TEL/P.A./CLOCK/ FIRE ALARM").

2.3 SWITCHES

A. Provide Circuit Switches Totally Enclosed, Bakelite or composition base, toggle type with 277 volt AC rating for full capacity or contacts for incandescent or fluorescent lamp loads. Switch ratings shall be 20 ampere only. Color shall vary depending on installation location and shall be selected by OWNER’S Representative.

B. Switches

1. Single Pole Switches

Make	Toggle Type	Lock Type
Hubbell	#CS1221	#CS1221-L
P&S	#20AC1	#20AC1-L
Sierra	#5021	#5071
Leviton	#1221	#1221-L

2. Double Pole Switch

Make	Toggle Type	Lock Type
Hubbell	#CS1222	#CS1222-L
P&S	#20AC2	#20AC2-L
Sierra	#5022	#5072
Leviton	#1222	#1222-L

3. Three-Way Switches

Make	Toggle Type	Lock Type
Hubbell	#CS1223	#CS1223
P&S	#20AC3	#20AC3-L
Sierra	#5023	#5073-L
Leviton	#1223	#1223-L

2.4 RECEPTACLES

A. All Receptacles in Flush Type Outlet Boxes shall be installed with a bonding jumper to connect the box to the receptacle ground terminal. Grounding through the receptacle mounting straps is not acceptable. The bonding jumper shall be sized in accordance with the branch circuit protective device as tabulated herein under "Grounding". Bonding jumper shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws 6-32 or larger (except isolated ground receptacles). For receptacles in surface mounted outlet boxes direct metal-to-metal contact between receptacle mounting strap (if it is connected to the grounding contacts) and outlet box may be used. Color shall vary depending on installation location and shall be selected by OWNER'S Representative.

B. Duplex Convenience Receptacles shall be grounding type, 120 volt, 15 ampere, and shall have two current carrying contacts and one grounding contact which is internally connected to the frame. Outlet shall accommodate standard parallel blade cap and shall be side wired:

1. P&S . . . . . #5262
2. Leviton . . . . . #5262
3. Hubbell . . . . . #CR5252

C. Duplex 20 Ampere Convenience Outlets same as 15 Ampere Except Ampacity shall be used where duplex receptacles are supplied by separate 20-ampere circuit:

1. P&S . . . . . #5362
2. Leviton . . . . . .#5362
3. Hubbell. . . . . #CR5352

D. Ground Fault Convenience Receptacles provide separate ground fault receptacle at each location indicated on Drawings.

1. Leviton . . . . . # 6398
2. Hubbell . . . . . # GFR5252

E. Weatherproof Receptacle: Ground fault type duplex receptacle, mounted in a flush hinged door enclosure with lock and key. Enclosure shall be a P&S #4600 with a #1591F46 receptacle. On exposed conduit runs, weatherproof ground fault type receptacle as herein before specified, installed in "FS" condulet with one of the following spring door type covers:

1. Hubbell . . . . . .#WP826 MP

F. Special Outlets shall be as indicated on the Drawings.

2.5 PLATES

Provide plates for every switch, receptacle, telephone, computer, television and other device outlets. All plates shall be stainless steel.

2.6 STRUCTURAL AND MISCELLANEOUS STEEL

Structural and miscellaneous steel used in connection with electrical work and located out-of-doors or in damp locations, to be hot-dip galvanized unless otherwise specified. Included are underground pull box covers and similar electrical items. Galvanizing averages 2.0 ounce per square foot and conforms to ASTM A123.

2.7 DISCONNECTS (SAFETY SWITCHES)

Disconnect switches shall be rated 600 volt A.C., NEMA Type HD, quick-make, quick-break, h.p.-rated, fused Class "R", in NEMA Type I enclosure, lockable with number of poles and amperage as indicated on the Drawings. Provide neutral bus and conductor landing lugs, size to match conductors shown on Drawings. Where enclosure is indicated W.P. (weatherproof) switches shall be rain-tight NEMA Type 3R enclosure, lockable. Maximum voltage, current and horsepower rating clearly marked on the switch enclosure and switches having dual element fuses shall have rating indicated on the nameplate.

2.8 CONCRETE WORK

A. Portland Cement

1. ASTM C33-67, Type II, Low Alkali Cement. Composed of Portland cement, coarse aggregate, fine aggregate, and water.

    a. Concrete for use as electrical equipment footings, lighting pole bases and equipment slabs on grade, concrete shall attain minimum 28-day compressive strength of 4,500 psi, using not less than 5 sacks of cement per cubic yard of wet concrete.
    b. Concrete for underground duct/conduit encasement, the minimum 28-day compressive strength shall be 4,500 psi. Provide a minimum of 10-pounds of red oxide concrete coloring per yard of concrete.
    c. Mix shall obtain a 6-inch slump, measured with standard slump cone per ASTM C145-58.

2. Coarse Aggregate: Uniformly graded between maximum size not over 1½-inch and not less than ¾-inch and minimum Size #4, crushed rock or washed gravel. For concrete encased conduit only, maximum aggregate size shall be ½-inch.
3. Fine Aggregate: Clean, natural washed sand of hard and durable particles varying from fine to particles passing 3/8-inch screen, of which at least 12% shall pass 50 mesh screens.

B. Water: Clean and free from deleterious quantities of acids, alkalis, salts, or organic materials.

C. Reinforcement

1. Bars: Intermediate Grade Steel conforming to ASTM A15-66, with deformations conforming to ASTM A305-65, except #2 bars shall be plain.
2. Welded Wire Fabric: ASTM A185-64.
3. Bending: Conform to requirements of ACI 318-63.

D. Form Material: For exposed work, use PS 1-66 "B-B Concrete Form" plywood forms, or equal. Elsewhere, forms may be plywood, metal, or 1-inches x 6-inches boards. Forms for round lighting pole bases shall be sono-tube.

PART 3 – EXECUTION

3.1 GROUNDING (ADDITIONAL REQUIREMENTS)

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State of California and Local Authorities Having Jurisdiction.

B. Each pull box or any other enclosure in which several ground wires are terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

C. The maximum resistance to ground shall not exceed 5 ohms.

3.2 OUTLET AND JUNCTION BOXES

A. Surface mounted outlets shall be attached to concrete or masonry walls by means of expansion shields.

3.3 CONCRETE WORK

A. Form

1. Space forms properly with spreaders and securely tie together. Do not use twisted wire form ties. Keep forms wet to prevent joints from opening up before concrete is placed. Replace improper construction as directed. Do not use wood inside forms.
2. Build in and set all anchors, dowels, bolts, sleeves, iron frames, expansion joints and other materials required for the Electrical Work. Place all items carefully, true, straight, plumb, and even.
3. Carefully remove all exposed forms. Cut nails and tie wires below face of concrete and fill all holes. Rubbish will not be allowed to remain in, under, or around concrete.

B. Mixing: Use batch machine mixer of approved type. After ingredients are in mixer, mix for at least 1½-minutes.

C. Transit Mixing: In lieu of mixing at site, transit mixing may be used if rate of delivery, haul time, mixing time, and hopper capacity is such that concrete delivered will be placed in forms within 90 minutes from time of introduction of cement and water to mixer.

D. Placing of Concrete:

1. Before placing concrete, remove wood, rubbish, vegetable matter and loose material from inside forms. Thoroughly wet down wood forms to close joints.
2. Clean reinforcement; remove paint, loose rust, scale and foreign material. Bars with bends not called for will be rejected. Hold securely in place to prevent displacement. Lap bar splices 24 diameters, min; lap fabric one mesh minimum. Tie intersections, corners, splices with 16 gallon annealed wire, or as otherwise called for.
3. Place concrete immediately after mixing. Do not use concrete that has begun to set; no tempering will be allowed. If chuting is used, avoid segregation. In placing

new concrete against existing concrete, use bonding agent per Manufacturer's directions.

4. Give careful and thorough attention to curing of concrete. Keep concrete and forms wet for a minimum of 10 days, after placing concrete.

E. Concrete Finish

1. Finish of Exposed Concrete: Horizontal surfaces, steel troweled monolithic finish; vertical surfaces, smooth and free of fins, holes, projection, etc.
2. Exposed lighting pole bases shall be filled and sack finished to a smooth finish.

END OF SECTION 16050
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SECTION 16111

CONDUIT AND WIRE

PART 1 – GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
2. General provisions and requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data Sheets for all Wire, Supports, Conduit, Fittings and Splicing Materials.

B. Submit Material List for all Conduit and Conduit Fittings.

PART 2 – PRODUCTS

2.1 CONDUIT

A. General

1. The interior surfaces of conduits and fittings shall be continuous and smooth, with a constant interior diameter. Conduits and conduit fittings shall provide conductor raceways of fully enclosed circular cross section. The interior surfaces of conduits and fittings shall be without ridges, burrs irregularities or obstructions. Conduits and fittings of the same type shall be of the same uniform weight and thickness.
2. Type of conduit, type of conduit fittings and conduit supports shall be suitable for the conditions of use and the conditions of location of installation, based on the Manufacturer's recommendations and based on applicable Codes.
3. All fittings for metal conduit shall be suitable for use as a grounding means, pursuant to the applicable Code requirements. All metal conduit and metal conduit fittings shall provide 3 second duration ground fault current carrying ratings, when installed and connected to the respective conduit, as follows:

a. RMC and EMT conduit fittings.

1) 0.5 inch through 1.5 inch conduit/fitting size - 10,000 ampere RMS.

2) 2.0 inch and larger conduit/fitting size - 20,000 ampere RMS.

b. FMC and LTFMC Conduit Fittings

1) 0.5 inch through 1.25 inch conduit/fitting size-1,000 ampere RMS (without external bonding jumper).
2) 1.5 inch through 4.0 inch fitting size-10,000 ampere RMS with bonding jumper.

4. Protective corrosion resistant finish for metal conduit fabricated from steel and metal conduit fittings fabricated from steel, shall be as follows:

a. Clean all metal surfaces (including metal threads) with acid bath "pickle" prior to coating, to remove dirt, oil and prepare surfaces for galvanizing.
b. Hot-dip galvanized zinc coating on all interior and exterior steel surfaces. Minimum finish zinc coating thickness shall not be less than 0.002 inches.
c. Threads shall be hot-dip zinc coated after machine fabrication.
d. Exterior metal surfaces shall be finished with clear organic polymer topcoat layer, after galvanizing.
e. The inner metal surfaces of conduit fittings shall be finished with a lubricating topcoat after galvanizing, to facilitate conductor pulling through the conduit/fitting.

5. Threads for metal conduit and metal conduit fittings shall be taper-pipe-thread, National Pipe Standards (NPS) and shall comply with ANSI-B1.20.1.
6. Metal conduit termination connector fittings shall be provided with a Manufacturer installed, insulating throat bushing inside the fitting. The bushing shall protect the wire conductor insulation from cutting, nicks and abrasion during conductor installation and electrical load "cycling" after installation is complete. The bushing shall comply with UL 94V-0 flammability.
7. Provide conduit bonding/grounding jumper from metal enclosures with "concentric ring" knockouts, to positively ground/bond each respective conduit(s) to the metal enclosure.
8. Metal conduit fittings connecting to PVC coated metal conduit shall be PVC coated to match the conduit.
9. The conduit and fittings shall be watertight and airtight without cracks and pinholes.

B. Rigid Metal Conduit (RMC)

1. Rigid metal, round tubing, machine threaded at both ends.

a. The conduit and conduit fittings shall comply with the requirements for an equipment grounding conductor, pursuant to applicable Codes.

2. RMC Raceway types shall be as follows:

a. Rigid Galvanized Steel conduit (RGS), minimum yield strength shall be 35,000 PSI. Shall comply with NEMA standard 5-19 (latest revision); ANSI C80.1 and ANSI-C80.4 (latest revision); UL 514-B and UL 6 (latest revisions); National Pipe Standard Specification (latest revision).
b. Intermediate steel Conduit (IMC). Shall comply with NEMA Standard 5-19 (latest revision) ANSI-C80.6 (latest revision); UL 2142 (latest revision).

3. RMC Fittings

a. Fittings shall be compatible with RGS and IMC.
b. Fittings shall be rated "liquid tight".
c. Fittings imbedded in concrete shall be rated "liquid tight" and "concrete tight".
d. Connectors and couplings for terminating, connecting and coupling to RMC conduit shall be threaded metal.
e. Fittings shall comply with ANSI C80.4 and ANSI C33-84 (latest revision); NEMA FB1 (latest revision); UL 514 (latest revision).

4. RMC Fittings as manufactured by:

a. For threaded enclosure, termination connection.

1) Thomas & Betts - 106 Series bonding locknut, 5302 Series sealing ring with stainless steel retainer.

b. For non-threaded enclosure, termination connector.

1) Thomas & Betts - 370 Series watertight threaded sealing hub, 106 Series threaded bonding lock nut, Sta-Con Series enclosure bonding jumper and 3870 Series threaded ground bushing.
2) OZ/Gedney-CHMT/CHT watertight threaded hub with bonding locknut and GH50G Series enclosure bonding jumper.

c. For RMC to RMC conduit-to-conduit coupling

1) Erickson - 674 (threaded) Series
2) OZ/Gedney Type 4 (threaded) Series
3) Threaded RMC conduit couplings, product of the same Manufacturer as the RMC conduit.

C. Rigid Non Metallic Conduit (RNMC)

1. General

a. Conduit and fittings shall be 90 degree centigrade conductor rated. Fabricated from homogeneous material, free from visible crack holes or foreign inclusions, with integral "end-bell". The conduit and conduit fittings shall be watertight and airtight.

b. Conduit, conduit fittings and conduit fitting assembly "solvent cement" shall all be the product of the same Manufacturer. Conduit fittings shall be solvent cement welded watertight.
c. Conduit and fittings shall be identified with legible markings showing ratings, size and Manufacturers name.
d. RNMC and fitting shall be corrosion resistant, watertight.
e. Conduit shall be suitable for conductor operating temperatures from minus 20 degrees centigrade to 90 degrees centigrade.
f. RNMC shall comply with NEMA TC-2 (PVC 40 conduit, latest revision) NEMA TC-6 (EB conduit latest revision) and NEMA TC-3 (fittings, latest revision); UL 514 and UL 651 (latest revision).

2. Polyvinyl Chloride (PVC) – RNMC

a. PVC-schedule 40 heavy wall construction.
b. PVC-schedule 80 extra heavy wall construction.
c. PVC-type EB.

3. RNMC fittings connecting to metallic raceways shall be provided with a ground/bond jumper connection.

D. Conduit Bodies Conduit Fitting

1. Conduit bodies shall provide conductor access with a removable conduit body cover and wiring area enclosed in metal housing. The conduit body shall facilitate pulling conductors.
2. In-line form "C" conduit bodies shall be prohibited.
3. The interior space "length" of 90 degree "elbow" conduit bodies shall not be less than 6 times the diameter size of the largest conduit connecting to the conduit body.
4. Conduit body covers shall be removable, gasketed; watertight "domed" metal covers with threaded screw attachment to the conduit body.
5. Lubricated, reusable, wire roller guards inside the conduit body shall protect wire from insulation damage during wire "pulling".
6. Conduit body fittings shall comply with UL 514.
7. Conduit bodies as manufactured by:

a. For RMC Conduit

OZ/Gedney - LB 6X/Mogul (90 degree elbow) Series - threaded body.

Appleton - LB/Mogul (90 degree elbow) Series - threaded body.

2.2 PVC COATING

A. PVC Coatings shall be provided as described for specified metal products.

B. PVC Coating shall be factory applied, to comply with NEMA-RN1 and 5-19.

C. The Adhesion of the PVC Coating to the Coated Metal shall exceed the strength of the coating itself, based on 0.5 inch “strip-pull” test.

D. Uniform Coating Thickness shall be continuous without “breaks” or “pinholes” and shall not be less than the following:

1. Exterior metal surfaces, 40 mil. coating thickness.
2. Interior metal surfaces, 10 mil. PVC or urethane coating thickness (i.e. interior of conduits, interior of conduit fittings etc.).

2.3 WIRE AND CABLE

A. All Wire and Cable shall be copper, 600 volt, #12 AWG minimum unless specifically noted otherwise on the Drawings. Conductors #10 AWG and smaller shall be solid. Conductors #8 AWG and larger shall be stranded. Type of insulation as noted on Drawings as follows: Insulation of conductor connected to circuit protection devices required to be "100%" rated, shall be 90 degree rated insulation:

1. Type THHN/THWN insulation used for #4 AWG and smaller.
2. Type THW/XHHW or THHN/THWN insulation used for #2 AWG and larger.
3. Type THWN or XHHW insulation used for all panel feeders’ switchboard feeders, motor control center feeders, transformer feeders and service conductors.
4. Type THHN insulation used for circuit conductors installed in fluorescent lighting fixture raceways, for conductors connected to the secondary of fluorescent or mercury vapor fixture ballast or other hot locations.
5. Type XHHW or THWN insulation shall be used where conductors are installed in conduit exposed to the outdoor weather.
6. The following color code for branch circuits:

   Neutral . . . White (Tape feeder neutrals with white tape near connections)

   a. Normal Power

120/208 Volt	480/277 Volt
Ground Green	Ground Green
Phase A Black	Phase A Brown
Phase B Red	Phase B Orange
Phase C Blue	Phase C Yellow

   b. Isolated ground insulation shall be green with a longitudinal yellow stripe.

7. Feeders identified as to phase or leg in each panelboard with printed identifying tape.

PART 3 – EXECUTION

3.1 TRENCHING, FOOTINGS, SLEEVES

A. Provide Trenching, concrete encasement of conduits, backfilling, and compaction for the underground electrical work, in accordance with applicable Sections of this Specification.

B. Provide Footings for all post and/or pole-mounted lighting fixtures: concrete shall conform to the applicable Sections of this Specification.

3.2 GROUNDING

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State and Local Authorities Having Jurisdiction.

B. Where Nonmetallic Conduit is used in the Distribution System, the CONTRACTOR shall install the proper sized copper ground wire in the conduit with the feeder for use as an equipment ground. The electrical metallic raceway system shall be grounded to this ground wire.

C. The Maximum Ground/Bond Resistance to the Grounding Electrode shall not exceed 1 ohms from any location in the electrical system. The maximum ground resistance of the grounding electrode to earth shall not exceed 5 ohms.

D. Ground/Bond Conductors

1. Provide an additional, dedicated, green insulation equipment ground/bond wire inside each conduit type as follows. The metal conduit shall not be permitted to serve (function) as the only (exclusive) electrical ground return path:

    a. All types of nonmetallic conduit raceways including but not limited to: RNMC - Rigid Nonmetallic Conduit.
    b. FMC - Flexible Metal Conduit.
    c. LTFMC - Liquid Tight Flexible Metal Conduit.
    d. EMT - Electrical Metal Tubing when used to support receptacle power.

2. The equipment ground/bond wire shall be continuous from the electrical circuit source point of origin to the electrical circuit end termination utilization point as follows:

    a. Every conduit path containing any length of the above identified conduits.
    b. Every conduit path connected to any length of the above-identified conduits.

3. The equipment ground/bond wire shall be sized as follows, but in no case smaller than indicated on the Drawings. Install equipment ground/bond wire in each conduit/raceway, with the respective phase conductors:

a.

Feeder, Subfeeders & Branch Circuit Protection	Minimum Equipment Ground Wire Size
15 Amp	#12
20 Amp	#12
30 to 60 Amp	#10
70 to 100 Amp	#8
101 to 200 Amp	#6
201 to 400 Amp	#2
401 to 600 Amp	#1
801 to 1000 Amp	2/0
1001 to 1200 Amp	3/0
1201 to 1600 Amp	4/0
1601 to 2000 Amp	250 MCM
2001 to 2500 Amp	350 MCM
2501 to 4000 Amp	500 MCM

4. Splices in ground/bond wires shall be permitted only at the following locations:

a. Ground buses with listed and approved ground lugs.
b. Where exothermic welded ground/bond wire splices are provided.

5. Provide ground/bond wire jumpers for conduit fittings with ground lugs, expansion and deflection conduit fittings at conduit fittings connecting between metallic and non-metallic raceways and to bond metal enclosures to conduit fittings with ground lugs.

E. Ground Conductors for Branch Circuit Wiring shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws, 6-32 or larger.

F. Each Panelboard, Switchboard, Pull Box or any other enclosure in which several ground wires are terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

3.3 CONDUIT

A. General

1. The sizes of the conduits for the various circuits shall be as indicated on the Drawings, but not less than the conduit size required by code for the size and quantity of conductors to be installed in the conduit.
2. Conduits shall be installed concealed from view.

3. Conduits shall be provided complete with conduit bends, conduit fittings, outlet boxes, pullboxes, junction boxes, conduit anchors/supports, grounding/bonding for a complete and operating conductor/wire raceway system.
4. Metal and nonmetal conduits shall be provided mechanically continuous between termination connection points. Metal conduit shall be provided electrically continuous between termination connection points.
5. Individual conduit paths and home runs shown on the Drawings shall be maintained as separate individual conduits for each homerun and path.
6. Transitions between conduits constructed of different materials and occurring in above grade locations shall be allowed only at outlet boxes, junction boxes, pull boxes and equipment enclosures unless specifically indicated otherwise. Provide outlet boxes and junction boxes.
7. Metal conduit terminating to nonmetal enclosures; terminating into metal enclosures with "concentric.ring" knockouts; terminating into metal enclosures with knockout reducing washers, including but not limited to equipment housings, outlet boxes, junction boxes, pull boxes, cable trenches, manholes, shall be provided with a ground/bonding lug integrated with the conduit termination conductor fitting construction, by the Fitting Manufacturer. The lug shall provide for connection of a grounding/bonding conductor (insulated or uninsulated). The grounding lug shall be located on the fitting, inside the termination enclosure.
8. The type of conduit, type of conduit fittings, and type of conduit supports and method of conduit installation shall be suitable for the conditions of use and conditions of location of installation based on the Manufacturer's recommendations; based on the applicable codes and based on the requirements of the Contract Documents.

B. RMC Installation Locations

RGS, IMC conduits and RGS, IMC fittings shall be installed in the following locations:

1. Embedded in foundations, and footings constructed with concrete.
2. Embedded in walls and foundations constructed with brick and masonry.
3. Exterior of building for exposed conduit locations.
4. Damp or wet locations, exposed or concealed locations.
5. Exposed on roofs.
6. Exposed on utility service poles, for pole risers less than 9 feet above finish grade.

C. PVC Coated RMC Installation Locations

PVC coated RMC conduit and PVC coated RMC fittings shall be installed in the following locations:

1. Underground conduit locations for elbows and bends with a radius of less than 36 times the conduit diameter.
2. Underground vertical risers extending above grade.
3. Installed in contact with earth or corrosive materials.
4. Exposed conduit in interior locations.

D. RNMC Installation Locations

RNMC conduit and RNMC fittings shall be installed in the following locations containing only “non-hazardous material”:

1. Underground, concealed below earth grade, unless specifically noted or specified otherwise.
2. Exposed on utility service poles, for pole risers at 9 feet or higher above finish grade, schedule 80 PVC only.
3. RNMC type “EB” conduit(s) shall be concrete encased along the entire length of the conduits for all installation locations.

E. Conduit Installation

1. Conduit Separation

   a. Conduit installed underground or below building slab without full concrete encasement: Shall be separated from adjacent conduits of identical systems (i.e. signal to signal, data to data, power to power, control to control etc.) by a minimum of 3 inches. Conduits of non-identical systems (i.e. signal to power; data to power; power to control; signal to control, etc.) shall be separated by a minimum of 12 inches.
   b. Conduit installed underground with full concrete encasement; shall be separated from adjacent conduits of similar systems (100 volt and less) by a minimum of 2 inches; conduits for non-power systems (100 volts and less to ground) shall be separated by a minimum of 6 inches from power circuits (over 100 volts to ground); conduits for power circuits shall be separated from adjacent conduits of similar power systems (over 100 volts to ground) by a minimum of 3 inches.
   c. Separation of conduits entering termination points or crossing other conduits may be reduced as required within 60 inches of the termination or crossing points.
   d. Conduits containing Utility Company service circuits (i.e. electrical power, telephone, or cable television) shall be separated a minimum of 12 inches from all other utilities and conduits, with or without concrete encasement; metallic or non-metallic conduit, above grade or underground conduit locations.

2. Conduit stubs

   a. Conduits stubbed underground outside of building line for future use shall be terminated a minimum of five feet clear (whichever distance is greater) of building or adjacent concrete walks and AC paving. The stubout conduit shall be capped. Provide concrete monuments, 6-inches x 6-inches x 15-inches deep, buried flush with grade over the capped ends. The face of monument shall be furnished with 3-inches square brass plates securely mounted and engraved with the number and size of conduits and type of service (i.e., "POWER", "TEL.", etc.).
3. Conduit concrete encasement:

a. Conduits which are run underground exterior to building slab shall be continuously concrete encased except, 15 and 20 ampere power branch circuit conduits underground do not require concrete encasement.
b. PVC rigid-non-metallic-type EB conduit, of any size and any location shall be continuously concrete encased the full length of the conduit installation, including under building slab.
c. Concrete for encasement of underground conduits shall be 2000 PSI 28 days cures strength with a maximum of ¾-inch gravel. Concrete encasement of conduits shall be continuous without voids. The encasement shall extend 3-inches past the edges of all conduits on all sides of the circuit. Provide 10-pounds of red oxide cement coloring uniformly mixed with each cubic yard of concrete for conduit encasement.
d. Conduits located below or adjacent to structural foundations shall be separated from the foundation by a minimum of 12 inches. Conduits located below structural foundations shall be fully and continuously concrete backfilled and encased between the bottom of the foundation to the bottom of the conduits. The concrete shall be 4000 PSI 28 day cure strength instead of 2000-PSI concrete.

4. Underground Conduits

a. Three or more underground conduits larger than 1-inch in size and occupying the same trench shall be separated and supported on factory fabricated, non-metallic, duct/conduit support spacers. The spacers shall be modular, keyed interlocking type, "built-up" to accommodate quantity, size orientation and spacing of installed conduits.
   The spacers shall maintain a constant distance between adjacent conduit supports and hold conduits in place during trench backfill operations. Minimum support spacer installation interval along with length of the conduits shall be as follows:

   1) Concrete encased conduits, not less than 8 feet on center.
   2) Non-concrete encased conduits, not less than 5 feet on center.

b. Provide trenching, excavation, shoring and Backfilling required for the proper installation of underground conduits. Tops of backfill shall match finish grade.
c. Bottoms of trenches shall be cut parallel to “finish grade” elevation. Make trenches 12-inches wider than the greatest diameter of the conduit.
d. Backfilling Trenches for Conduits without Concrete Encasement Requirements

   1) Conduits which are not required by the Contract Documents to be concrete encased and are located exterior to building slab, shall be set on a 3 inch bed of damp clean sand. Conduit trenches shall be backfilled to within 12 inches of finished grade with damp sand after installation of conduit is completed. Remainder of backfill shall be native soil.

2) Conduits located under a building which are not required by the Contract Documents to be concrete encased, shall be completely backfilled and compacted with clean damp sand to the same level as the building foundation pad.
3) Provide a continuous yellow 12 inches wide flat plastic tracer tape, located 12 inches above the conduits in the trench. The tracer tape shall be imprinted with "Warning-Electric Circuits" a minimum of 24 inches on center.

e. Backfilling Trenches for Conduits with Concrete Encasement Requirements by the Contract Documents.

1) Trenches with all conduits concrete encased shall be backfilled with clean damp sand when located under building pads.
2) Trenches with all conduits concrete encased and not located under a building pad and not located under paved areas shall be backfilled with clean damp sand or native soil.

f. Backfill Material

1) Sand and native soil backfill of trenches shall be machine vibrated in 6-inch lifts to provide not less than 90% compaction of backfill.
2) Concrete and slurry mix shall be machine vibrated during installation to remove "air-voids".
3) Soil shall have no stones, organic matter of aggregate greater than 3 inches.
4) The slurry mix shall consist of concrete, clean sand and clean water mixture. Maximum shrinking of slurry mix shall not exceed 5% wet to dry.

g. Do not backfill until OWNER'S Representative has approved installation and As-Built Drawings are up to date. Promptly install conduits after excavation has been done, so as to keep the excavations open as short a time as possible. Excess soil from trenching shall be removed from the site.
h. Install underground conduit, except under buildings, not less than 24-inches below finished grade in non-traffic areas and 30-inches below finished grade in traffic areas, including roads and parking areas. Not less than 48-inches below finished grade under public/ private transit system right of way and railroad right of way. Dimensions shall be measured to the top of the conduit.
j. Conduit crossing existing underground utilities shall cross below the bottom depth of the existing utilities. If the top portion of the existing utility depth below finish grade exceeds 72 inches and the specified separation and depths are maintained when crossing over the top of the existing underground utility, the conduit may cross above the existing underground utility.

k. Provide long radius horizontal bends (minimum radius of 36 times the conduit diameter) in underground conduits where the conduit is in excess of 100 feet long.
l. Conduits installed below grade and on grade below buildings, shall not be smaller than 0.75 inches. Conduits for circuits exceeding 600 volts shall not be smaller than 5.0 inches.
m. Underground conduits entering a building shall be sloped. The conduit direction of slope shall be away from the building, and shall prevent water in the conduit from "gravity draining" towards the building. The conduit slope "high point" shall originate from the building, out to the first exterior pullbox, manhole etc. exterior conduit termination "low point". The minimum slope angle shall be a constant 8 inches (or greater) of fall for each 100 feet of conduit length.
n. Dewatering

1) Provide pumping to remove, maintain and dispose of all water entering the excavation during the time the excavation is being prepared, for the conduit laying, during the laying of the conduit, and until the backfill at the conduit zone has been completed. These provisions shall apply on a continuous basis.
Water shall be disposed of in a manner to prevent damage to adjacent property. Trench water shall not be drained through the construction. Groundwater shall not be allowed to rise around the pipe until joining compound has firmly set.
2) The OWNER'S Representative shall be notified 48 hours prior to commencement of dewatering.

5. Raceway/Conduits, which are installed at this time and left empty for future use, shall have 0.25 inch diameter polyvinyl rope left in place for future use. The pull rope shall be 500-pound minimum tensile strength. Provide a minimum of 5 feet of slack at each end of pull ropes.
6. Conduit Bends Risers and Offsets

a. The minimum bend radius of "factory or field" fabricated conduit bends shall not be less than the following. The bend radius shall be measured at the surface, inside radius of the conduit wall.

1) RMC and EMT conduit minimum bend radius - conduit for power circuits over 100 volts and less than 600 volts, 8 times conduit diameter. Conduit for power circuits over 600 volt, 12 times conduit diameter. Conduit for signal and fiber optic circuits, 10 times conduit diameter.
2) RNMC conduit - conduit minimum bend radius 36 times the conduit diameter. Under building reduce minimum bend radius to 10 times the conduit diameter. Conduit bends and offsets in RNMC with less than 36 times conduit diameter bend/offset radius shall be RNMC PVC schedule 80 or PVC coated RGS.

3) Conduits for Utility Company conductors. Conduit minimum bend radius shall comply with the respective Utility Company requirements.

b. Bends and offsets in conduits shall be kept to an absolute minimum. The total summation of all bends and offsets permitted in a conduit segment, occurring between two conduit termination/connection end points, shall not exceed the following, including conduit fittings:

1) RMC conduit - 360 angular degrees
2) RNMC conduit - 270 angular degrees

c. Each field fabricated conduit offset, bend and elbow which are not the standard product of the Raceway/Conduit Manufacturer shall be mandrel tested. The test shall be conducted after the conduit installation is complete and prior to pulling-in any wire, in the same manner as for underground conduits.

d. Factory manufactured angle connector conduit fittings shall be installed in exposed conduit locations only. Installation in locations normally concealed from view shall not be permitted. Not more than one factory manufactured angle connector shall be permitted in any length of conduit between conduit termination end points.

e. RNMC conduit risers from below grade shall be PVC coated RGS. Conduit risers, bends or offsets entering into a building shall be PVC coated RGS.

f. If three or more conduit-bends of the same conduit size and same conduit material type, installed, as part of the contract work, fail to comply with the required minimum conduit bend radius or conduit angular degree limits. The following corrective actions shall occur:

1) The CONTRACTOR shall remove all the non-complying conduit bends and the respective wire in the conduit from the project site. Provide new conduit and wire, complying with the Contract Documents.
2) Where the conduit bends similar to the non-complying conduit bends are installed concealed in walls, floors, above ceilings or below grade, the Contractor shall expose the conduit bends to allow visual observation.
3) The CONTRACTOR shall remove the non-complying conduit bends and dispose of the Project site. The CONTRACTOR shall provide new conduit bends and conductors complying with the Contract Documents.
4) All the costs to correct the deficient material and work along with costs to repair the direct, indirect, incidental damages and contract delays shall be the sole responsibility of the CONTRACTOR and shall be included in the bid price.

7. RNMC Conduit

a. Joints and fittings shall be solvent welded to RNMC conduit. Joints and fittings shall be watertight and airtight after fabrication.

8. Tighten each conduit fittings and fitting appurtenance, to the "torque" (allowable tolerance ±5%) value recommended by the fitting Manufacturer and applicable Code. If three or more conduit fittings are found to not be in compliance with the Manufacturer's "torque" (tightness) recommendations, the following corrective actions shall occur:

    a. The CONTRACTOR shall tighten "re-torque" the defective fittings and all similar conduit fittings installed as part of the Contract Documents in the presence of the OWNER'S Representative.
    b. If the respective conduit fittings similar to the deficient "torque tightness" fittings are installed concealed in walls, floors, above ceilings or below grade, the CONTRACTOR shall expose the fitting, to allow retightening each similar conduit fitting to the Manufacturers recommended "torque" values.
    c. All the cost to repair the direct, indirect, incidental damages and contract delays resulting from complying with these requirements shall be the sole responsibility of the CONTRACTOR and shall be included in the bid price.

F. Conduit Bodies

1. Conduit bodies shall be installed in exposed conduit locations only or above accessible ceilings.
2. Conduit bodies shall be accessible for removing body cover and pulling wire through the conduit body.
3. Conduit bodies shall not be installed inside enclosed walls.

3.4 WIRE AND CABLE

A. Branch Circuit and Fixture Joints for #10 AWG and Smaller Wire shall be made with UL-approved connectors listed for 600 volts, approved for use with copper and/or aluminum wire. Connector to consist of a cone-shaped, expandable coil spring insert, insulated with a nylon shell and two wings placed opposite each other to serve as a built-in wrench or shall be molded one-piece as manufactured by 3M-"Scotchlok".

B. Branch Circuit Joints of #8 AWG and Larger shall be made with screw pressure connectors made of high strength structural aluminum alloy and UL-approved for use with both copper and/or aluminum wire as manufactured by Thomas & Betts. Joints shall be insulated with plastic splicing tape, tapered half-lapped and at least the thickness equivalent to 1.5 times the conductor insulation. Tapes shall be fresh and of quality equal to Scotch.

C. Use UL Listed Pulling Compound for Installation of Conductors in Conduits.

D. Correspond each Circuit to the Branch Number Indicated on the Panel Schedule shown on the Drawings except where departures are approved by the OWNER'S Representative.

E. Control wiring to conform to the wiring diagrams shown on the Mechanical Drawings and the Manufacturer's Wiring Diagrams.

F. All Splices in Exterior Pull Boxes and Light Poles shall be cast resins encapsulated.

1. Power conductor splices - 3M Scotchcast Series 82/85/90; Plymouth or equal.
2. Control and signal circuits 3M Scotchcast Series 8981 thru 8986, Plymouth or equal.

G. Neatly group and lace all wiring in panelboards, motor control centers and terminal cabinets with plastic ties at 3-inches on centers. Tag all spare conductors.

END OF SECTION 16111
120616/535012

SECTION 16160

BRANCH CIRCUIT PANELBOARDS, DISTRIBUTION PANELS AND TERMINAL CABINETS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all other Specification Sections and drawings for related work required to be included as work under Division Sixteen.
2. General provisions and requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide Manufacturers Catalog Data for Panels, Cabinets and Circuit Breakers.

B. Provide Shop Drawing Showing Panel Circuit Arrangements, Size, Voltage, Ampacity, Overcurrent Protective Devices, etc.

C. Provide Nameplate Engraving Schedule.

D. Short Circuit and Arc-Flash

1. Perform and submit engineered settings for each fuse and adjustable circuit breaker device, showing the correct time and current settings to provide the coordination within the limits of the specified equipment, per the latest applicable Standards of IEEE and ANSI. Provide Electric Arc-Flash calculations as part of the Coordination Study recommendations. The information shall be submitted in both tabular form and on time current log-log graph paper, with an engineering narrative, six copies.
2. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified contract equipment, including but not limited to:

    a. IEEE-242, Recommended Practices for Protection and Coordination of Industrial and Commercial Distribution.
    b. IEEE-1584, Guide to Performing Arc-Flash Hazard Study.
    c. CEC/NEC

3. Electrical equipment including switchgear, switchboards, electrical panels, and control panels, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electrical-Arc-Flash” warning signs. The signs shall explain a

hazard to personnel may exist if the equipment is worked on while energized or operated by Personnel, to wear the correct Protective Equipment/clothing (PPE) when working “Live”, or operating “Live” equipment and circuits.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND DISTRIBUTION PANELS

A. Shall be flush or surface mounting as indicated with circuit breakers as shown on panel schedule, hinged lockable doors, index cardholders and proper bussing.

B. Where indicated on the Drawings shall be furnished with subfeed breakers and/or lugs, split bussing, contactors, time switches, relays, etc., as required.

C. All panels shall be keyed alike.

D. Shall be finished with one coat of zinc chromate and coat of primer sealer after a thorough cleaning where exposed to public view (e.g., corridors, covered passages, offices, etc.) and gray in switchboard, janitor's heater and storage rooms. Prime coated panelboard shall be painted to match surroundings after installation. Shall be fabricated of sheet steel of the following minimum gauges: Door and trim #12; enclosure - Code gauge steel.

E. Furnish all Panels and Terminal Cabinets with the Manufacturers Flush Locks and Keys except where indicated otherwise herein. Fasten the trim to panel and terminal cabinets by means of concealed, bolted or screwed fasteners accessible only when the door is open.

F. Panels 208/120-Volt, Three Phase, 4-Wire, S/N or 120/240-Volt, Single Phase, 3-Wire, S/N.

Panel types as manufactured by:

1. Cutler Hammer.....Type Pow-R-Line 1
2. General Electric .....Type "A" Series
3. Square D.....Type NQOD
4. Siemens.....Type “S” Series

G. Panels for 480/277-Volt, Three Phase, 4-Wire, S/N.

Panelboard types as manufactured by:

1. Cutler Hammer.....Type Pow-R-Line 2
2. General Electric .....Type “A” Series
3. Square D.....Type NEHB
4. Siemens.....Type “S” Series

H. Distribution Panels Shall be as Manufactured:

		Narrow Wide
1.	Cutler Hammer	Pow-R-Line 3 ..... Type CDP
2.	General Electric	Type CCB or QMR
3.	Square D	Type HCN or HCM

4. Distribution panelboards for 208/120 volt three phase and 120/240 volt single phase shall be similar to the 480/277 volt panelboards.

I. Panels for Bussing Sizes thru 400-amp shall be 20-inches Wide. Surface or flush mounting as indicated. Recess mounted type shall have a 20-inches wide (maximum) recess metal enclosure with trim plate cover extending 1-inch on all sides of enclosure. Depth shall be 5¾-inches nominal. Height of panel as required for devices.

J. Provide 6-inches Additional Gutter Space in all Panels where Double Lugs are Required or where Cable Size exceeds Bus Size. Minimum bottom gutter space shall be 6-inches high. 12-inches additional gutter space may be required for aluminum feeders where used.

K. Panels with Bus Sizes Greater than 400 ampere for 480/277-Volt, Three Phase, 4-Wire, S/N or 480 volt, Three Phase, 3-Wire shall be 24-inches (maximum) wide by 6½-inches (maximum) deep units and 30-inches to 40-inches (maximum) wide by 8-inches to 12-inches (maximum deep units. The wider units shall be used only at locations where the narrow unit is not available with the number of 225-ampere frame branch circuits shown on the panel schedules, or where the main breaker size exceeds the narrow panel maximum.

L. Panelboards shown on the Drawings with Relays, Time Clocks or Other Control Devices shall have a separate metal barriered compartment mounted above panel with separate hinged locking door to match panelboard. Panelboards with circuits controlled by low voltage remote control relays shall be provided with separate cabinets to contain the relays, adjacent to the panelboard. Provide mounting subbase in cabinet for control devices and wiring terminal strips.

M. Panels shall have a Circuit Index Cardholder Removable Type, with Clear Plastic Cover. Index card shall have numbers imprinted to match circuit breaker numbers.

2.2 SHORT CIRCUIT RATING

A. Branch Circuit Panelboard Circuit Breakers and Bussing shall be rated for short circuit interrupt and withstand symmetrical amperes as follows (but in no case less than shown on the Drawings):

	C/B and/or Bus Rating	Panel Voltage	Short Circuit Amp.
1.	400A and less	240V and below	10,000A
2.	400A and less	over 240V and below 600V	14,000A

3.	Over 400A/800A & below	240V and below	25,000A
4.	Over 400A/800A & below	over 240V and below 600V	18,000A

2.3 CIRCUIT BREAKERS

A. Manufacturer

1. Circuit breakers as manufactured by the following companies only are acceptable:

    a. Cutler Hammer
    b. General Electric Co.
    c. Square D Co.
    d. Siemens

B. Configuration

1. Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the Drawings.
2. Circuit numbers of breakers shall be black-on-white micarta tabs or other previously approved method. Circuit number tabs, which can readily be changed from front of panel, will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.
3. Panelboard circuit breakers shall be bolt on type.

C. Where 2-Pole or 3-Pole Breakers occurs in the Panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.

D. Lock-Off and Lock-On

1. All circuit breakers shall be pad-lockable in the "off" position. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval). Other means of attachment shall not be accepted without prior written approval of the OWNER'S Representative.
2. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall be furnished with lockout clips, mounted in the “on” position. The breakers shall be able to trip automatically with lockout clips in place.
3. Provide lock-on clips on branch circuit breakers supplying fire alarm equipment and fire alarm panels. Provide identification of the dedicated "fire alarm" circuit function and operation. Color code the circuit breakers to comply with AHJ requirements.

2.4 BUSSING

A. Bus Material

1. Bussing shall be rectangular cross section copper; alternately silver or tin-plated aluminum.
2. Bussing shall be full length of the enclosure.

B. Ground Bus

1. Each panel shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

C. Provisions

1. Provide space and all hardware and bus mounting attachments for future devices as indicated on the Drawings.

2.5 TERMINAL CABINETS

A. Terminal Cabinets shall be fabricated of code gauge sheet steel for flush mounting (except where noted as surface) of size indicated on the drawings, and complete with hinged lockable doors and the number of 2-way screw terminals required for termination of all conductors. Terminal cabinet locks to operate from same key used for panelboards. The trim to terminal cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door to terminal cabinets. Terminal cabinets shall have 5/8-inch plywood backing. Cabinets shall be finished with one coat of zinc chromate and one coat of primer sealer after a thorough cleaning where exposed to public view (e.g., corridors, covered passages, offices, etc.) and gray in switchboard, janitors, heater, and storage rooms. Prime coated cabinets shall be painted to match surroundings after installation.

B. Terminals for Signal Systems Cabinets to Cannon Type “SS”.

C. Provide Engraved Nameplate on each Cabinet Indicating its Designation and System (i.e., “Life Safety System - Panel 2LS”).

PART 3 - EXECUTION

3.1 MOUNTING

A. Flush Mounted Panelboards and Terminal Cabinets shall be securely fastened to at least two studs or structural members. Trim shall be flush with finished surface.

B. Surface Mounted Panels and Terminal Cabinets shall be secured to walls by means of preformed steel channels securely fastened to at least two studs or structural members.

C. Panelboards shall be Installed to Insure the Top Circuit Protective Device (including top compartment control devices) are not more than 6-feet-6-inches above finish floor in front of the panel and the bottom device is a minimum of 12-inches above the floor. Manufacturer shall specifically indicate on Shop Drawing submittals each panel where these conditions cannot be met.

3.2 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. Provide a Red and White Bakelite Nameplate with ½-inch High Letters in each 277/480-Volt Panel Fastened to Face of Dead-Front Plate, to Read: "DANGER 480 (or as applicable) VOLTS KEEP OUT AUTHORIZED PERSONNEL ONLY".

B. Panel Manufacturer shall stencil the panel number identification on the inside of panel door to correspond with the panel designation on the Drawings.

C. Identification Plates and Numbers shall be attached with screws or twist lock fasteners. Adhesive attachment of any kind shall not be used.

END OF SECTION 16160
120616/535012

SECTION 16425

SWITCHBOARDS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division Sixteen.
   2. General provisions and requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide Schematic "ladder type" logic control wiring diagrams and "point-to-point control wiring diagrams showing control and protective systems interlocks.

B. Provide Nameplate Engraving Schedule.

C. Submit Full-Scale Time/Current Transparencies on Log/Log Paper for all Fuses, circuit breakers, ground fault system devices, and relays.

D. Short Circuit and ARC-Fault
   1. Perform and submit engineered settings for each fuse and adjustable circuit breaker device, showing the correct time and current settings to provide the coordination within the limits of the specified equipment, per the latest applicable standards of IEEE and ANSI. Provide Electric ARC-FLASH calculations as part of the Coordination Study recommendations. The information shall be submitted in both tabular form and on time current log-log graph paper, with an engineering narrative, six copies.
   2. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment, including but not limited to:
      a. IEEE-242, Recommended Practices for Protection and Coordination of Industrial and Commercial Distribution.
      b. IEEE-1584, Guide to Performing ARC-FLASH Hazard Study.
      c. CEC/NEC

E. Factory Tests: Switchgear Tests - ANSI C37.20. Certified copies of design tests, production tests, and conformance tests of the switchgear shall be submitted and review

comments shall be received before delivery of equipment to the project site. In lieu of the above tests, a report of these tests previously performed on identical units of each rating will be acceptable.

1.3 APPLICABLE STANDARDS

A. The Switchgear Equipment shall be Designed, Tested and Assembled to comply with ANSI, IEEE, and NEMA and UL.

B. Equipment Components/Devices, Switchboards, and/or Switchgear shall be manufactured by: General Electric, Cutler-Hammer, Square–D, or Siemens.

PART 2 - PRODUCTS

2.1 BUSSING

A. Horizontal and Vertical Busses shall be full lengths in each Equipment Section. Buses shall have a minimum withstand rating equal to available fault current indicated on Drawings, but in no case shall the rating be less than 42,000 amperes, symmetrical.

B. Provide Interconnected Full Capacity Neutral Bus in each Section with the same ratings and construction as the phase busses.

C. Provide Interconnected Ground Bus in each Section.

D. Provide Space and all Hardware and Mounting Attachments for future devices as indicated on the Drawings.

E. Main Horizontal Bussing shall be full capacity in all Switchboard Sections.

F. Vertical Buss may be Tapered, to not less than 1/3 the Ampacity are of the Main Horizontal Buss; but in no case shall the vertical buss be of less capacity than the sum of the frame size ampacities of overcurrent devices mounted in the respective Sections including any indicated spares and spaces.

G. The Switchboard Bussing shall be of sufficient cross-sectional area to meet UL Standard 891 on temperature rise Bus shall be copper with silver plated bus joints or extruded aluminum with tin plated bus joints. The through bus shall have provisions for the addition of future Sections. The through bus supports, connections and joints are to be bolted with grade 5 hex head bolts and Belleville washers to minimize maintenance requirements.

2.2 CIRCUIT BREAKERS

A. General
   1. Circuit protective devices as indicated on the Drawings. All devices shall have an interrupting capacity not less than the maximum available fault current at the circuit breaker as indicated on the drawings, but in no case shall the interrupting capacity be less than 65,000 ampere symmetrical interrupting for 480/277 volt devices and 42,000 ampere symmetrical for 240 volt or 208/120 volt devices.
   2. Provide padlock-off devices on each device. Breakers shall provide time overcurrent and instantaneous circuit protection.
   3. Circuit breakers shall employ a stored energy, quick make-quick break, and trip free operating system on each phase, with common trip. Breakers shall comply with UL 489 and NEMA AB1 latest revisions.
   4. Circuit breakers noted as "100%" on the Drawings shall be tested and rated to carry the breaker full rated (100%) ampere load continuously including the assemblies the circuit breakers are installed into.
   5. Provide conductor lugs on circuit breakers to accept conductor sizes and quantities shown on Drawings.
   6. Electrical equipment including switchgear, switchboards, electric panels and control panels, motor control centers, combination motor starters, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electric-ARC-FLASH” warning signs. The signs shall explain a hazard to personnel may exist if the equipment is worked on while energized or operated by personnel while energized. The sign shall instruct personnel to wear the correct Protective Equipment/clothing (PPE) when working “Live”, or operating “Live” electrical equipment and circuits.

B. Performance Requirements for Circuit Breakers Conforming to one or more of the Following Applications:
   - 600 Ampere or larger frame size.
   - Larger than 400 Ampere trip.
   - Service entrance in main switchboard.
   - Noted as main circuit breakers on the drawings.

   1. Circuit breaker shall employ current sensors and static electronic automatic trip system. Three phase or single-phase operation as noted on the Drawings. Current carrying components shall be completely isolated from the static trip units. The trip unit shall be independent of external power sources. Circuit breaker shall be UL listed for reverse connection.
   2. Breaker solid state trip control functions shall provide the following field adjustable features;
      a. Adjustable ampere setting to vary the continuous current carrying capacity, minimum range of 80% thru 100% of full load trip rating.
      b. Adjustable long-time delay setting to vary the time the breaker will trip under sustained overload conditions. Minimum of three settings, "minimum - intermediate - maximum".
      c. Adjustable short-time pickup to vary the level of high current the breaker can carry for short periods of time, minimum range of 2 times thru 8 times of ampere setting.

d. Adjustable short time delay to vary the time of the short-time pickup. Minimum of three settings "minimum-intermediate-maximum".
e. Short time "I^2t" switch to allow a current-squared multiplied by time ramp function in the short-time system. Two position setting "in-out".
f. Adjustable instantaneous pickup to vary the breaker ampere setting for immediate (instantaneous) interruption of severe overloads (short circuits). Adjustable minimum range of 2.0 times thru 9 times of circuit breaker ampere sensor rating (note where the coordination study requires a higher instantaneous setting, change the specified adjustable instantaneous trip to fixed instantaneous trip at 15 times the breaker ampere sensor setting).
g. Individual fault trip indicators shall provide local indication on the breaker for overload and short circuit (and ground fault where applicable) conditions.
h. Provide one Manufacturer standard test set for solid state trip circuit breakers.

C. Performance Requirements for Circuit Breakers Conforming to one or more of the Following Applications:
- Smaller than 600 ampere frame size.
- 400 ampere and smaller trip.
- 225 ampere and larger frame size.
- Larger than 100 ampere trip.

1. Circuit breaker shall be molded case thermal-magnetic or solid-state trip. Thermal-magnetic circuit breakers shall be furnished with field adjustable, instantaneous magnetic trip element.
2. Solid state trip breakers shall conform to the requirements described for solid state breakers larger than 400 ampere trip except, only the following field adjustments are required;
   a. Ampere setting adjustable minimum range of 80% thru 100% of full load trip rating.
   b. Short time pickup adjustable minimum range of 2 times thru 8 times of the ampere setting.
   c. Fixed or field adjustable instantaneous trip.

D. Performance Requirements for Circuit Breakers Conforming to the Following Applications:
- 100 ampere frame size and smaller.
- 100 ampere and smaller trip.

1. Circuit breaker shall be molded case thermal-magnetic trip.

E. Series Rated Circuit Breakers (SR)
1. Performance requirements for circuit breakers conforming to the following applications:
   - 400 ampere and smaller trip and identified as Series Rated (SR) on the Drawings. Circuit breakers shall be UL listed for series rating with all downstream circuit breakers.

2.3 SWITCH AND FUSE FEEDER PROTECTIVE DEVICES

A. Fusible Switches: Quick-make, quick-break type with rejection clips for use with Class "R" fuses. Switches with ratings up to and including 100 ampere at 240 volts shall be twins mounted. Switches rated through 60 amperes and 480 volts shall be twins mounted. Switches shall be removable from front of switchboard without disturbing adjacent units or switchboard bus structure.

B. Fuses shall be time delay current limiting types, UL Class RK-1 unless otherwise indicated on the Drawings. Provide one spare set of fuses of each size and type in each switchboard.

2.4 MAIN SWITCHBOARDS

A. Switchboard shall be floor-mounted, dead-front, dead-rear type, front and rear aligned, self-supporting, consisting of one or more Vertical Sections with group mounted non-drawout circuit protective devices, instrumentation and control wiring as indicated on the Drawings and as specified herein.

B. Switchboard shall be designed, built and tested in accordance with applicable portion of the latest editions of NEMA PB-2, Underwriters Laboratories No. UL-891 and the National Electrical Code.

C. Switchboard Sections shall be floor standing self-supporting, of the universal frame type using die-formed, 12-gauge steel members bolted and welded together. Provide removable side and rear plates with formed edges all around. Provide ventilation openings required maintaining minimum operating temperature. Provide removable steel cover plates for all usable device spaces. Provide lifting means and provisions for moving by means of rollers or skids to installation location. Bolt individual Sections together to form a single rigid switchboard assembly. Provide full height, hinged, vertical wireway metal covers, on each vertical wireway, of each Distribution Section of the switchboard, containing group mounted feeder protective devices.

D. Switchboard shall include, but not be limited to, the following:
   1. Underground Pull Section as required by the serving utility incoming service.
   2. Metering facilities as required by the serving utility.
   3. Current transformer space.
   4. Main disconnects.
   5. Distribution and feeder circuit protective devices.
   6. Owner metering (where indicated on Drawings).
   7. Bussing, incoming utility compliant and distribution.

2.5 DISTRIBUTION SWITCHBOARDS

A. Switchboards shall be floor mounted, dead-front, dead-rear type, front and rear aligned, self-supporting, consisting of one or more Vertical Sections with group mounted circuit protective devices, instrumentation and control wiring as indicated on the Drawings and as specified herein. Switchboards shall comply with UL Standard #UL-891.

B. Distribution switchboards shall include but not be limited to the following:
   1. Main disconnects (where indicated on drawings).
   2. Feeder protective devices.
   3. Owner metering (where indicated on drawings).
   4. Bussing.

C. Switchboard Sections shall of the universal frame type using die-formed, 12 gauge steel members bolted and welded together. Provide removable side and rear plates with formed edges all around. Provide ventilation openings required maintaining minimum operating temperature. Provide removable steel cover plates for all usable device spaces. Provide lifting means and provisions for moving by means of rollers or skids to installation location. Bolt individual Sections together to form a single rigid switchboard assembly. Provide full height, hinged, vertical wireway metal covers, on each vertical wireway, of each Distribution Section of the switchboard, containing group mounted feeder protective devices.

2.6 CONTROL WIRING

A. Terminal Blocks with Barriered Terminals shall be provided for all control wiring terminator points. Control wiring shall be run in horizontal and vertical, isolated, internal metal wireways and shall be carried across hinges in laced bundles. Wire terminators shall be crimp-on type spade terminal

B. Secondary Control Wiring shall be a minimum of 14 AWG stranded copper type SIS 600-volt insulation.

C. Control Circuits shall have circuit number tags at each termination or break in the wire to match circuit numbers on terminal strips and control wiring diagrams.

PART 3 - EXECUTION

3.1 INSTALLATION

Install switchboards in accordance with Manufacturer's written instructions and applicable portions of NECA's "Standards of Installations" for switchboards and motor control centers.

3.2 SWITCHBOARD ANCHORING

Bolt switchboards to floor and wall where wall exists. Where units are free standing provide preformed steel channel or angle iron bracing to nearest wall or building structural member. Switchboard anchoring shall be designed for a 1.0 gravity lateral acceleration of the equipment. Submit structural calculations and details.

3.3 TESTING (ADDITIONAL REQUIREMENTS)

Adjustable settings shall be set and tested after the equipment installation is complete, for proper operation at set pickup and/or drop-out points, by an independent Test Laboratory.

Testing shall comply with the Equipment Manufacturer recommendations. Submit three copies of all test results to OWNER'S Representative. Correct any deficiencies and retest.

3.4 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. Provide a Red and White Bake-lite Nameplate with ½-inch High Letters in each Section Fastened to Face of Dead-Front Plate, to Read: "Danger 480 (actual volts) volts, KEEP OUT, AUTHORIZED PERSONNEL ONLY".

B. Manufacturer shall stencil the equipment name on each device and equipment section to correspond to the identification of the Drawing.

C. Devices Mounted in Equipment Controlling Protective Devices shall be provided with nameplates indicating device controlled or monitored.

END OF SECTION 16425
120616/535012

SECTION 16500

LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SCOPE

A. Work Included:

All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 16.
2. General provisions and requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General

1. Submit Certification letter from Manufacturers of LED or Lamps and Ballasts and power/driver supplies, (or alternately, Manufacturer's published catalog data) stating/showing the specific LED or lamp, ballast, or power/driver supply combination comply with Manufacturer recommendation and approval for the combined use, shown on the Drawings.
2. Provide complete Manufacturers catalog data information for each light fixture (luminaire), ballast, power/driver supplies, LED or lamps, materials, auxiliary equipment/devices, finishes and photometrics.

B. Performance Certification

1. Submit Manufacturer's Certified LED or Lamp and Ballast Tests Report data showing compliance with Contract Document.
2. Submit Manufacturer's letter of Certification for each fixture type, confirming the proposed combination of specific LED or lamp, ballast, power/ driver supply and auxiliary components for each light fixture (luminaire) type will function together correctly and perform in compliance with the requirements of the Contract Documents as follows:
   "The proposed lamp(s), LED or lamp ballast(s), drivers, (where, applicable), lamp sockets and fixture have been tested as an assembly. The proposed fixture products assemblies are certified by the Manufacturer to function within the required temperature, lumen output, electrical characteristics and operational life described in the Contract Documents".

C. Light Fixture Samples

1. If requested by the OWNER'S Representative, provide a sample of each fixture proposed as a substitution for a specified fixture. Sample fixture shall be complete with specified lamps, 3-wire grounding "SO" cord and plug for 120-volt 60Hz, AC plug-in operation. Sample fixtures shall be delivered to the OWNER'S Representative's office for review, the samples shall be picked up within 10-working days after review comments have been received; any samples left beyond this time will be discarded by the OWNER'S Representative. Decision of OWNER'S Representative regarding acceptability of any lighting fixture is final.

1.3 QUALITY ASSURANCE (ADDITIONAL REQUIREMENTS)

A. Work and Materials shall be in full accordance with the latest Rules and Regulations as follows. The following publications shall be included in the Contract Document requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the requirements describing the more restrictive provisions shall become the applicable Contract definition:
   1. UL – Underwriters' Laboratory:
      a. UL – 1572: HID Lighting Fixtures
      b. UL – 1570: Fluorescent Lighting Fixtures
      c. UL – 1029: HID Ballast
      d. UL – 935: Fluorescent Lamp Ballast
      e. UL – 542: Lamp Holders, Starters, and Starter Holders
      f. UL – 8750 and 1598C: Light Emitting Diode – LED Equipment for use in Lighting Products and Replacements
   2. NEMA – National Electrical Manufactures Association:
      a. NEMA – LE4: Recessed Luminaries Ceiling Compatibility
      b. NEMA – SSL #1, #3 and #6: Electronic Drivers for LED; LED and Incandescent Lamp Replacement
      c. NEMA – LSD #44, #45, #49 and #51: SSL-Solid State Lighting
   3. United States Federal Government:
      a. FCC – Part 18: EMI and RFI emissions limitations.
      b. EPA: Energy conservation publications and waste disposal regulations.
   4. ETL and C.B.M. Certified and Approved.
   5. Electrical Installation Standards, National Electrical Contractors' Association:
      a. NEIS/NECA and IESNA – 500: Recommended Practice for Installing Indoor Commercial Lighting Systems.
      b. NEIS/NECA and IESNA – 501: Recommended Practice for Installing Exterior Lighting Systems
      c. NEIS/NECA and IESNA – 502: Recommended Practice for Installing Industrial Lighting Systems.
   6. Illuminating Engineering Society – IES (IESNA):
      a. IES – LM41: Photometric and Reporting.
      b. IES – 587: Transient Surge Protection.
      c. IES – LM79: Solid State Lighting (SSL) Testing and Measurement.
      d. IES – LM80: Testing for Lifetime of LED.
   7. ANSI-American National Standards Institute:

a. ANSI – C81
b. ANSI – C82
c. ANSI – C62.41: Transient Withstand
d. ANSI – C78: Lamps

8. State California Code of Regulations - Title-24 Energy Code

PART 2 - PRODUCTS

2.1 GENERAL

A. Complete Fixture
1. Provide light fixtures complete including LED or lamps, ballasts, drivers, lamp holders sockets, housings, ceiling and wall trim "rings" for each ceiling type, mounting and adapter support brackets, diffusers/lenses and outlet boxes.
2. Include an allowance of $300.00 to provide a light fixture for each lighting fixture outlet shown on Drawings without a fixture type designation.

B. Specific Fixture Requirements and Fixture Schedule Information
1. The catalog numbers included in the description of the various types of lighting fixtures shall be considered to establish the type or class of the fixture with a particular Manufacturer only. The fixture length, number of lamps and lamp types, component materials, accessories, mounting type, ceiling, wall and install adapters, operation voltage, and all other components required to fulfill the total description of the fixture based on all Drawing information, branch circuits, voltages, Specification information, and shall be included in the Contract requirements regardless of whether or not the catalog number specifically includes these components.
2. Lighting fixtures shall be the types as indicated in fixture schedule on the Drawings and as described in the Specifications.
3. All fixtures of the same fixture type shall be the same Manufacturer and of identical finish and appearance, unless indicated otherwise on Drawings.

C. Manufacturer Certification of Operation
1. Lamps and lamp ballasts and power supplies (drivers) shall be recommended and certified by the respective Manufacturer(s), to be "matched" to operate correctly together, within the published characteristics, for efficacy, lamp starting, operating life hours, lumen output, power factor, power input, operating line ampere, sound intensity, and temperature.

2.2 LIGHT FIXTURES (LUMINAIRES)

A. General
1. Lighting fixtures shall have all parts, ballasts, drivers, sockets, support attachments, trim flanges and fittings necessary to complete and properly install the fixture at the indicated installation locations. All fixtures shall be provided with lamps of size and type specified.

2. Ceiling and/or wall surface mounted lighting fixtures shall not have any exposed chase nipples or conduit knockouts visible to view within fixture housing. Lighting fixtures mounted in continuous rows shall have chase nipples or conduit knockouts between lighting fixture housing, but shall not have visible chase nipples/conduit knockouts on the visible ends of the continuous row of lighting fixtures.
3. Where fixture color is indicated to be selected by the ARCHITECT and/or OWNER'S Representative, provide two color chip samples for each color for review.
4. Recessed fixtures with attached junction box shall be provided with a junction box permanently attached to the plaster ring so that the junction box is accessible through the fixture opening when the fixture is removed. Connection between fixture and pull box shall be flexible metal conduit with not less than 16 AWG "AF" or "CF" type fixture rated copper wires, high temperature wire insulation for not less than 600 volts AC. The flexible conduit shall be sufficient length, so that when the fixture is removed, the pullbox is readily accessible.
5. Recessed fixtures shall be Underwriters' Laboratory approved for recessed installation with plaster frame and attached pull box. Lamp enclosure, reflectors and finish wiring shall not be installed until plastering is completed. Exposed finish trim shall not be installed until finish painting of the adjacent surface is completed.
6. The fixture shall bear Underwriters' Laboratory label of approval for the wattage and installation indicated.
7. Light fixtures installed outdoors, in damp or wet locations shall be UL labeled for said location as "damp-location" and "wet-location" for the respective installation location.
8. Fixtures in contact with thermal/building insulation shall be UL listed and rated for direct contact installation in thermal insulation systems.
9. Lamp auxiliary support brackets shall be heat-resistant, non-dielectric. Alternatively, metal auxiliary lamp support brackets shall be electrically isolated from the fixture, to prevent glass decomposition.
10. Lighting fixtures installed in masonry and/or concrete construction. The fixture housing shall be rated for "concrete-pour" installation location.

11. Provide a permanent label inside each light fixture stating the following relamping information. Not less than 0.125-inch high black alphanumeric characters on white background.

    "Replacement lamp(s) installed in this light fixture must comply with the following criteria:

    **: CRI *: Lamp Watts*
    **: CCT-K *: Lamp Lumens*

    *Only lamp rated * type lamp ballast shall be installed in this fixture."*

    **Insert the value required for the specific lamp required by the Contract Documents for each light fixture.*

2.3 SOLID STATE LIGHTING (SSL), LIGHT EMITTING DIODES (LED) LAMPS, POWER SUPPLIES, AND LIGHT FIXTURES (ADDITIONAL REQUIREMENTS)

A. General
   1. Solid State LED light source (lamps), related control equipment (driver-power supply), and luminaire (light fixture) optics for light output distribution.
   2. Shall comply with the US-DOE Energy Star Program for SSL-LED. Submit documentation with Shop Drawings.
   3. Shall comply with the latest revision IESNA LM-79 and LM-80. Submit documentation with Shop Drawings.
   4. SSL chromaticity shall comply with latest revision NEMA and ANSI – C78.377. Submit documentation with Shop Drawings.
   5. Submit with Shop Drawings two samples of each light fixture type employing SSL, with prewired 120 volt, 60Hz AC “SO” cord and plug-in cap.

B. LED Lamps
   1. Lamp lumen output and overall efficiency shall be based on the LED lamps installed in specified fixture and ambient operating temperature.
   2. Lamp Color Rendition Index (CRI) shall equal or exceed CRI – 80, unless noted otherwise on Drawings.
   3. Lamp color output shall be 4000-degree K (± 100K), unless noted otherwise on Drawings.
   4. CRI and lamp color temperature shall be same for all light fixtures of the same fixture type.

C. LED Power Supply (driver)
   1. Combination of power supply and SSL – lamp shall be tested and certified by respective Manufacturers for performance and proper operation.
   2. Provide dimming type driver where indicated on Drawings. Driver and dimming equipment shall be tested and certified by respective Manufactures for performance and proper operation.

2.4 LIGHTING STANDARDS (SUPPORT POLES, POLE MOUNTED LIGHTING FIXTURES AND LUMINAIRES)

A. General
   1. Lighting poles, pole bases, pole arms, lighting fixtures (luminaires), supports with all lighting pole attachments and anchors shall be designed and constructed to withstand not less than 100 miles per hour steady horizontal wind loading and 130 miles per hour horizontal wind gust loading, without any damage to the lighting standards.
   2. Provide tamper-resistant "hand-hole" and cover on the pole, for access into wiring terminations inside the pole. Provide ground "lug" attachment for equipment bond conductor.

3. Provide factory applied weather protective base undercoat and final finish on all exposed and internal components. Color as indicated or as selected by OWNER'S Representative.

B. Base Plate
1. Provide a base plate at the bottom of each pole to attach and secure the pole to the pole anchor bolts. The base plate shall be permanently attached to the bottom of the pole.

C. Anchors
1. Anchor bolts shall be threaded the entire bolt length, not less than four bolts for each pole equally spaced around the pole base. Provide a minimum of two threaded nuts for each anchor bolt. Install a nut on the top and bottom sides of each base plate anchor bolt location. Not less than four threads shall be exposed after pole is installed and leveled.

PART 3 - EXECUTION

3.1 LIGHT FIXTURE INSTALLATION

A. General
1. The CONTRACTOR shall aim the exterior adjustable lighting fixtures after dark in the presence of, and at a time convenient to the OWNER'S Representative.
2. Fixtures shall be ordered and furnished to operate correctly on the branch circuit voltage connected to the respective fixture as shown on the Site Plan Electrical Drawings. The voltages shown on the fixture schedule are for generic fixture information only.
3. Install and connect lighting fixtures to the circuits and control sequences indicated on the Drawings and to comply with respective Manufacturer's instructions/ recommendations.

3.2 LENS AND DIFFUSERS

Lens, diffusers, internal reflectors shall be completely cleaned of all dust, dirt and fingerprints after the installation of the light fixtures and lamps, and after all trades have completed work and prior to occupancy of the facility by the OWNER.

3.3 COMMISSIONING LIGHTING FIXTURES (ADDITIONAL REQUIREMENTS)

A. General
1. Verify correct lighting control configurations and operation in each room.
2. Simulate normal source power failure by "opening" (turn off) building main service disconnect and verify connections and operation of each emergency lighting fixture.

3. Remove protective shipping/installation shields on fixtures. Verify fixtures and lamps are clean and free of construction debris. Clean light fixtures found to be contaminated or dirty.
4. Setup, program, and function test lighting control systems to perform each of the indicated control functions, area/room zones and sequences.
5. Provide “aiming”, directional adjustment of light fixtures, both indoor and outdoor. Aiming shall comply with Manufacturer’s aiming diagrams, and as directed by Owner’s Representative.

END OF SECTION 16500
120616/535012

SECTION 16501

SPORTS FLOODLIGHTING

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under this Section.
   2. General Provisions and Requirements for electrical work.

B. The purpose of these Specifications is to define the lighting system performance and design standards for City of Lake Forest PORTOLA CENTER PARK using an LED Lighting source. The Manufacturer/Contractor shall supply lighting equipment to meet or exceed the standards set forth in these Specifications.

C. The sports lighting will be for the following venues:
   1. Soccer – 240-feet x 120-feet

D. The primary goals of this sports lighting project are:
   1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed to not drop below specified target values for a period of 25 years.
   2. Environmental Light Control: It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors. The LED design should provide better control than a good HID design.
   3. Life-cycle Cost: In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated for the duration of the warranty.
   4. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 25-year life cycle. All communication and monitoring costs for 25-year period shall be included in the bid.

1.2 LIGHTING PERFORMANCE

A. Illumination Levels and Design Factors: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed and field measurements taken on the grid spacing with the minimum number of grid points specified below. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be

measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period.

Area of Lighting	Ave. Target Illumination Levels	Max. to Min. Uniformity Ratio	Grid Points	Grid Spacing
Soccer Field	30	2:1	72	20'x20'

B. Hours of usage: Designs shall be based on the following hours of usage.

Area of Lighting	Annual Usage Hours	25 year Usage Hours
Soccer Field	500	12,500

C. Color: The lighting system shall have a minimum color temperature of 5700K and a CRI of 75.

D. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be as described below. Higher mounting heights may be required based on photometric report and ability to ensure the top of the field angle is a minimum of 10 degrees below horizontal.

# of Poles	Pole Designation	Pole Height
4	S1, S2, S3 and S4	50'

1.3 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

B. Spill Light and Glare Control: To minimize impact on adjacent properties, spill light and candela values must not exceed the following.

	Average	Maximum
At the Property Line Maintained Max Vertical Foot-candles	0.032 fc	0.16 fc
At the Property Line Maintained Horizontal Foot-candles	0.0062 fc	0.03 fc
At the Property Line Max Candela (per fixture)	1820.69 Cd	6560.84 Cd

C. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both, horizontal and aimed, towards the most intense bank of lights. Illumination level shall be measured in accordance with the IESNA LM-5-04 after 1 hour warm up.

D. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the

capability of achieving the specified performance. Reports shall be certified by a qualified independent Testing Laboratory with a minimum of 5-years' experience or by a Manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.4 LIFE-CYCLE COSTS

A. Manufacturer shall submit a 25-year life cycle cost calculation as outlined in the required submittal information.

B. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

1.5 EQUIPMENT QUALIFICATIONS

A. This Specification is based upon Light Structure Green supplied by Musco Sports Lighting Inc. Call 1-800-659-0117 for local Distributors. No known equals.

PART 2 – PRODUCT

2.1 SPORTS LIGHTING SYSTEM CONSTRUCTION

A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired and tested.

B. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermos-setting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

C. System Description: Lighting system shall consist of the following:
   1. Galvanized steel poles and cross-arm assembly
   2. Non-approved pole technology:
      a. Square static cast concrete poles will not be accepted.

b. Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long term performance concerns.

3. Lighting systems shall use concrete foundations. See Section 2.03 for details.
   a. For a foundation using a pre-stressed concrete base embedded in concrete backfill the concrete shall be air-entrained and have a of minimum compressive design strength at 28 days of 3,000 PSI. 3,000 PSI concrete specified for early pole erection, actual required minimum allowable concrete strength is 1,000 PSI. All piers and concrete backfill must bear on and against firm undisturbed soil.
   b. For anchor bolt foundations or foundations using a pre-stressed concrete base in a suspended pier or reinforced pier design pole erection may occur after 7 days. Or after a concrete sample from the same batch achieves a certain strength.
4. Manufacturer will supply all drivers and supporting electrical equipment
   a. Remote drivers and supporting electrical equipment shall be mounted approximately 10-feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure.
   b. Alternate: Integral drivers mounted at the top of the pole will require a pole mounted enclosure approximately 10-feet above grade. The enclosure shall include a disconnect per circuit and surge protection.
5. Manufacturer shall provide surge protection at the pole equal to or greater than 40kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2_2002.
6. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.
7. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
8. Control cabinet to provide remote on-off control and monitoring of the lighting system. See Section 2.04 for further details.
9. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.
   a. Integrated grounding via concrete encased electrode grounding system.
   b. If grounding is not integrated into the structure, the Manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780.The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

D. Safety: All system components shall be UL listed for the appropriate application.

2.2 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:
   1. Electric power: 480 Volt, 3 Phase
   2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed 3% of the rated voltage.

B. Energy Consumption: The kW consumption for the field lighting system shall be 19.5kW.

2.3 STRUCTURAL PARAMETERS

A. Wind Loads: Wind loads shall be based on the 2016 California Building Code. Wind loads to be calculated using ASCE 7-10, a design wind speed of 110, Exposure Category C and wind importance factor of 1.

B. Pole Structural Design: The stress analysis and safety factor of the poles shall conform to 2009 AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (LTS-5).

C. Foundation Design: The foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2013 CBC Table 1806.2.

D. Foundation Drawings: Project specific Foundation Drawings stamped by a Registered Engineer in the State where the project is located are required. The Foundation Drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These Drawings must be submitted at time of bid to allow for accurate pricing

2.4 CONTROL

A. Instant On/Off Capabilities: System shall provide for instant on/off of luminaires.

B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.

C. Remote Lighting Control System: System shall allow Owner and Users with a Security Code to schedule on/off system operation via a web site, phone, fax or email up to 10-years in advance. Manufacturer shall provide and maintain a two-way TCP/ IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

D. The Owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute “early off” commands by phone. Scheduling tool shall be capable of setting curfew limits.

E. Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

F. Remote Monitoring System: System shall monitor lighting performance and notify Manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The Controller shall determine switch position (manual or auto) and contactor status (open or closed).

G. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaire outages, control operation and service. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

H. Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the Owner.
   1. Cumulative hours: shall be tracked to show the total hours used by the facility
   2. Report hours saved by using early off and push buttons by users.

I. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

PART 3 – EXECUTION

3.1 SOIL QUALITY CONTROL

A. It shall be the Contractor’s responsibility to notify the Owner if soil conditions exists other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner’s approval / payment for additional costs associated with:
   1. Providing engineered foundation embedment design by a Registered Engineer in the State of California for soils other than specified soil conditions;
   2. Additional materials required to achieve alternate foundation;
   3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.2 DELIVERY TIMING

Delivery Timing Equipment On-Site: Equipment must be on-site 6 to 8-weeks from receipt of submittal approval.

3.3 FIELD QUALITY CONTROL

A. Illumination Measurements: Upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative and Manufacturer's Representative, illumination measurements shall be taken and verified.

The illumination measurements shall be conducted in accordance with IESNA LM-5-04.

B. Field Light Level Accountability
   1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 25 Years.
   2. The Contractor/Manufacturer shall be responsible for an additional inspection 1-year from the date of commissioning of the lighting system and will utilize the Owner's light meter in the presence of the Owner.
   3. The Contractor/Manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.

C. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the Requirements of the Performance Specifications and submitted information, the Manufacturer shall be required to make adjustments to meet Specifications and satisfy Owner.

3.4 WARRANTY AND GUARANTEE

A. 25-Year Warranty: Each Manufacturer shall supply a signed warranty covering the entire system for 25 years from the date of shipment. Warranty shall guarantee specified light levels. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other Manufacturers.

B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for 25 years from the date of equipment shipment. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

PART 4 – DESIGN APPROVAL

4.1 RE-BID SUBMITTAL REQUIREMENTS (NON-MUSCO)

A. Design Approval: The Owner / Engineer will review pre-bid submittals per Section 4.1.B from all the Manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the Design Requirements of the Specifications, a letter and/or Addendum will be issued to the Manufacturer indicating approval for the specific design submitted.

B. Approved Product: Musco's Light-Structure System™ with TLC for LED™ is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this Section at least 10 days prior to bid. Special manufacturing to meet the Standards of this Specification may be required. An addendum will be issued prior to bid listing any other approved Lighting Manufacturers and Designs.

C. All listed Manufacturers not pre-approved shall submit the information at the end of this Section at least 10 days prior to bid. An Addendum will be issued prior to bid; listing approved Lighting Manufacturers and the design method to be used.

D. Bidders are required to bid only products that have been approved by this Specification or Addendum by the Owner or Owner's Representative. Bids received that do not utilize an approved system/design, will be rejected.

REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED)

10 DAYS PRIOR TO BID

All items listed below are Mandatory, shall comply with the Specification and be submitted according to Pre-Bid Submittal Requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. **Submit checklist below with submittal**.

Yes/No	Tab	Item	Description
	A	Letter/Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the Manufacturer's local Representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting Design Drawing(s) showing: a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface. e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in footcandles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor.
	D	Off Field Lighting Design	Lighting Design Drawing showing initial spill light levels along the boundary line (defined on Bid Drawings) in footcandles. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights.
	E	Environmental Light Control Design	Environmental glare impact scans must be submitted showing the maximum candela from the field edge on a map of the surrounding area until 500 candelas or less is achieved.
	F	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years' experience.
	G	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the Performance Requirements noted in these Specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	H	Structural Calculations	Pole structural calculations and foundation design showing Foundation Shape, Depth Backfill Requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the Foundation Drawing along with soil bearing pressures. Design must be stamped by a Structural Engineer in the State of CA, if required by Owner.
	I	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system to include monitoring. They will also provide ten references of customers currently using proposed system in the State of CA.
	J	Electrical Distribution Plans	Manufacturer bidding an alternate product must include a revised Electrical Distribution Plan including changes to service entrance, panels and wire sizing, signed by a licensed Electrical Engineer in the State of CA.
	K	Warranty	Provide written warranty information including all terms and conditions. Provide ten references of customers currently under specified warranty in the State of CA.
	L	Project References	Manufacturer to provide a list of ten projects where the technology and specific fixture proposed for this project has been installed in the State of CA. Reference list will include

			project name, project city, installation date, and if requested, contact name and contact phone number.
	M	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	N	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	O	Non-Compliance	Manufacturer shall list all items that do not comply with the Specifications. If in full compliance, tab may be omitted.
	P	Life-cycle Cost Calculation	Document life-cycle cost calculations as defined in the Specification. Identify energy costs for operating the luminaires. Maintenance cost for the system must be included in the warranty. All costs should be based on 25 Years (complete table below)

25-Year Life Cycle Operating Cost			
a.	**Luminaire Energy Consumption** # ____ luminaires x ____kW demand per luminaire x 0.13kWh rate x 500 annual usage hours x 25 years		_____
c.	**Cost for Maintenance, not covered, for 25 years** Assume # 7.5_ repairs at $_500_ each if not included with the bid	+	_____
	TOTAL 25-Year Life-Cycle Operating Cost	=	_____

The information supplied herein shall be used for the purpose of complying with the Specifications for City of Lake Forest PORTOLA CENTER PARK lighting project. By signing below I agree that all Requirements of the Specifications have been met and that the Manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting Specifications and not listed in the Non-Compliance Section.

Manufacturer: _____ **Signature:** _____

Contact Name: _____ **Date:** _____

Contractor: _____ **Signature:** _____

END OF SECTION 16501
032618/535012

APPENDIX A:

- Project Soils Report
  By Geocon, Inc., (March 8, 2017
- Project Soils Report Addendum
  By Geocon, Inc., (March 21, 2017)

UPDATE
GEOTECHNICAL REPORT

PORTOLA COMMUNITY PARK
LAKE FOREST, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

CITY OF LAKE FOREST
LAKE FOREST, CALIFORNIA

MARCH 8, 2017
PROJECT NO. G1218-88-12

Project No. G1218-88-12
March 8, 2017

City of Lake Forest
25550 Commercentre Dr., Suite 100
Lake Forest, California 92630

Attention: Mr. Scott Wasserman

Subject: UPDATE GEOTECHNICAL REPORT
PORTOLA COMMUNITY PARK
LAKE FOREST, CALIFORNIA

Dear Mr. Wasserman:

In accordance with your authorization of our proposal LG-16378 Dated September 30, 2016 (Revised October 13, 2016), we prepared this update geotechnical report for the proposed subject project. The accompanying report presents the results of our study and recommendations pertaining to the geotechnical aspects of proposed development of the site.

The Portola Community Park will consist of multiple sheet-graded areas utilized for sports such as soccer, pickle ball and volleyball. There are also designated picnic and play areas, a dog park, public restrooms, site lighting and hardscape improvements. The property is located at 28040 Glenn Ranch Road, southwest of the Glenn Ranch Road and Saddleback Ranch Road intersection within the City of Lake Forest, California. The site is considered suitable for construction and support of the proposed development provided the recommendations contained in this update report are incorporated into the design and construction of the development.

Should you have questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Rupert S. Adams
CEG 2561

PROFESSIONAL GEOLOGIST ★ STATE OF CALIFORNIA ★ RUPERT S. ADAMS NO. 2561 CERTIFIED ENGINEERING GEOLOGIST

Shawn Foy Weedon
GE 2714

REGISTERED PROFESSIONAL ENGINEER ★ SHAWN WEEDON No. 2714 ★ GEOTECHNICAL ★ STATE OF CALIFORNIA

RSA:SFW:dmc

(2/del) Addressee
(e-mail) RJM Design Group
Attention: Mr. Craig Sensenbach

TABLE OF CONTENTS

UPDATE GEOTECHNICAL REPORT

1. PURPOSE AND SCOPE

This report presents the results of our update geotechnical study for the public Portola Community Park site. The property is located at 28040 Glenn Ranch Road (southwest of the Glenn Ranch Road and Saddleback Ranch Road intersection) within the City of Lake Forest, California (see Vicinity Map, Figure 1). The purpose of this update report is to provide excavation and remedial grading considerations, foundation and concrete slab-on-grade recommendations, retaining wall and lateral load recommendations, 2016 CBC seismic design criteria, drilled pier foundation recommendations, preliminary pavement and flatwork recommendations, and discussions regarding the local geologic hazards including faulting, liquefaction, and seismic shaking.

The scope of the study also included a review of:

1. *Geotechnical Investigation, Portola Center South, Tentative Tract No. 15353, 40-Scale Grading Plan Submittal, Lake Forest, California,* prepared by Geocon Incorporated, dated January 31, 2014 (Project No. G1218-52-01A).

2. *Rough Grading Plan for Portola Center – TM 15353, City of Lake Forest,* prepared by Hunsaker and Associates, dated December 28, 2016 (Delta 7)

3. *Portola Community Park, 28040 Glenn Ranch Road, Construction Plan* prepared by RJM Design Group, 2 sheets, Undated.

2. GRADING

The Portola Community Park site is only partially graded at the time of this report; however, we are currently performing the testing and observation services during ongoing mass grading and MSE wall construction operations. Based on the referenced plans and our field observations during mass grading, the subject site will be underlain by compacted fill at finished grade overlying the Puente Formation. The majority of the site will be comprised of compacted fill placed under the observation of Geocon Incorporated. The east margin of the site, parallel to Glenn Ranch Road is comprised of older compacted fill placed under the observation and testing of others during the construction of Glenn Ranch Road. The maximum fill depth under the site is approximately 130 feet. The current mass grading operations will result in sheet-graded and contour graded areas that approximate the final park grades, and 2 to 1 (horizontal to vertical) fill slopes up to 25 feet in height.

The mass grading operations to date, have consisted of removal and recompaction of surficial soil, undocumented fill and landslide debris, excavation within formational materials to achieve a suitable foundation for compacted fills, and placement of compacted fill to reach design rough grades. In

conjunction with mass grading, a series of MSE walls have been partially constructed along the west edge of the park site in order to reach design rough grades elevations.

During recent mass grading operations, we observed compaction procedures and performed in-place density tests to evaluate the dry density and moisture content of the compacted fill materials. We performed the in-place density tests in general conformance with ASTM D 6938 (nuclear). In general, the in-place density test results indicate that the compacted fill soil has a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content at the locations tested. Where fill depth exceeded 40 feet, fill soils were compacted fill soil has a dry density of at least 92 percent of the laboratory maximum dry density near to slightly above optimum moisture content at the locations tested.

3. PROJECT DESCRIPTION

Based on our review of the referenced grading plans, the park site will consist of the construction of multiple contour graded areas that will be utilized for a variety of recreational activities including soccer, volleyball and pickleball. There will also be picnic and play areas, a dog park, public restroom facilities, landscape and hardscape areas, and public parking.

Based on our review of the referenced precise grading plans, the majority of the proposed park site pad will require cuts and fills less than 5 feet from the proposed rough graded condition. A relatively deep storm water containment system is planned under the footprint of the proposed public parking area, that is tied into the storm water system that discharges immediately west of the park site via a 60-inch RCP storm drain. The Geologic Map, Figure 2, depicts the planned sheet-graded elevations, the proposed park layout, and expected geology subsequent to the current mass grading operations.

The locations and descriptions of the site and proposed development are based on the referenced grading plans and our understanding of project development. If project details vary significantly from those described herein, Geocon Incorporated should be contacted to evaluate the necessity for review and revision of this report.

4. SOIL AND GEOLOGIC CONDITIONS

Two surficial soil types (compacted fill, and previously placed engineered fill) and two geologic units (Soquel and Yorba Members of the Puente Formation) exist on the proposed park site. Other surficial soil types and geologic units are present just beyond the limits of the park site. The approximate lateral extent of fill materials and geologic units is shown on the Geologic Map and Geologic Cross-Section, Figures 2 and 3, respectively (map pocket). The fill and geologic units are described herein in order of increasing age.

4.1 Compacted Fill (Qcf)

Compacted fill has been and will continue to be placed during the current mass-grading operations. The fill consists of silty to clayey sand, sandy clay and sandy silt derived predominately from excavations within the existing on-site materials. The compacted fill thickness will range from a maximum of 130 feet under the north end of the soccer field to less than 5 feet at the southwest end of the park site. We are performing testing and observation during the mass grading operations as discussed herein. We expect the fill materials will possess a "very low" to "high" expansion potential (expansion index of 130 or less) and "S1" to "S2" water-soluble sulfate content exposure classes depending on the source of the fill placed near finished grade. The compacted fill will be considered suitable to support the proposed site improvements.

4.2 Undocumented Fill (Qudf)

Undocumented fill is present in several locations within and beyond the limits of the park site. Temporary fill placed under the observation of Geocon is present at the south end of the park site that was placed during construction of the temporary storm water basin and other associated structures. This fill generally consists of medium dense, damp to moist, dark brown silty and sandy clay derived from cuts made to construct the south half of the temporary basin. The temporary basin will be completely removed during remedial grading of the landslide (Figure 2).

Undocumented fills consisting of loose to medium dense sand, silt and clay mixtures are present beyond the limits of the property to the west (Figure 2). These fills also contain wood and metal debris.

4.3 Engineered Artificial Fill (afe)

Previously placed engineered fill underlies the northwest portion of the planned sheet-graded area. Engineered fill was placed at the site under the observation of Pacific Soils Engineering, Inc. in the late 1980s. We reviewed the geotechnical reports related to the placement of the fill, buttress and stability fills, and subdrain placement as presented in the referenced report. The majority of the previously placed fill appears to be suitable in its present condition for the support of additional compacted fill and structural loads; however, partial removal and recompaction of previously placed fill within areas of proposed grading and improvements may be required.

4.4 Alluvium (Qal)

Alluvium is stream-deposited material found in the canyon drainages and generally varies in thickness depending on the size of the canyon and extent of the drainage area. The alluvium consists of firm to stiff, light to dark brown, sandy clay and loose to medium dense, silty to clayey sand.

Alluvium is not present within the limits of the park site, but is still present beyond the property to the west as shown on the Geologic Map, Figure 2.

4.5 Colluvium (Qcol)

Colluvium, derived from weathering of the underlying bedrock materials at higher elevations and deposited by gravity and sheet-flow, is present on the side slopes of canyons and the upper portions of the canyon drainages. The colluvium is generally stiff to hard, dry to moist, light to dark brown, sandy clay, and loose to medium dense, clayey to silty sand and clayey silt. Colluvium is not present within the limits of the park site but is present west of the park site (Figure 2).

4.6 Landslide Debris (Qls)

An area of ancient landslide debris exists within, and adjacent to the site (Figure 2). The landslide is founded on a bedding place shear within the Yorba Member of the Puente Formation. This landslide was identified during recent grading operations adjacent to the park site. The landslide debris consists of highly fractured, rotated blocks siltstones and claystones, which were observed to overlie colluvial deposits at the tow of the landslide. Landslide debris is not suitable for the support of compacted fill or structures in its present condition and may be subject to further slope instability. Remedial grading operations are planned and will be performed as part of the ongoing park site grading operations.

4.7 Capistrano Formation-Oso Member (Tco)

Late Miocene- to early Pliocene-age Oso Member of the Capistrano Formation is located along the natural slopes beyond the western boundary of the park site (Figure 2). The Capistrano Formation is in high-angle fault contact with the older Puente Formation along the Cristianitos Fault. The Oso Member of the Capistrano Formation generally consists of fine- to medium-grained sandstone that is white to light yellowish brown, poorly bedded to massive, and weakly to moderately cemented.

4.8 Puente Formation-Yorba Member (Tpy)

The upper Miocene-age Yorba Member of the Puente Formation is the youngest member in the sequence within the Puente Formation that was previously exposed on the site. The Yorba Member conformably overlies the older Soquel Member of the Puente Formation. The contact between the two members is generally dipping from south to west. The Yorba Member typically consists of light olive to grayish brown, thinly bedded, moderately indurated, sandy to clayey siltstone with occasional, thin, remolded clay beds known as bedding plane shears. Some of the beds contain high concentrations of evaporate minerals such as carbonates and gypsum.

In general, the sediments of the Yorba Member of the Puente Formation exhibit low to moderate shear strength and “medium” to “high” expansion characteristics (expansion index of 51 to 130). The

Yorba Member is suitable for the support of compacted fill and structural loads. The Yorba Member contains minerals that may be corrosive to steel or concrete. The Yorba Member is no longer exposed at grade in the community park site; however, fill soils derived from the Yorba Member may be present at proposed grades.

4.9 Puente Formation-Soquel Member (Tps)

The Soquel Member conformably overlies the older La Vida Member of the Puente Formation. The contact between the two members is generally dipping from south to west. The Soquel Member predominantly consists of white to light yellowish brown, massively bedded, weakly to moderately cemented, fine- to coarse-grained (arkosic) sandstone (Tps) with very occasional, thin interbeds of siltstone and claystone. Due to recent grading, the Soquel member is no longer exposed within the footprint of the 5-acre park site, but is present below the site under recently placed, compacted fill soil.

In general, the granular sediments of the Soquel Member exhibit favorable shear strength and "very low" to "low" expansion characteristics (expansion index of 50 or less). The Soquel Member sandstone is suitable for the support of new compacted fill and structural loads. Granular material from this unit was primarily used as select backfill within the reinforced zone for MSE retaining walls on the western edge of the community park site, but also as backfill during site grading to achieve proposed grades.

5. GROUNDWATER

We did not encounter groundwater or seepage conditions during the grading operations and we do not expect groundwater to adversely impact the development of the property. It is not uncommon for groundwater or seepage conditions to develop where none previously existed. Groundwater elevations are dependent on seasonal precipitation, irrigation, land use, among other factors, and vary as a result. Proper surface drainage will be important to the future performance of the project.

Existing subdrains installed during canyon infill grading operations in the 1980s were noted to actively discharge water during site grading of the park site. The upper portions of these subdrains extend offsite to the east. The aforementioned subdrains were intercepted during grading operations, extended under the park site and connected to the 60-inch storm drain outlet structure at the west side of the property. As-built subdrain locations are depicted on the Geologic Map, Figure 2.

6. GEOLOGIC HAZARDS

6.1 Faulting

The faults in Southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on criteria developed by the California Division of Mines and Geology (CDMG). By definition, an active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years), but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive. The site is not located within a State of California Earthquake Fault Zone (CDMG, 2013).

Active or potentially active faults with the potential for surface fault rupture are not known to pass directly beneath the site. Therefore, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. The site, however, is located in the seismically active Southern California region, and could be subjected to moderate to strong ground shaking in the event of an earthquake on one of the many active Southern California faults.

The San Joaquin Hills Thrust, located approximately 5½ miles west of the site, is the closest known active fault. The San Joaquin Hills Thrust is a recently discovered blind thrust fault (fault with no surface expression) having an expected maximum earthquake magnitude (Mw) of 7.1. The fault extends roughly between Huntington Beach and Dana Point, is not exposed at the ground surface, and is typically identified at depths greater than 3 kilometers. This fault and other blind thrust faults are not exposed at the surface and do not present a potential surface fault rupture hazard; however, these active features are capable of generating future earthquakes and ground shaking.

The Cristianitos Fault has been mapped west of the property. We encountered the fault within a fault trench excavated as a part of the study for Portola Center South. The fault offsets the Oso Member of the Capistrano Formation and the Soquel Member of the Puente Formation. The fault trends roughly north and dips at high-angles to nearly vertical. We observed continuous “A” and “AB” topsoil units extending across the fault trace with no evidence of offset. Evidence was not observed within the recent and previous fault trenches, and no evidence is present in the literature that suggests the fault offsets Holocene-age material. The Cristianitos Fault is locally overlain by Quaternary terrace deposits ranging in age from an estimated 34,000 to 120,000 years before present and has not been offset by faulting (Shlemon, 1987). The onshore portion of the Cristianitos Fault is considered “inactive” by the State Geologist. We do not expect the Cristianitos Fault to affect the proposed park site and structural setbacks will not be required.

6.2 Seismicity

According to the computer program *EZ-FRISK (Version 7.62),* 27 known active faults are located within a search radius of 50 miles from the property. We used the 2008 USGS fault database that provides several models and combinations of fault data to evaluate the fault information. Based on this database, the San Joaquin Hills Thrust, located approximately 5½ miles west of the site, is the nearest known active fault and is the dominant source of potential ground motion. Earthquakes that might occur on the San Joaquin Hills Thrust or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated maximum earthquake magnitude and peak ground acceleration for the San Joaquin Hills Thrust are 7.1 and 0.40g, respectively. Table 6.2.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the 10 most dominant faults in relation to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS2008 acceleration-attenuation relationships.

TABLE 6.2.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2007 (g)
San Joaquin Hills Thrust	5½	7.1	0.28	0.38	0.40
Chino	10	6.8	0.21	0.19	0.21
Elsinore	11	7.85	0.26	0.21	0.28
Newport Inglewood	15	7.5	0.20	0.15	0.19
Puente Hills (Coyote Hills)	20	6.9	0.13	0.13	0.12
Puente Hills	22	7.1	0.13	0.13	0.14
Puente Hills (Santa Fe Springs)	28	6.7	0.09	0.09	0.07
Palos Verdes	29	7.3	0.12	0.08	0.08
Palos Verdes Connected	29	7.7	0.14	0.10	0.12
San Jose	29	6.7	0.09	0.07	0.06

In the event of a major earthquake on the referenced faults or other significant faults in the southern California and northern Baja California area, the site could be subjected to moderate to severe ground shaking. With respect to this hazard, the site is considered comparable to others in the general vicinity.

We performed a site-specific probabilistic seismic hazard analysis using *EZ-FRISK*. Geologic parameters not addressed in the deterministic analysis are included in this analysis. The program operates under the assumption that the occurrence rate of earthquakes on each mapped Quaternary fault is proportional to the faults' slip rate. The program accounts for fault rupture length as a function of earthquake magnitude, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008), Campbell-Bozorgnia (2008) and Chiou-Youngs (2007) NGA USGS2008 in the analysis. Table 6.2.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.2.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2008 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2007 (g)
2% in a 50 Year Period	0.53	0.52	0.58
5% in a 50 Year Period	0.41	0.40	0.44
10% in a 50 Year Period	0.33	0.31	0.33

The California Geologic Survey (CGS) has a program that calculates the ground motion for a 10 percent probability of exceedence in a 50-year period based on an average of several attenuation relationships. Table 6.2.3 presents the calculated results from the Probabilistic Seismic Hazards Mapping Ground Motion Page from the CGS website.

TABLE 6.2.3
PROBABILISTIC SITE PARAMETERS FOR SELECTED FAULTS
CALIFORNIA GEOLOGIC SURVEY

Calculated Acceleration (g) Firm Rock	Calculated Acceleration (g) Soft Rock	Calculated Acceleration (g) Alluvium
0.34	0.36	0.39

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. Seismic design of the structures should be performed in accordance with the 2016 California Building Code (CBC) guidelines currently adopted by the City of Lake Forest.

6.3 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soil is cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil relative densities are less than about 70 percent. If the four of the previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement may occur whether the potential for liquefaction exists or not. The potential for liquefaction and seismically induced settlement occurring within the site soil is considered to be very low due to the dense nature of the compacted fill and formational materials and the lack of a permanent groundwater table within 50 feet of the ground surface.

6.4 Tsunamis and Seiches

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes. The site is approximately 13 miles from the Pacific Ocean and at a low elevation of about 945 feet MSL. Therefore, we consider the risk associated with tsunamis to be negligible.

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is not located downstream of a large body of water. Therefore, the potential of seiches affecting the site is considered very low.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 From a geotechnical engineering standpoint, we opine the site is suitable for development provided the recommendations presented herein are implemented in design and construction of the project.

7.1.2 With the exception of possible moderate to strong seismic shaking and fill loading settlement, we did not observe significant geologic hazards or know of them to exist on the site that would adversely affect the proposed project.

7.1.3 We do not expect groundwater or seepage to be encountered during construction of the proposed park improvements.

7.1.4 The site is underlain by compacted fill and the Puente Formation. We are performing the testing and observations of the on-going mass grading operations. In general, the fill being placed will be compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content near the surface grade elevations.

7.1.5 The compacted fill and formational materials are considered suitable for support of additional structural fill and/or loads from the proposed park improvements. However, processing, moisture conditioning as necessary and compaction of the upper 1 to 2 feet of the existing fill will be required prior to the construction of the planned improvements. Deeper removals may be necessary within temporary surface desilting basins, or in areas underlain by compacted engineered fill placed by others.

7.1.6 We do not expect we would encounter formational materials at proposed sheet grades within the park site. However, occasional cemented fragments of formational materials up to 18-inches may be encountered in deeper excavations or drilled piers.

7.1.7 The site is considered suitable for the use of conventional continuous and spread footings with a concrete slab-on-grade system.

7.2 Existing Grade Soil Conditions

7.2.1 Compacted fill is exposed at grade across the entire community park site. Figures 2 and 3 present the Geologic Map and cross section for the subject property that shows the

expected geologic conditions subsequent to the mass grading operations. In general, the on-site soil consists of silty and clayey sand, sandy and clayey silt, and sandy clay.

7.2.2 Based on our observations during grading operations and our experience in the area, we expect the fill can be excavated with moderate effort using conventional heavy-duty excavation equipment. Excavations within the formational materials located at grade and below the fill soil may require heavy to very heavy effort. Oversize material may be generated during excavation in existing fill and may require export.

7.2.3 The soil encountered during the current phase of mass grading is considered to be "expansive" (expansion index [EI] of 21 or greater) as defined by 2016 California Building Code (CBC) Section 1803.5.3. Table 7.2.1 presents soil classifications based on the expansion index. For the purpose of this update geotechnical report, we expect the soil encountered near the proposed sheet- graded surface possess a "medium" to "high" expansion potential (expansion index of 51 to 130). Additional expansion index testing should be performed subsequent to the fine grading operations to evaluate the expansion potential of the upper 3 to 4 feet of soil within the areas of proposed structures and improvements.

TABLE 7.2.1
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	ASTM D 4829 Expansion Classification	2016 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.4 We previously performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. The results indicate that the on-site materials at the locations tested possess "S1" to "S2" sulfate exposure to concrete structures as defined by 2016 CBC Section 1904 and ACI 318-14 Chapter 19. Table 7.2.2 presents a summary of concrete requirements set forth by 2016 CBC Section 1904 and ACI 318. Concrete placed at the site should be designed using an "S2" sulfate exposure. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration over time.

TABLE 7.2.2
REQUIREMENTS FOR CONCRETE
EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Sulfate Severity	Exposure Class	Water-Soluble Sulfate % by Weight	Cement Type	Maximum Water to Cement Ratio by Weight	Minimum Compressive Strength (psi)
Not Applicable	S0	0.00-0.10	--	--	2,500
Moderate	S1	0.10-0.20	II	0.50	4,000
Severe	S2	0.20-2.00	V	0.45	4,500
Very Severe	S3	> 2.00	V+ Pozzolan or Slag	0.45	4,500

7.2.5 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements that could be susceptible to corrosion are planned.

7.3 Temporary Excavations

7.3.1 The stability of the excavations is dependent on the design and construction of the shoring system. Therefore, Geocon Incorporated cannot be responsible for site safety and the stability of the proposed excavations. It is the responsibility of the underground contractors during utility excavations to follow all applicable safety standards and industry protocols when performing excavations during the construction of the proposed project.

7.3.2 Temporary slopes should be made in conformance with OSHA requirements considering the soil type. The undocumented fill and surficial soil should be considered a Type C soil, properly compacted fill should be considered a Type B soil (Type C soil if seepage is encountered), and the formational materials should be considered a Type A soil (Type B soil if seepage is encountered) in accordance with OSHA requirements. In general, special shoring requirement will not be necessary if temporary excavations will be less than 4 feet high. However, temporary excavation depths greater than 4 feet should be laid back at an appropriate inclination in accordance with OSHA recommendations. These excavations should not be allowed to become saturated or allowed to dry appreciably. Surcharge loads should not be permitted within a distance equal to the depth of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

7.3.3 Table 7.3 presents the allowable slope inclination for different soil types based on the information presented by OSHA assuming seepage is not encountered.

TABLE 7.3
ALLOWABLE SLOPE INCLINATIONS FOR EXCAVATIONS
LESS THAN 20 FEET FOR UNDERGROUND CONTRACTORS

Soil or Rock Type	On-Site Geologic Unit	Maximum Inclination (horizontal:vertical)	Maximum Slope Angle from Horizontal (degrees)
Type A	Formational Materials without BPS	¾:1	53
Type B	Properly Compacted Fill	1:1	45
Type C	Undocumented Fill Surficial Soil	1½:1	34

7.4 Seismic Design Criteria

7.4.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 7.4.1 summarizes site-specific design criteria obtained from the 2016 California Building Code (CBC; Based on the 2015 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. The structure should be designed using Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2016 CBC and Table 20.3-1 of ASCE 7-10. The values presented in Table 7.4.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 7.4.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Soil Site Class	D	Table 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.475g	Figure 1613..3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.547g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.000	Table 1613.3.3(1)
Site Coefficient, F_V	1.500	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.475g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.821g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.983g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.547g	Section 1613.3.4 (Eqn 16-40)

7.4.2 Table 7.4.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 7.4.2
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Site Class	D	CBC Table 1613.3.2
Mapped MCE_G Peak Ground Acceleration, PGA	0.533	Figure 22-7
Site Coefficient, F_{PGA}	1.000	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.533g	Section 11.8.3 (Eqn 11.8-1)

7.4.3 Conformance to the criteria in Tables 7.4.1 and 7.4.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.5 Grading

7.5.1 Grading should be performed in accordance with the attached *Recommended Grading Specifications* contained in Appendix A. Where the recommendations of this section conflict with those of Appendix A, the recommendations of this section shall take precedence. Earthwork should be observed and fill tested for dry density and moisture content by Geocon Incorporated.

7.5.2 A pre-construction conference with the owner, city inspector, general contractor, civil engineer, and geotechnical engineer in attendance should be held at the site prior to the beginning remedial grading. Special soil handling requirements can be discussed at that time. Earthwork should be observed and compacted fill tested by representatives of Geocon Incorporated.

7.5.3 Grading of the site should commence with the removal of vegetation and debris within the limits of grading and improvements. Removal of vegetation should be deep enough to remove roots and root systems such that the fill is relatively free of organic material. Vegetation and deleterious debris should be exported from the site and should not be mixed with fill soil. Underground improvements planned for removal should have the resulting depressions backfilled with properly compacted fill. In addition, storm drain pipes

abandoned in place should be removed and replaced with properly compacted fill or filled with slurry.

7.5.4 In general, the upper 1 to 2 feet of existing compacted fill should be re-processed, moisture conditioned as necessary, and compacted prior to placing additional fill. Deeper processing may be required in surface desilting basins or in areas of fill placed by others.

7.5.5 We should observe the grading operations and the removal bottoms to check the exposure of the formational materials prior to the placement of compacted fill.

7.5.6 After preparation of the ground surface, the site should be brought to design elevations with fill compacted in layers. The site materials are considered suitable for use as fill provided it is generally free from vegetation, debris and other deleterious matter. Layers of fill should not be thicker than will allow for adequate bonding and compaction. Fill, including wall and trench backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM Test Procedure D 1557. Fill with an expansion index greater than 50 should be placed at least 3 feet below finish grade, where possible, or exported from the site.

7.5.7 Import fill soil (if necessary) should consist of granular materials with a “very low” to “low” expansion potential (EI of 50 or less) free of deleterious material and stones larger than 3 inches and should be compacted as recommended herein. Geocon Incorporated should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to determine its suitability as fill material.

7.5.8 Finished slopes should be landscaped with drought-tolerant vegetation having variable root depths and requiring minimal landscape irrigation. In addition, the slopes should be drained and properly maintained to reduce erosion.

7.6 Foundation and Concrete Slabs-On-Grade Recommendations

7.6.1 The foundation recommendations herein are based on the assumption that the grading is performed in accordance with the recommendations provided in this report. The foundation recommendations are also based on the assumption that any building pads will consist of properly compacted fill. These recommendations assume the prevailing soil conditions within 4 feet of finish grade will generally consist of “very low” to “low” expansive soil (EI of 90 or less) and that the foundations will be bearing in compacted fill.

7.6.2 The proposed restroom building can be supported on a conventional shallow foundation system. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Continuous strip footings should be at least 12 inches wide and should extend at least 24 inches below lowest adjacent pad grade. Isolated spread footings should be at least 2 feet square and founded 24 inches below lowest adjacent pad grade in properly compacted fill. Figure 4 presents a typical wall/column footing dimension detail.

7.6.3 Foundations may be designed for an allowable soil bearing pressure of 2,500 pounds per square foot (psf) for dead plus live loads for footings founded in properly compacted fill. The values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.6.4 Steel reinforcement for continuous footings should consist of at least four No. 5 steel reinforcing bars placed horizontally in the footings, 2 near the top and 2 near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer.

7.6.5 The recommendations herein are based on soil characteristics only (EI of 90 or less) and are not intended to replace reinforcement required for structural considerations.

7.6.6 Building floor slabs should possess a thickness of at least 5 inches and reinforced with a minimum of No. 4 steel reinforcing bars placed at 18 inches on center in both horizontal directions in the middle of the slab. The structural engineer should design the final slab thickness and reinforcing steel required for the planned loading conditions.

7.6.7 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

7.6.8 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. It is common to have a sand layer thickness of 3 or 4 inches for a 5-inch-thick concrete slab in the southern California area. The

foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.6.9 As an alternative to the conventional foundation recommendations, consideration should be given to the use of post-tensioned concrete slab and foundation systems for the support of the proposed structures. The post-tensioned systems should be designed by a structural engineer experienced in post-tensioned slab design and design criteria of the Post-Tensioning Institute (PTI) DC 10.5-12 *Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils* or *WRI/CRSI Design of Slab-on-Ground Foundations*, as required by the 2016 California Building Code (CBC Section 1808.6.2). Although this procedure was developed for expansive soil conditions, it can also be used to reduce the potential for foundation distress due to differential fill settlement. The post-tensioned design should incorporate the geotechnical parameters presented in Table 7.6. The parameters presented in Table 7.6 are based on the guidelines presented in the PTI DC 10.5 design manual.

TABLE 7.6
POST-TENSIONED FOUNDATION SYSTEM DESIGN PARAMETERS

Post-Tensioning Institute (PTI) Third Edition Design Parameters	Value
Thornthwaite Index	-20
Equilibrium Suction	3.9
Edge Lift Moisture Variation Distance, $e_{M(}$feet)	4.9
Edge Lift, $y_{M(}$inches)	1.58
Center Lift Moisture Variation Distance, $e_{M(}$feet)	9.0
Center Lift, $y_{M(}$inches)	0.66

7.6.10 If the structural engineer proposes a post-tensioned foundation design method other than the 2016 CBC:

- The criteria presented in Table 7.6 are still applicable.
- Interior stiffener beams should be used.
- The width of the perimeter foundations should be at least 12 inches.
- The perimeter footing embedment depths should be at least 24 inches. The embedment depths should be measured from the lowest adjacent pad grade.

7.6.11 Our experience indicates post-tensioned slabs are susceptible to excessive edge lift, regardless of the underlying soil conditions. Placing reinforcing steel at the bottom of the perimeter footings and the interior stiffener beams may mitigate this potential. Current PTI design procedures primarily address the potential center lift of slabs but, because of the placement of the reinforcing tendons in the top of the slab, the resulting eccentricity after tensioning reduces the ability of the system to mitigate edge lift. The structural engineer should design the foundation system to reduce the potential of edge lift occurring for the proposed structures.

7.6.12 The foundations for the post-tensioned slabs should be embedded in accordance with the recommendations of the structural engineer. If a post-tensioned mat foundation system is planned, the slab should possess a thickened edge with a minimum width of 12 inches and extend below the clean sand or crushed rock layer.

7.6.13 During the construction of the post-tension foundation system, the concrete should be placed monolithically. Under no circumstances should cold joints form between the footings/grade beams and the slab during the construction of the post-tension foundation system unless designed by the project structural engineer.

7.6.14 Isolated footings, if present, should have the minimum embedment depth and width recommended for conventional foundations. The use of isolated footings, which are located beyond the perimeter of the building and support structural elements connected to the building, are not recommended. Where this condition cannot be avoided, the isolated footings should be connected to the building foundation system with grade beams.

7.6.15 Consideration should be given to using interior stiffening beams and connecting isolated footings and/or increasing the slab thickness. In addition, consideration should be given to connecting patio slabs, which exceed 5 feet in width, to the building foundation to reduce the potential for future separation to occur.

7.6.16 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. If unexpected soil conditions are encountered, foundation modifications may be required.

7.6.17 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.6.18 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal:vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- For fill slopes less than 20 feet high, building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

- When located next to a descending 3:1 (horizontal:vertical) fill slope or steeper, the foundations should be extended to a depth where the minimum horizontal distance is equal to H/3 (where H equals the vertical distance from the top of the fill slope to the base of the fill soil) with a minimum of 7 feet but need not exceed 40 feet. The horizontal distance is measured from the outer, deepest edge of the footing to the face of the slope. An acceptable alternative to deepening the footings would be the use of a post-tensioned slab and foundation system or increased footing and slab reinforcement. Specific design parameters or recommendations for either of these alternatives can be provided once the building location and fill slope geometry have been determined.

- If swimming pools are planned, Geocon Incorporated should be contacted for a review of specific site conditions.

- Swimming pools located within 7 feet of the top of cut or fill slopes are not recommended. Where such a condition cannot be avoided, the portion of the swimming pool wall within 7 feet of the slope face be designed assuming that the adjacent soil provides no lateral support. This recommendation applies to fill slopes up to 30 feet in height, and cut slopes regardless of height. For swimming pools located near the top of fill slopes greater than 30 feet in height, additional recommendations may be required and Geocon Incorporated should be contacted for a review of specific site conditions.

- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.6.19 The foundation and concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

7.6.20 Concrete slabs should be provided with adequate construction joints and/or expansion joints to control unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute when establishing crack-control spacing. Additional steel reinforcing, concrete admixtures and/or closer crack control joint spacing should be considered where concrete-exposed concrete finished floors are planned.

7.6.21 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.6.22 Where exterior flatwork abuts the structure at entrant or exit areas, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.6.23 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.7 Drilled Pier Recommendations

7.7.1 We understand drilled piers will be used for the planned light structures. Piers can be designed to develop support by end bearing within the formational materials and properly compacted fill. An allowable end bearing pressure of 4,000 pounds per square foot (psf) and 8,000 psf for compacted fill and formational materials, respectively, can be used for the design of the drilled piers using a minimum drill depth of 5 feet. An allowable skin friction resistance of 300 psf can be used for drilled piers. These allowable values possess a factor of safety of at least 2 for skin friction and end bearing. We estimate the settlement of the drilled piers will be approximately ½ inch.

7.7.2 The diameter of the piers should be a minimum of 2 feet. The design length of the drilled piers should be determined by the structural designer. Piers should be spaced at least three-pile diameters, center-to-center. If they are spaced closer than this, the efficiency of the group will be less than 100 percent.

7.7.3 Because a significant portion of the pier capacity will be developed by end bearing, the bottom of the borehole should be cleaned of loose cuttings prior to the placement of steel and concrete. Experience indicates that backspinning the auger does not remove loose material and a flat cleanout plate or hand cleaning is necessary. Concrete should be placed within the pier excavation as soon as possible after the auger/cleanout plate is withdrawn to

reduce the potential for discontinuities or caving. Pier sidewall instability may randomly occur if cohesionless soil or seepage is encountered. We do not expect seepage will be encountered during the drilling operations. However, casing may be required to maintain the integrity of the pier excavation, particularly if seepage or sidewall instability is encountered. The fill and the formational materials contain gravel, cobble, boulders and cemented materials. Therefore, difficult drilling conditions during excavations for the piers should be anticipated. The drilled piers should be designed to avoid the existing canyon subdrains and existing utilities/structures.

7.8 Concrete Flatwork

7.8.1 Exterior concrete flatwork not subject to equipment loading or vehicular traffic should be constructed in accordance with the recommendations herein. Slab panels should be a minimum of 4 inches thick and, when in excess of 8 feet square, should be reinforced with 6 x 6 - W2.9/W2.9 (6 x 6 - 6/6) welded wire mesh or at least No. 3 reinforcing bars spaced 18 inches center to center in both directions in the middle of the slab to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be checked prior to placing concrete.

7.8.2 Even with the incorporation of the recommendations within this report, the exterior concrete flatwork has a likelihood of experiencing some movement due to swelling or settlement; therefore, the steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

7.8.3 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stem wall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.9 Conventional Retaining Walls

7.9.1 Retaining walls that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall in feet) at the top of the wall and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 40 pounds per cubic foot (pcf). Where the backfill will be inclined at no steeper than 2:1 (horizontal to vertical), an active soil pressure of 55 pcf is recommended. These soil pressures assume that the backfill materials within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall possess an expansion index of 90 or less.

7.9.2 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top, an additional uniform pressure of 7H and 13H psf should be added to the above active soil pressure for walls with deign heights of 8 feet or less and greater than 8 feet, respectively. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

7.9.3 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted backfill material (EI of 90 or less) with no hydrostatic forces or imposed surcharge load. Figure 5 presents a typical retaining wall drainage detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.9.4 In general, wall foundations founded in properly compacted fill or formational materials should possess a minimum depth and width of one foot and may be designed for an allowable soil bearing pressure of 2,000 psf. The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is expected.

7.9.5 The structural engineer should determine the seismic design category for the project. If the project possesses a seismic design category of D, E, or F, the proposed retaining walls should be designed with seismic lateral pressure. A seismic load of 22H should be used for design on walls that support more than 6 feet of backfill in accordance with Section 1803.5.12 of the 2016 CBC. The seismic load is dependent on the retained height

where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. We used a peak site acceleration, PGA_M of 0.533g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.9.6 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls. In the event that walls higher than 8 feet or other types of walls (such as crib-type walls) are planned, Geocon Incorporated should be consulted for additional recommendations.

7.9.7 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

7.9.8 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 8 feet.

7.9.9 We understand the walls for the storm water storage device will be designed as retaining walls. The recommendations included herein apply to the design of the planned walls. In addition, loads from the adjacent retaining wall on the southern property line and the soil should be applied to the storm water management device. The loads do not need to be applied if the retaining wall will be extended below a 1:1 plane extending up from the planned storm water basin walls and the wall does not rely on the adjacent soil within the 1:1 plane (i.e. designing a retaining wall with an increased height).

7.10 Lateral Loading

7.10.1 To resist lateral loads, a passive pressure exerted by an equivalent fluid weight of 350 pounds per cubic foot (pcf) should be used for the design of footings or shear keys poured neat in compacted fill. The passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

7.10.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between soil and concrete of 0.35 should be used for design.

7.10.3 The passive and frictional resistant loads can be combined for design purposes. The lateral passive pressures may be increased by one-third when considering transient loads due to wind or seismic forces.

7.11 Slope Maintenance

7.11.1 Slopes that are steeper than 3:1 (horizontal to vertical) may, under conditions which are both difficult to prevent and predict, be susceptible to near surface (surficial) slope instability. The instability is typically limited to the outer three feet of a portion of the slope and usually does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. The disturbance and/or loosening of the surficial soils, as might result from root growth, soil expansion, or excavation for irrigation lines and slope planting, may also be a significant contributing factor to surficial instability. It is, therefore, recommended that, to the maximum extent practical: (a) disturbed/loosened surficial soils be either removed or properly recompacted, (b) irrigation systems be periodically inspected and maintained to eliminate leaks and excessive irrigation, and (c) surface drains on and adjacent to slopes be periodically maintained to preclude ponding or erosion. It should be noted that although the incorporation of the above recommendations should reduce the potential for surficial slope instability, it will not eliminate the possibility, and, therefore, it may be necessary to rebuild or repair a portion of the project's slopes in the future.

7.12 Preliminary Pavement Recommendations

7.12.1 We calculated the flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of TI) of 5.0, 5.5, 6.0, and 7.0 for parking stalls, driveways, medium truck traffic areas, and heavy truck traffic areas, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the driveways and parking areas should be based on the R-Value of the subgrade soil encountered at final subgrade elevation. We have assumed an R-Value of 10 and 40 for the subgrade soil and 78 for the base materials, respectively, for the purposes of this preliminary analysis. Table 7.12.1 presents the preliminary flexible pavement sections.

TABLE 7.12.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Aggregate Base (inches)
Parking stalls for automobiles and light-duty vehicles	5.0	10	3	9
		40	3	4
Driveways for automobiles and light-duty vehicles	5.5	10	3	11
		40	3	5
Medium truck traffic areas	6.0	10	3.5	12
		40	3.5	6
Driveways for heavy truck traffic	7.0	10	4	15
		40	4	7

7.12.2 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.12.3 The base materials and asphalt concrete should conform to the *Standard Specifications for Public Works Construction (Greenbook).*

7.12.4 The base thickness can be reduced if a reinforcement geogrid is used during the installation of the pavement. Geocon should be contact for additional recommendations, if required.

7.12.5 A rigid Portland cement concrete (PCC) pavement section should be placed in driveway entrance aprons and in trash bin loading/storage areas. The concrete pad for trash truck areas should be large enough such that the truck wheels will be positioned on the concrete during loading. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 Guide for Design and Construction of Concrete Parking Lots using the parameters presented in Table 7.12.2.

TABLE 7.12.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	100 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

7.12.6 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.12.3.

TABLE 7.12.3
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Parking Stalls (TC=A)	5.5
Driveways, Alleyways, and Heavy Truck and Fire Lane Areas (TC=C)	7

7.12.7 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch).

7.12.8 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 7-inch-thick slab would have a 9-inch-thick edge). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

7.12.9 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should not exceed 30 times the slab thickness with a maximum spacing of 12.5 feet for the 5.5-thick slabs and 15 feet for the 6-inch and thicker slabs and should be sealed with an appropriate sealant to prevent the migration of water through the

control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report.

7.12.10 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab. As an alternative to the butt-type construction joint, dowelling can be used between construction joints for pavements of 7 inches or thicker. As discussed in the referenced ACI guide, dowels should consist of smooth, 1-inch-diameter reinforcing steel 14 inches long embedded a minimum of 6 inches into the slab on either side of the construction joint. Dowels should be located at the midpoint of the slab, spaced at 12 inches on center and lubricated to allow joint movement while still transferring loads. In addition, tie bars should be installed at the as recommended in Section 3.8.3 of the referenced ACI guide. The structural engineer should provide other alternative recommendations for load transfer.

7.13 Site Drainage and Moisture Protection

7.13.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

7.13.2 In the case of basement walls or building walls retaining landscaping areas, a water-proofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

7.13.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

7.13.4 If detention basins, bioswales, retention basins, water infiltration, low impact development (LID), or storm water management devices are being considered, Geocon Incorporated should be retained to provide recommendations pertaining to the geotechnical aspects of possible impacts and design.

7.13.5 If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. Based on our experience with similar clayey soil conditions, infiltration areas are considered infeasible due to the poor percolation and lateral migration characteristics. We have not performed a hydrogeology study at the site. Down-gradient and adjacent structures may be subjected to seeps, movement of foundations and slabs, or other impacts as a result of water infiltration.

7.13.6 The United States Department of Agriculture (USDA), Natural Resources Conservation Services possess general information regarding the existing soil conditions for areas within the United States. Based on the USDA website and our experience in the area, the existing soil possesses a Hydrologic Soil Group D. Table 7.13 presents the description of Hydrologic Soil Group. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soil that in the natural condition are in group D are assigned to dual classes.

TABLE 7.13
HYDROLOGIC SOIL GROUP DEFINITIONS

Hydrologic Soil Group	Hydrologic Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

7.14 Improvement and Foundation Plan Review

7.14.1 Geocon should review the improvement plans and foundation plans prior to finalization to check their compliance with the recommendations of this report and evaluate the need for additional comments, recommendations, and/or analyses.

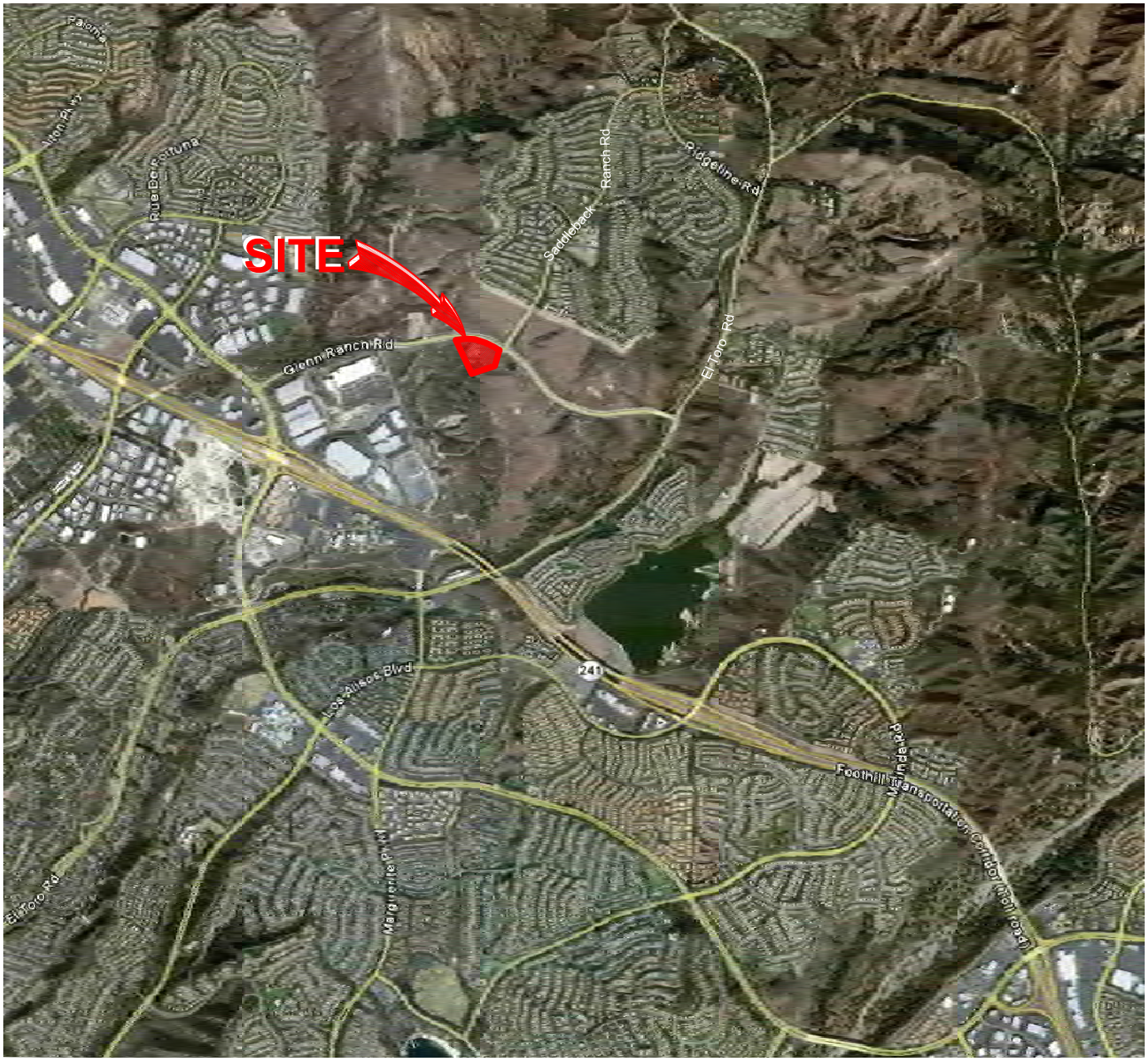
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. Recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

4. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.



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NO SCALE

VICINITY MAP

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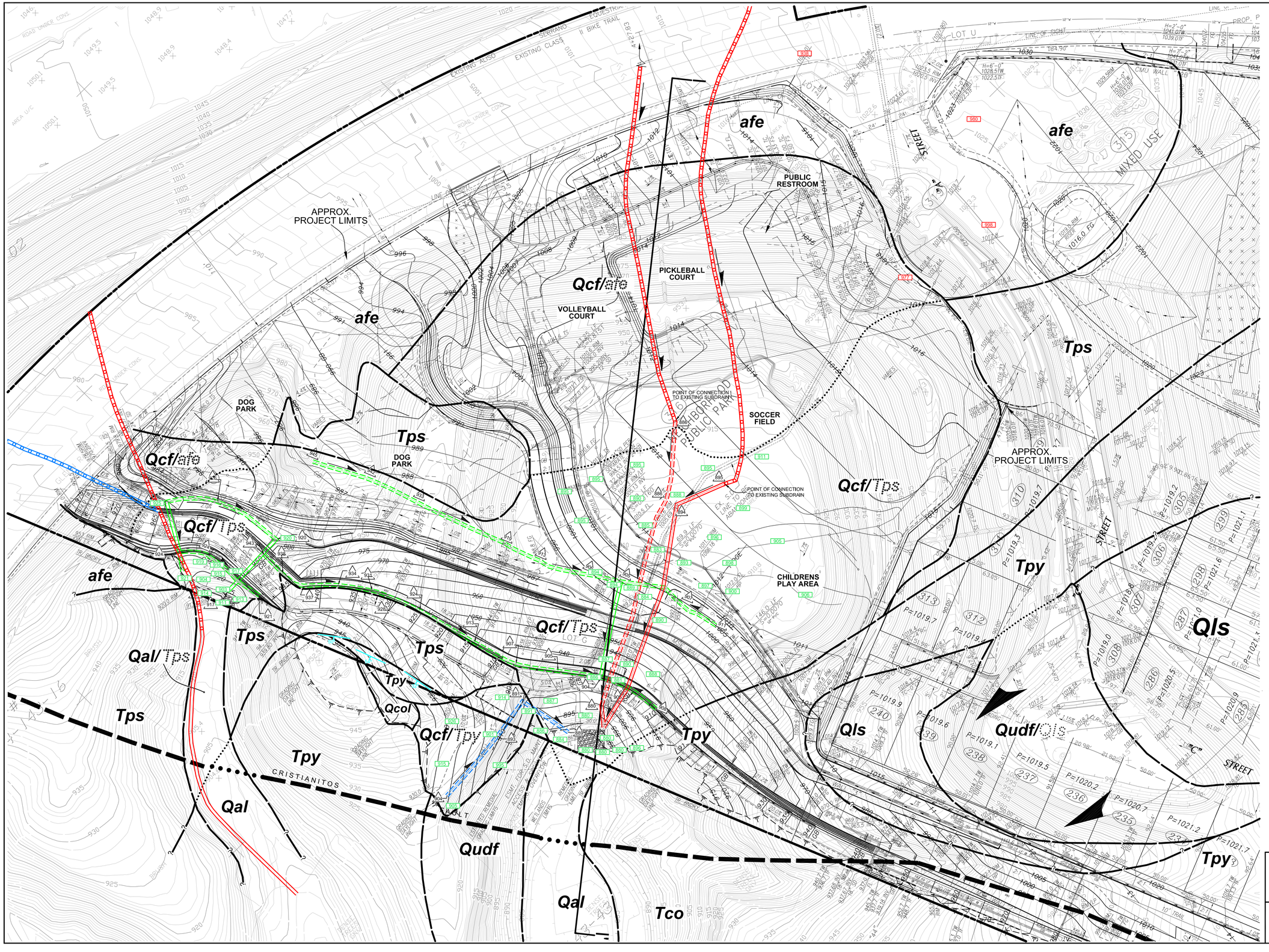
PORTOLA COMMUNITY PARK
LAKE FOREST, CALIFORNIA

RA / CW		DSK/GTYPD

DATE 03 - 08 - 2017	PROJECT NO. G1218 - 88 - 12	FIG. 1

Plotted:03/08/2017 8:07AM | By:JONATHAN WILKINS | File Location:Y:\PROJECTS\G1218-88-12 Portola South Park Site\DETAILS\G1218-88-12 VicinityMap.dwg



GEOCON LEGEND

- Qcf ..... COMPACTED FILL (Dotted Where Buried)
- Qudf ..... UNDOCUMENTED FILL
- afe ..... ENGINEERED ARTIFICIAL FILL (Dotted Where Buried)
- Qal ..... ALLUVIUM
- Qcol ..... COLLUVIUM
- Qls ..... LANDSLIDE DEBRIS (Dotted Where Buried)
- Tco ..... CAPISTRANO FORMATION - OSO MEMBER
- Tpy ..... PUENTE FORMATION - YORBA MEMBER (Siltstone; Dotted Where Buried)
- Tps ..... PUENTE FORMATION - SOQUEL MEMBER (Sandstone; Dotted Where Buried)
- ..... APPROX. LOCATION OF CHRISTIANITOS FAULT (Dotted Where Buried)
- ..... APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried, Queried Where Uncertain)
- 15 ..... STRIKE AND DIP OF BEDDING
- 15 ..... STRIKE AND DIP OF BEDDING PLANE SHEAR
- ..... APPROX. LOCATION OF NEW SUBDRAIN (Solid) 4-INCH 6-INCH 8-INCH
- ..... APPROX. LOCATION OF PRE-EXISTING SUBDRAIN (Perforated) 4-INCH 6-INCH 8-INCH
- ..... APPROX. LOCATION OF NEW SUBDRAIN (Perforated) 4-INCH 6-INCH 8-INCH
- ..... APPROX. LOCATION OF PROPOSED SUBDRAIN (Perforated) 4-INCH 6-INCH
- 1033 ..... APPROX. ELEVATION OF BASE OF REMOVAL (Geocon, In Feet, MSL)
- 955 ..... APPROX. ELEVATION OF BASE OF REMOVAL (By Others, In Feet, MSL)
- 880 ..... APPROX. ELEVATION OF SUBDRAIN
- ..... APPROX. LOCATION OF GEOLOGIC CROSS-SECTION

INTERIM GEOLOGIC MAP

PORTOLA SOUTH PARK SITE
LAKE FOREST, CALIFORNIA

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SCALE	1" = 40'	DATE	03 - 08 - 2017
PROJECT NO.	G1218 - 88 - 12	FIGURE	2
SHEET	1 OF 1		

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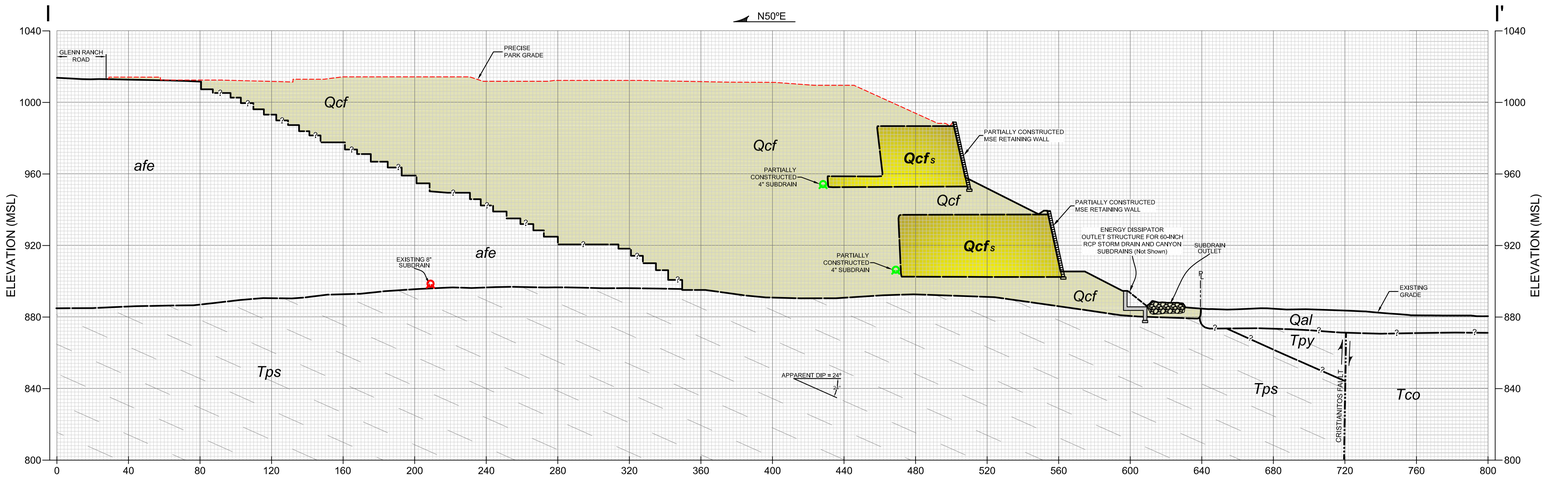

GEOLOGIC CROSS-SECTION I-I'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

- **Qcfs** .....COMPACTED FILL IN GEOGRID REINFORCED ZONE (See MSE Wall Plan)
- **Qcf** .....COMPACTED FILL
- **afe** .....ENGINEERED ARTIFICIAL FILL
- **Qal** .....ALLUVIUM
- **Tco** .....CAPISTRANO FORMATION
- **Tpy** .....PUENTE FORMATION - YORBA MEMBER (Siltstone)
- **Tps** .....PUENTE FORMATION - SOQUEL MEMBER (Sandstone)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)
- .....APPROX. LOCATION OF 8" SCHEDULE 40 PERFORATED SUBDRAIN
- .....APPROX. LOCATION OF 4" SCHEDULE 40 PERFORATED MSE WALL DRAIN

INTERIM GEOLOGIC CROSS - SECTION

PORTOLA SOUTH PARK SITE
LAKE FOREST, CALIFORNIA

GEOCON INCORPORATED
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SCALE 1" = 40'	DATE 03 - 08 - 2017
PROJECT NO. G1218 - 88 - 12	FIGURE 3
SHEET 1 OF 1	

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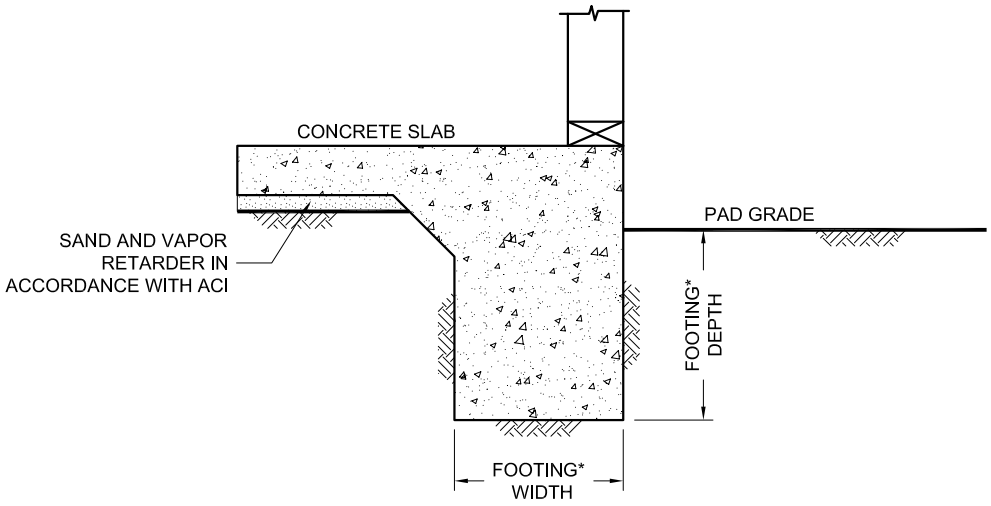

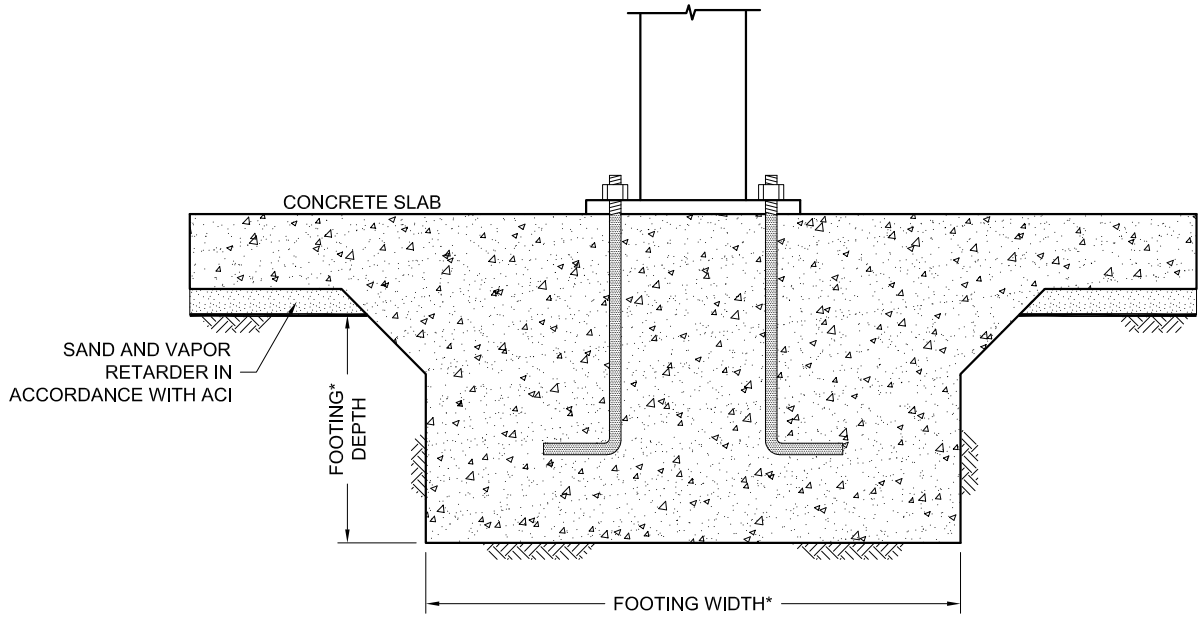

*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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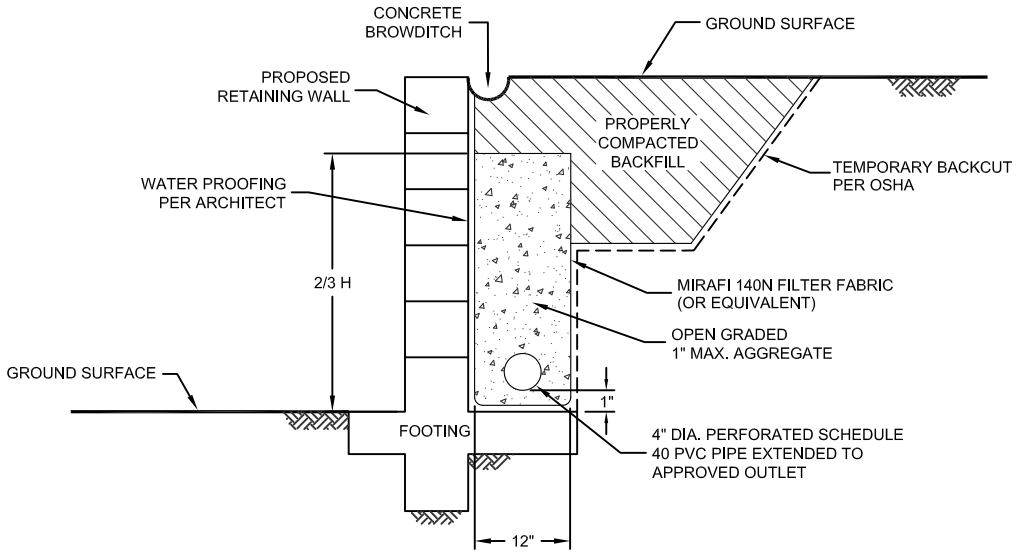
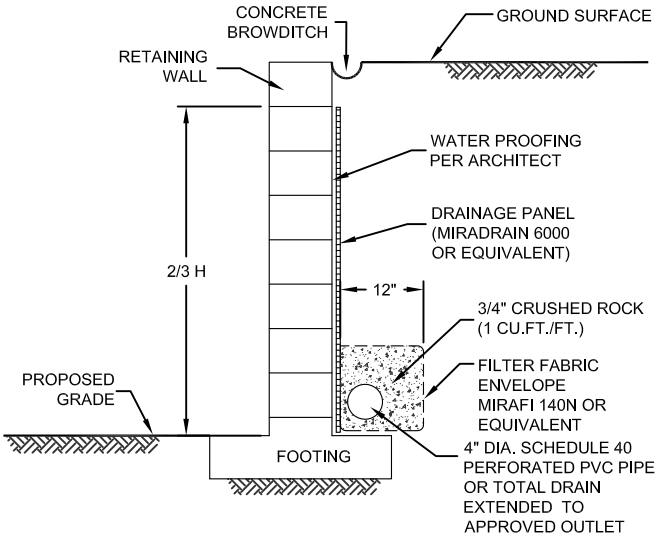
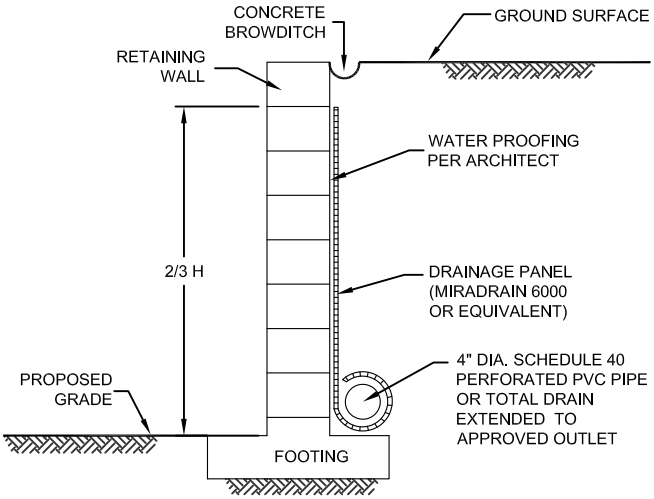
DATE 03 - 08 - 2017	PROJECT NO. G1218 - 88 - 12	FIG. 4

Plotted:03/08/2017 8:24AM | By:JONATHAN WILKINS | File Location:Y:\PROJECTS\G1218-88-12 Portola South Park Site\DETAILS\Wall-Column Footing Dimension Detail (COLFOOT2).dwg







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET
OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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DATE 03 - 08 - 2017	PROJECT NO. G1218 - 88 - 12	FIG. 5

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APPENDIX A

APPENDIX A

RECOMMENDED GRADING SPECIFICATIONS

FOR

PORTOLA COMMUNITY PARK
LAKE FOREST, CALIFORNIA

PROJECT NO. G1218-88-12

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

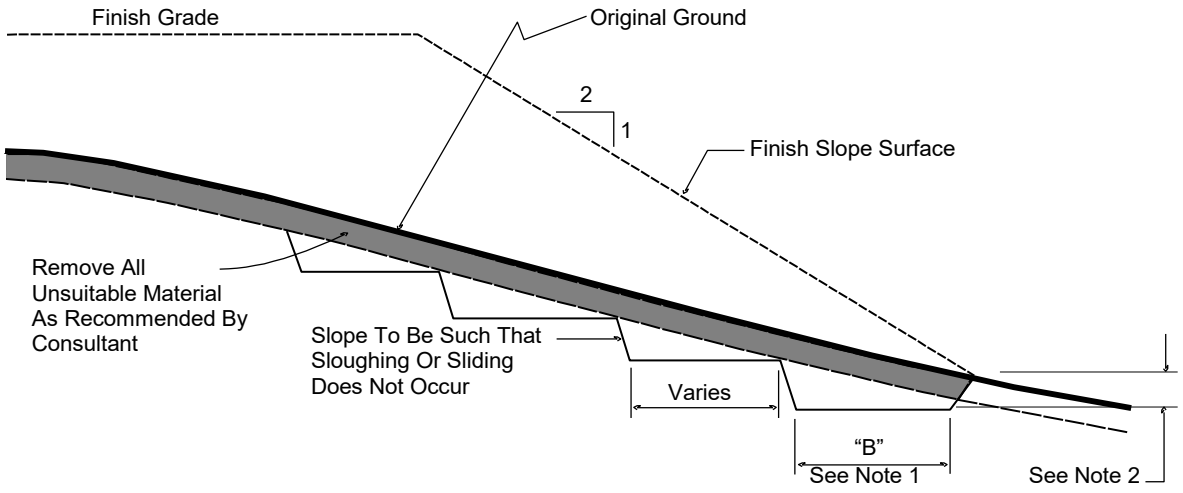
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

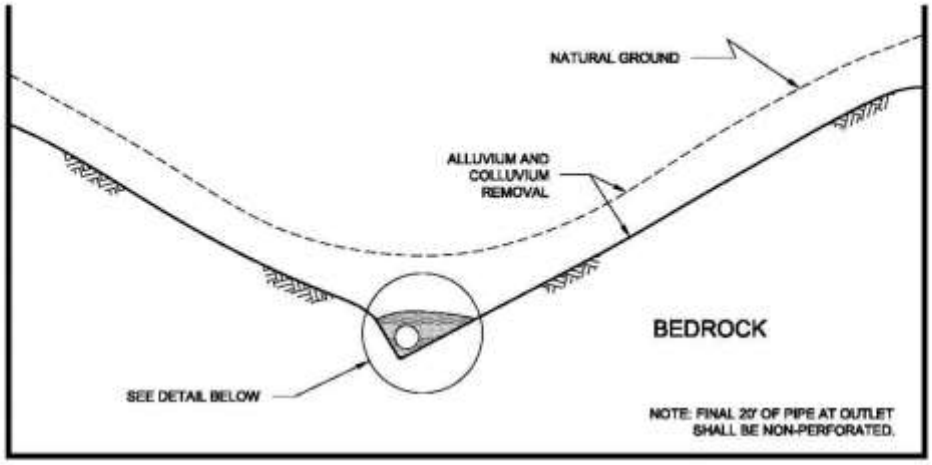
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

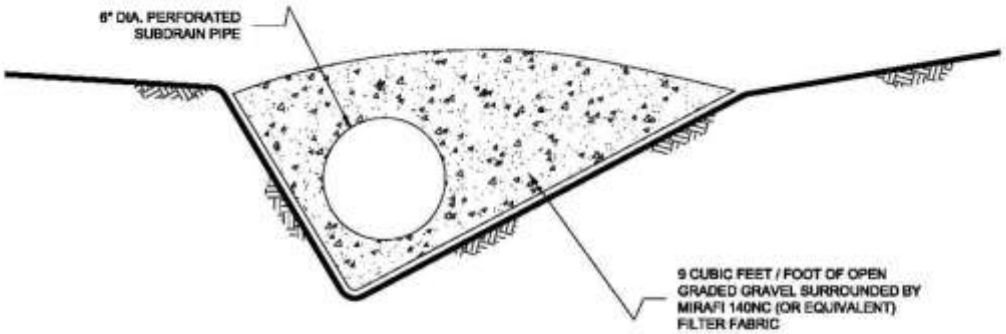
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

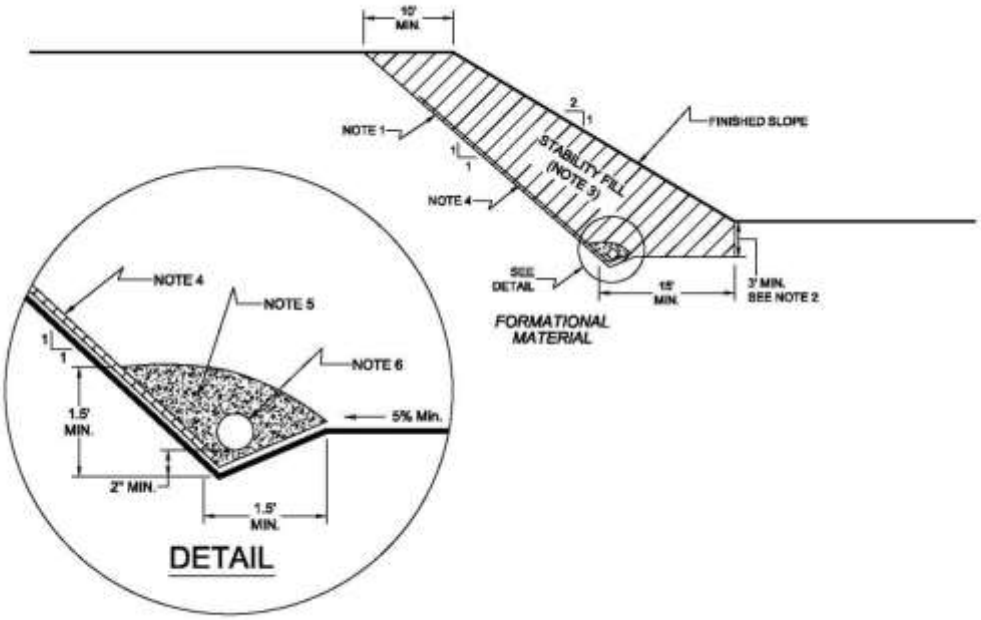
1.....8-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

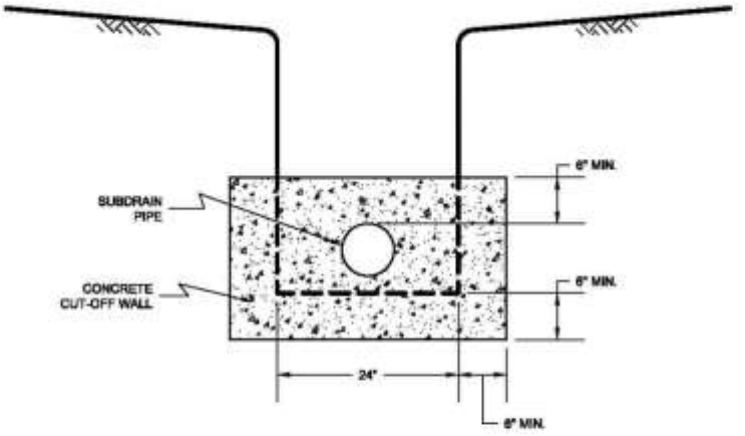
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

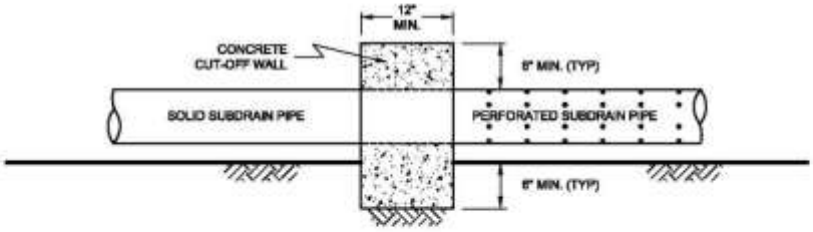
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

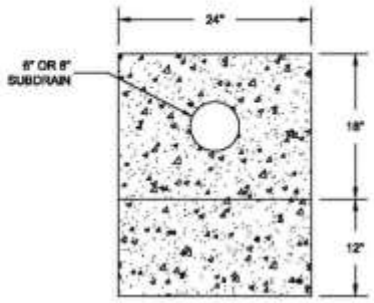


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

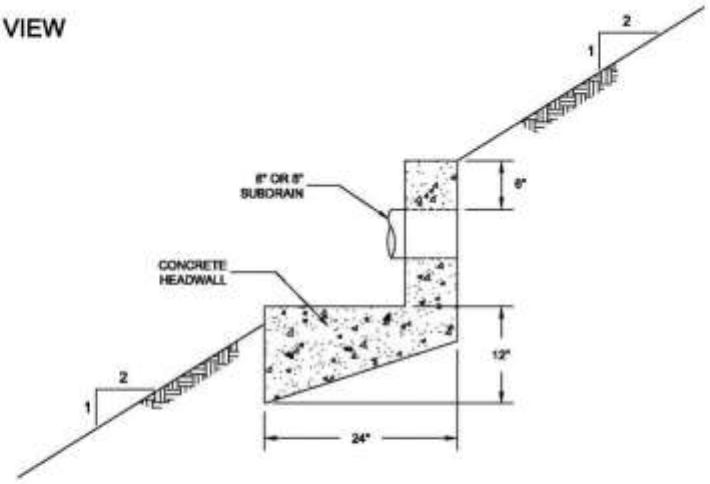
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an "as-built" map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop*.

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

1. *2016 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2015 International Building Code,* prepared by California Building Standards Commission, dated July, 2016.

2. *ACI 318-14, Building Code Requirements for Structural Concrete* and *Commentary on Building Code Requirements for Structural Concrete,* prepared by the American Concrete Institute, dated September, 2014.

3. ACI 330-08, *Guide for the Design and Construction of Concrete Parking Lots,* prepared by the American Concrete Institute, June 2008.

4. ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures,* Second Printing, April 6, 2011.

5. Boore, D. M., and G. M Atkinson, *Ground-Motion Prediction for the Average Horizontal Component of PGA, PGV, and 5%-Damped PSA at Spectral Periods Between 0.01 and 10.0 S,* Earthquake Spectra, February 2008, Volume 24, Issue 1, pages 99-138.

6. California Geologic Survey, *Seismic Shaking Hazards in California, Based on the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model,* 2002 (revised April 2003). 10% probability of being exceeded in 50 years. http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html

7. Campbell, K. W., and Y. Bozorgnia, *NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s,* Preprint of version submitted for publication in the NGA Special Volume of Earthquake Spectra, February 2008, Volume 24, Issue 1, pages 139-171.

8. Chiou, Brian S. J., and Robert R. Youngs, *A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra,* preprint for article to be published in NGA Special Edition for Earthquake Spectra, Spring 2008.

9. Risk Engineering, *EZ-FRISK,* 2015.

10. United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

11. Unpublished Geotechnical Reports and Information, Geocon Incorporated.

12. USGS computer program, *Seismic Hazard Curves and Uniform Hazard Response Spectra,* http://earthquake.usgs.gov/research/hazmaps/design/.

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G1218-88-12
March 21, 2017

City of Lake Forest
25550 Commercentre Drive, Suite 100
Lake Forest, California 92630

Attention: Mr. Scott Wasserman

Subject: ADDITIONAL DRILLED PIER RECOMMENDATIONS FOR LIGHTLY LOADED STRUCTURES
PORTOLA COMMUNITY PARK
LAKE FOREST, CALIFORNIA

Reference: *Update Geotechnical Report, Portola Community Park, Lake Forest, California*, prepared by Geocon Incorporated, dated March 8, 2017 (Project No. G1218-88-12).

Dear Mr. Wasserman:

We prepared this letter to provide additional drilled pier recommendations for lighter structures than the proposed light fixtures discussed in the referenced report. We understand additional recommendations are required for fencing and other lightly loaded structures.

Piers can be designed to develop support by end bearing within the formational materials and properly compacted fill. An allowable end bearing pressure of 2,000 pounds per square foot (psf) can be used for the design of the drilled piers for lightly loaded structures using a minimum drill depth of 2 feet. An allowable skin friction resistance of 300 psf can be used for drilled piers. These allowable values possess a factor of safety of at least 2 for skin friction and end bearing. We estimate the settlement of the drilled piers will be approximately ½ inch. The diameter of the piers should be a minimum of 1 foot. The design length of the drilled piers should be determined by the structural designer. The remaining recommendations presented in the referenced report still remain applicable to the design and construction of the planned park.

Should you have any questions regarding this correspondence, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Shawn Foy Weedon
GE 2714

REGISTERED PROFESSIONAL ENGINEER
SHAWN WEEDON
No. 2714
GEOTECHNICAL
STATE OF CALIFORNIA

SFW:dmc

(e-mail) Addressee

DETAIL NOTES:

(PASS AND ANCHERAGE FOR EQUIPMENT)

1. STEEL REINFORCED, CAST-IN-PLACE CONCRETE PAD, FOR SUPPORT AND ANCHORING OF EQUIPMENT. TOP OF PAD SHALL BE LEVEL AND FLAT WITHIN 1/32-INCHES OVER ENTIRE EQUIPMENT MOUNTING SURFACE AREA. 4500 PSI CONCRETE MINIMUM COMPRESSIVE STRENGTH AFTER 28 DAY CURE TIME.
   - A. 8-INCH PAD FOR EQUIPMENT TOTAL WEIGHT 1000 POUNDS OR GREATER.
   - B. 6-INCH PAD FOR EQUIPMENT TOTAL WEIGHT LESS THAN 1000 POUNDS.
2. 3-INCHES MINIMUM, TYPICAL ALL SIDES. 48-INCH MINIMUM ON "FRONT" SIDES OF EQUIPMENT, EXCEPT AS SHOWN OTHERWISE ON DRAWING PLAN VIEW.
3. CONTINUOUS CHAMFER FINISH ALL CONCRETE PAD EXPOSED EDGES AND CORNER INTERSECTION. TYPICAL.
4. STEEL REINFORCING (REBAR), PLACED HORIZONTALLY. 6-INCHES ON CENTER EACH DIRECTION CONTINUOUS INSIDE CONCRETE PAD
   - A. #5 REBAR FOR EQUIPMENT TOTAL WEIGHT 1000 POUNDS OR GREATER.
   - B. #4 REBAR FOR EQUIPMENT TOTAL WEIGHT LESS THAN 1000 POUNDS.
5. CLEAN SAND BACKFILL, 4-INCH DEPTH AND 90-PERCENT MACHINE COMPACTION, UNDER EQUIPMENT PAD.
6. 5/8-INCH DIAMETER STAINLESS STEEL EXPANSION ANCHOR BOLT AND NUT, WITH 4.5-INCH MINIMUM EMBEDMENT INTO CONCRETE. PROVIDE AT EACH CORNER OF EACH EQUIPMENT INDIVIDUAL SECTION, NOT TO EXCEED MORE THAN 36-INCHES ON CENTER FROM EACH ADJACENT ANCHOR BOLT. HILTE-KVIK BOLT 2, ICBO ER4627. LOAD TEST AS DESCRIBED IN STATE OF CALIFORNIA TITLE 24, SECTION 1925A 3.5
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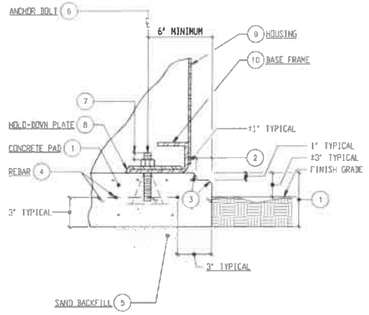
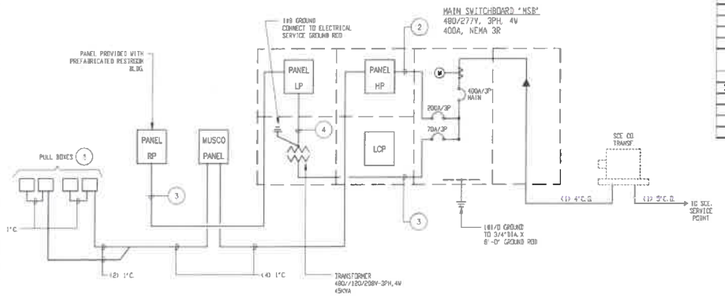


NIC

MAIN SWITCHBOARD ANCHOR DETAIL

SCALE: NONE | B



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PLAN NOTES

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UTILITY COMPANY CONTACT

POWER CO.: SCE CO.
TODD TATE
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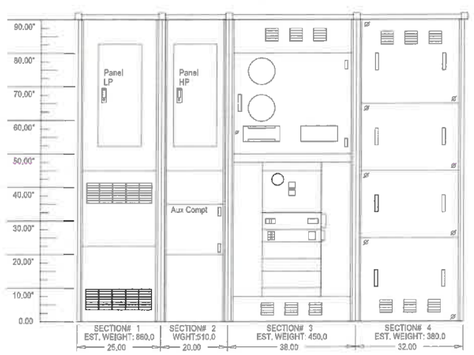
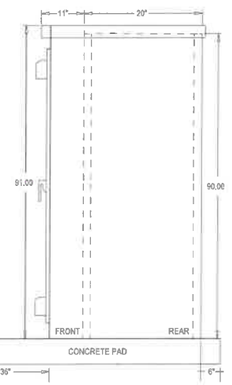


BASIS OF DESIGN: SIEMENS



NIC

SINGLE LINE DIAGRAM & SWITCHBOARD ELEVATION

SCALE: NONE | A

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   - b. SCALED DIMENSIONS AND GRAPHICALLY SHOWN LOCATIONS ARE TO BE CONSIDERED ONLY APPROXIMATE, FIELD VERIFY DIMENSIONS PRIOR TO BID.
   - c. BECAUSE THE PLANS ARE INTENDED TO SET FORTH THE REQUIREMENTS FOR CONSTRUCTION IN ONLY AN INDUSTRY-STANDARD LEVEL OF QUALITY AND DETAIL, AND THEREFORE ARE INTENDED TO BE SUPPLEMENTED BY APPROPRIATE REQUESTS FOR CLARIFICATION AND INFORMATION, ERRORS AND OMISSIONS AND TO BRING THESE ERRORS AND OMISSIONS TO THE ATTENTION OF AN APPROPRIATE OWNER REPRESENTATIVE IN A TIMELY MANNER AND ASSUMES THE RISK OF THE CONSEQUENCES OF FAILING TO DO SO BEFORE BIDDING OR OTHERWISE PROCEEDING
   - d. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION, AND NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES OR INCONSISTENCIES.
6. SUBMITTALS WILL BE RE/REVIEW BY THE ELECTRICAL ENGINEER, IF AT ALL, ONLY PURSUANT TO THE INDUSTRY-STANDARD PROTOCOL SET FORTH IN AIA DOCUMENT A201, AND IN NO EVENT WILL THE THE SUBMITTAL REVIEW PROCESS RELIEVE OR LESSEN THE SUBMITTING CONTRACTOR'S RESPONSIBILITY FOR AN INAPPROPRIATE SUBMITTAL.
7. IN NO EVENT WILL ANY SITE VISITS BY THE ELECTRICAL ENGINEER CONCERN CONSTRUCTION MEANS AND METHODS OR CONSTRUCTION SAFETY, AND ALL SUCH MATTERS SHALL REMAIN THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. COPIES OF THE THE PLANS PROVIDED IN ANY ELECTRONIC FORM ARE SUBJECT TO THE SAME PROVISIONS AS THE OTHER INSTRUMENTS OF SERVICE PREPARED BY OR ON BEHALF OF ELECTRICAL ENGINEER FOR THE PROJECT, INCLUDING WITHOUT LIMITATION THE ENGINEER'S COMMON LAW, STATUTORY OR OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. A RECIPIENT IS GRANTED AT MOST A TRANSFERABLE NONEXCLUSIVE LICENSE TO REUSE THE PLANS SOLELY FOR PROJECT PURPOSES; AND NO RECIPIENT IS AUTHORIZED TO USE OR TO ALLOW THE USE OF ALL OR ANY PROTION OF THESE PLANS FOR ANY OTHER PURPOSE, AND ANY USE FOR ANY OTHER PURPOSE WOULD CONSTITUTE ACTIONABLE PLAGIARISM. ELECTRICAL ENGINEER PROVIDES DOCUMENTS IN AN ELECTRONIC FORM ONLY IN ITS STANDARD FORMATS AND CONVENTIONS AND WITH NO GUARANTEE OF COMPATIBILITY WITH ANY RECIPIENT'S SOFTWARE OR HARDWARE AND ANY USE WITH OR CONVERSION TO OTHER FORMATS OR CONVENTIONS, OR THE USE WITH ANY PARTICULAR SOFTWARE OR HARDWARE, IS AT THE RECIPIENT'S SOLE RISK.
9. ALL CONDUIT, STRUCTURES AND INSTALLATION FOR POWER AND TELEPHONE UTILITIES SHALL CONFORM WITH THE REQUIREMENTS (MINIMUM BEND RADIUS, CONCRETE ENCASEMENT, CONDUIT, TYPE, ETC.) OF THE UTILITIES COMPANY. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY PRIOR TO BID AND INCLUDE ALL COSTS IN BID.
10. CONTRACTOR SHALL OBTAIN SOUTHERN CALIFORNIA EDISON CO. (SCE CO.) CONSTRUCTION DRAWINGS PRIOR TO CONSTRUCTION AND SHALL INSTALL POWER CONDUIT AND STRUCTURES ACCORDING TO SCE CO. DRAWINGS. EXTRA PAYMENTS WILL NOT BE GRANTED FOR FAILURE TO DO SO.
11. LOCATIONS OF EXISTING UTILITIES ARE NOT SHOWN AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING OR CONDUIT, ETC. AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
12. REFER TO THE DRAWINGS AND SHOP DRAWINGS OF OTHER TRADES FOR ADDITIONAL DETAILS WHICH AFFECT THE PROPER INSTALLATION OF THIS WORK.
13. THE DRAWINGS INDICATE, IN A DIAGRAMMATIC MANNER, THE DESIRED LOCATIONS AND ARRANGEMENT OF THE COMPONENTS OF ELECTRICAL WORK. DETERMINE EXACT CONDUIT ROUTING, CONDUIT BENDS, AUXILIARY JUNCTION BOXES, SUPPORTS AND UNDEFINED CONSTRUCTION DETAILS AS A JOB CONDITION TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE CODE REQUIREMENTS. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING THE WORK SO AS TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE OF CONDITIONS ENCOUNTERED.
14. IN THE EVENT CHANGES IN THE INDICATED LOCATIONS OR ARRANGEMENTS ARE NECESSARY, DUE TO DEVELOPED CONDITIONS IN THE BUILDING CONSTRUCTION OR REARRANGEMENT OF EQUIPMENT, SUCH CHANGES SHALL BE MADE WITHOUT COST PROVIDING THE CHANGE IS ORDERED BEFORE THE CONDUIT RUNS, ETC., AND WORK DIRECTLY CONNECTED TO SAME IS INSTALLED AND NO EXTRA MATERIALS ARE REQUIRED.
15. ELECTRICAL PLANS DO NOT SHOW ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT CONTROL. REFER TO MECHANICAL AND PLUMBING PLANS AND SPECIFICATIONS. WHERE EQUIPMENT IS INDICATED TO BE BY ELECTRICAL CONTRACTOR PROVIDE ALL CONDUIT, WIRE, J-BOX, OUTLET BOXES, RELAY SWITCHES, TIME SWITCHES, CONTROL CIRCUITS, ETC. REQUIRED FOR A COMPLETE AND OPERABLE MECHANICAL AND PLUMBING INSTALLATION. ALL WIRE SHALL BE INSTALLED IN CODE SIZED CONDUIT.
16. LOCATIONS OF DISCONNECT SWITCHES AND CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. VERIFY ACTUAL CONNECTION LOCATIONS WITH EQUIPMENT SHOP DRAWINGS AND LOCATE DISCONNECT SWITCHES TO PROVIDE CODE REQUIRED CLEARANCES AND ACCESS. DISCONNECT SWITCHES ON ROOF SHALL BE 30" MINIMUM ABOVE ROOF. MOUNTING OF DISCONNECTS DIRECTLY ON MECHANICAL EQUIPMENT IS NOT ACCEPTABLE. PROVIDE ANGLE IRON SUPPORT BRACKETS BOLTED TO ROOF FRAMING. FIELD GALVANIZE ALL FIELD CUT ENDS OF SUPPORTS. PROVIDE ROOF FLASHING AS REQUIRED.
17. PROVIDE ALL EQUIPMENT WITH ENCLOSURES LISTED OR LABELED FOR USE AND LOCATION WHERE SUCH EQUIPMENT IS INSTALLED.
18. PROVIDE UL LISTED FIRE STOP FOR ALL PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS AND CEILINGS TO MAINTAIN ALL FIRE RATINGS. THE FIRE STOP MATERIALS SHALL BE RE-ENTERABLE AND REUSABLE.
19. GROUNDING SHALL BE EXECUTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS, BOTH OF THE STATE OF CALIFORNIA AND LOCAL AUTHORITIES HAVING JURISDICTION.
20. PROVIDE GROUND WIRE IN EACH CONDUIT CONTAINING CIRCUITS FEEDING RECEPTACLES. THE CONDUIT SHALL NOT BE PERMITTED TO SERVE AS THE ONLY ELECTRICAL GROUND RETURN PATH.
21. PROVIDE HANDLE TIES AT CIRCUIT BREAKERS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS OF MULTI-WIRE BRANCH CIRCUITS WITH A SHARED NEUTRAL.
22. UNLESS NOTED OTHERWISE ALL 120 VOLT HOMERUNS OVER 100 FEET SHALL BE #10 AWG MINIMUM, OVER 175 FEET SHALL BE #8 AWG MINIMUM. ADJUST CONDUIT SIZE ACCORDINGLY.
23. NOTIFY THE ARCHITECT IN WRITING WHEN INSTALLATION IS COMPLETE AND THAT A FINAL INSPECTION OF THIS WORK CAN BE PERFORMED. IN THE EVENT DEFECTS OR DEFICIENCIES ARE FOUND DURING THIS FINAL INSPECTION, THEY SHALL BE CORRECTED TO THE SATISFACTION OF THE ARCHITECT BEFORE FINAL ACCEPTANCE CAN BE ISSUED.

SYMBOL LIST

(ALL SYMBOLS NOT NECESSARILY USED ON THESE DRAWINGS)

ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION AS NOTED ON THE DRAWINGS. VERIFY EXACT LOCATIONS AND HEIGHTS OF OUTLETS WITH ARCHITECTURAL INTERIOR ELEVATIONS PRIOR TO ROUGH-IN.

- DUPLEX CONVENIENCE RECEPTACLE VERTICAL ON FLUSH WALL MOUNTED OUTLET BOX, +18".
- JUNCTION BOX INDICATES CONNECTION TO EQUIPMENT AS REQUIRED, TYPICAL.
- PANELBOARD, ADJACENT LINE INDICATES PANEL FRONT. ADJACENT BALLOON INDICATES PANEL DESIGNATION "A", SEE DRAWING E-3 FOR PANEL SCHEDULE.
- CIRCUIT BREAKER STATIONARY (NON-DRAWOUT), SECONDARY VOLTAGE.
- FUSED SAFETY SWITCH (DISCONNECT), HORSE POWER RATED. MOUNT ON WALL +45", OR ON EQUIPMENT +36". PROVIDE SWITCH AND FUSES SIZED PER EQUIPMENT MANUFACTURER REQUIREMENTS
- MOTOR CONNECTION. PROVIDE FUSED SAFETY SWITCH (DISCONNECT), HORSE POWER RATED, WALL MOUNTED, +45" OR EQUIPMENT MOUNTED, +36". PROVIDE SWITCH AND FUSES SIZED PER EQUIPMENT MANUFACTURER REQUIREMENTS.
- CONDUIT, INSTALLED CONCEALED IN WALL OR IN CEILING SPACE.
  - 1/2" C - 2 #12
  - 1/2" C - 3 #12
  - 3/4" C - 4 #12
  - 3/4" C - 5 #12
  - 3/4" C - 6 #12
  - 1" C - 7 #12
  - 1" C - 8 #12
  - 1 1/4" C - 9 #12
- CONDUIT, INSTALLED CONCEALED IN OR UNDER FLOOR OR BELOW GRADE, 3/4" CONDUIT MINIMUM.
- HOMERUN TO PANEL "B" FOR CIRCUITS 5, 7, 9 WITH SEPARATE NEUTRALS.

B-5,7,9			
+45"	MOUNTING HEIGHT TO CENTER LINE OF DEVICE FROM FINISH FLOOR OR EXTERIOR GRADE	IG	ISOLATED GROUND AND ISOLATED NEUTRAL
		J-BOX	JUNCTION BOX
1	KEY NOTE CALLOUT. REFER TO CORRESPONDING NOTE ON DRAWING WHERE CALLOUT OCCURS.	KVA	KILOVOLT AMPERES
		KW	KILOWATT
A.F.F.	ABOVE FINISH FLOOR	LCL	LONG CONTINUOUS LOAD
A.F.G.	ABOVE FINISH GRADE	LTG, LTS	LIGHTING
AWG	AMERICAN WIRE GAUGE	MCB	MAIN CIRCUIT BREAKER
AMP, A	AMPERE	MLO	MAIN LUGS ONLY
A.I.C.	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)	NEC	NATIONAL ELECTRICAL CODE
		NIC	NOT IN CONTRACT
CIRC.,CKT.	CIRCUIT	PH. or Φ	PHASE
CB	CIRCUIT BREAKER	PROVIDE	FURNISH, INSTALL AND CONNECT.
C	CONDUIT	REC, RECEPT	RECEPTACLE
CLCB	CURRENT LIMITING CIRCUIT BREAKER	RGS	RIGID GALVANIZED STEEL
C.O.	CONDUIT ONLY.	SECONDARY	600 VOLTS AND LESS
DOWN	CONNECTED	TYP	TYPICAL
DIA	DIAMETER	U.N.O.	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING	V	VOLTS
EF	EXHAUST FAN	VA	VOLT AMPERES
(E)	EXISTING EQUIPMENT TO REMAIN	WP	WEATHERPROOF
FLA	FULL LOAD AMPS	W	WIRE
GFI	GROUND FAULT CIRCUIT INTERRUPTER.	1P	SINGLE POLE
GFP	GROUND FAULT PROTECTION	2P	DOUBLE POLE
GRD	GROUND	3P	TRIPLE POLE

Contractor to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the installation of pedestrian lighting and foundations at dog park and along path to dog park (electrical conduits existing), installation of pickle ball court light poles (footings and conduits existing); and volleyball court light poles and foundations (conduits existing).

SHEET INDEX

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:
FBA Engineering
Consulting Electrical Engineers
130 Paularino Avenue Suite A130
Costa Mesa, CA 92626
949.852.9990 • 949.852.1687 (fax)
fbaeng.com
FBA Job Number: 556.012

PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630
RICHARD E. WHEELER P.E., DIRECTOR OF PUBLIC WORKS, CITY ENGINEER
CITY OF LAKE FOREST DECEMBER 20, 1991

PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
GENERAL NOTES, SINGLE LINE DIAGRAM, DETAILS & SYMBOL LIST

THE CITY OF LAKE FOREST
Public Works Department

E-1.01
PROJECT NO. PW 2017-16
SHEET 40 OF 45

DETAIL NOTES:

(PADS AND ANCHORAGE FOR EQUIPMENT)

1. STEEL REINFORCED, CAST-IN-PLACE CONCRETE PAD, FOR SUPPORT AND ANCHORING OF EQUIPMENT. TOP OF PAD SHALL BE LEVEL AND FLAT WITHIN ±1/32-INCHES OVER ENTIRE EQUIPMENT MOUNTING SURFACE AREA. 4500 PSI CONCRETE MINIMUM COMPRESSIVE STRENGTH AFTER 28 DAY CURE TIME.
   - A. 8-INCH PAD FOR EQUIPMENT TOTAL WEIGHT 1000 POUNDS OR GREATER.
   - B. 6-INCH PAD FOR EQUIPMENT TOTAL WEIGHT LESS THAN 1000 POUNDS.
2. 3-INCHES MINIMUM, TYPICAL ALL SIDES, 48-INCH MINIMUM ON 'FRONT' SIDES OF EQUIPMENT, EXCEPT AS SHOWN OTHERWISE ON DRAWING PLAN VIEW.
3. CONTINUOUS CHAMFER FINISH ALL CONCRETE PAD EXPOSED EDGES AND CORNER INTERSECTION, TYPICAL.
4. STEEL REINFORCING (REBAR), PLACED HORIZONTALLY 6-INCHES ON CENTER EACH DIRECTION CONTINUOUS INSIDE CONCRETE PAD.
   - A. #5 REBAR FOR EQUIPMENT TOTAL WEIGHT 1000 POUNDS OR GREATER.
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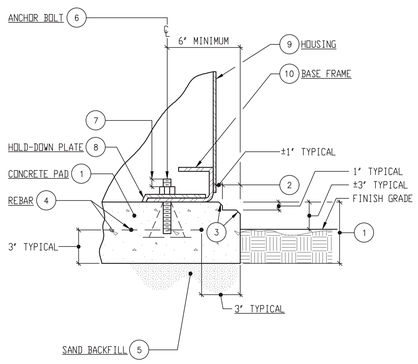

NIC

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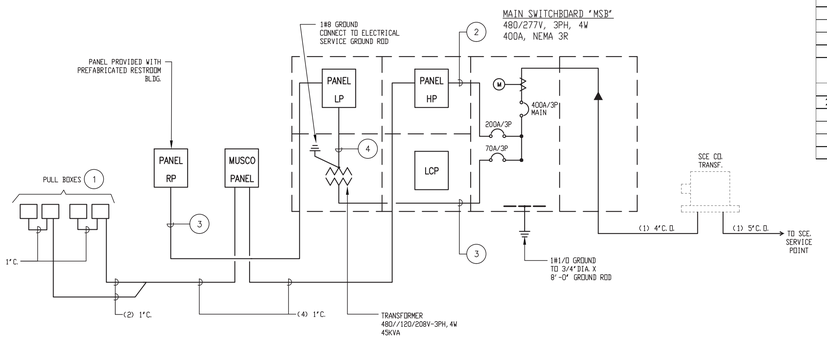

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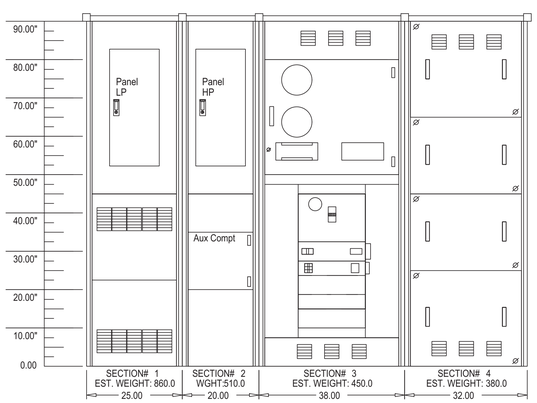

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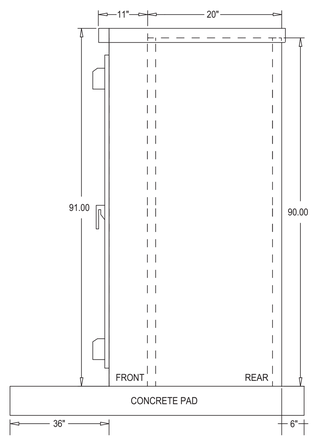

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   - a. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DRAWINGS.
   - b. SCALED DIMENSIONS AND GRAPHICALLY SHOWN LOCATIONS ARE TO BE CONSIDERED ONLY APPROXIMATE, FIELD VERIFY DIMENSIONS PRIOR TO BID.
   - c. BECAUSE THE PLANS ARE INTENDED TO SET FORTH THE REQUIREMENTS FOR CONSTRUCTION IN ONLY AN INDUSTRY-STANDARD LEVEL OF QUALITY AND DETAIL, AND THEREFORE ARE INTENDED TO BE SUPPLEMENTED BY APPROPRIATE REQUESTS FOR CLARIFICATION AND INFORMATION, ERRORS AND OMISSIONS AND TO BRING THESE ERRORS AND OMISSIONS TO THE ATTENTION OF AN APPROPRIATE OWNER REPRESENTATIVE IN A TIMELY MANNER AND ASSUMES THE RISK OF THE CONSEQUENCES OF FAILING TO DO SO BEFORE BIDDING OR OTHERWISE PROCEEDING.
   - d. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION, AND NOTIFY THE ARCHITECT IMMEDIATLEY OF ANY DISCREPANCIES OR INCONSISTENCIES.
6. SUBMITTALS WILL BE REVIEWED BY THE ELECTRICAL ENGINEER, IF AT ALL, ONLY PURSUANT TO THE INDUSTRY-STANDARD PROTOCOL SET FORTH IN AIA DOCUMENT A201, AND IN NO EVENT WILL THE THE SUBMITTAL REVIEW PROCESS RELIEVE OR LESSEN THE SUBMITTING CONTRACTOR'S RESPONSIBILITY FOR AN INAPPROPRIATE SUBMITTAL.
7. IN NO EVENT WILL ANY SITE VISITS BY THE ELECTRICAL ENGINEER CONCERN CONSTRUCTION MEANS AND METHODS OR CONSTRUCTION SAFETY, AND ALL SUCH MATTERS SHALL REMAIN THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. COPIES OF THE THE PLANS PROVIDED IN ANY ELECTRONIC FORM ARE SUBJECT TO THE SAME PROVISIONS AS THE OTHER INSTRUMENTS OF SERVICE PREPARED BY OR ON BEHALF OF ELECTRICAL ENGINEER FOR THE PROJECT, INCLUDING WITHOUT LIMITATION THE ENGINEER'S COMMON LAW, STATUTORY OR OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. A RECIPIENT IS GRANTED AT MOST A TRANFERABLE NONEXCLUSIVE LICENSE TO REUSE THE PLANS SOLELY FOR PROJECT PURPOSES; AND NO RECIPIENT IS AUTHORIZED TO USE OR TO ALLOW THE USE OF ALL OR ANY PROTION OF THESE PLANS FOR ANY OTHER PURPOSE, AND ANY USE FOR ANY OTHER PURPOSE WOULD CONSTITUTE ACTIONABLE PLAGIARISM. ELECTRICAL ENGINEER PROVIDES DOCUMENTS IN AN ELECTRONIC FORM ONLY IN ITS STANDARD FORMATS AND CONVENTIONS AND WITH NO GUARANTEE OF COMPATIBILITY WITH ANY RECIPIENT'S SOFTWARE OR HARDWARE AND ANY USE WITH OR CONVERSION TO OTHER FORMATS OR CONVENTIONS, OR THE USE WITH ANY PARTICULAR SOFTWARE OR HARDWARE, IS AT THE RECIPIENT'S SOLE RISK.
9. ALL CONDUIT, STRUCTURES AND INSTALLATION FOR POWER AND TELEPHONE UTILITIES SHALL CONFORM WITH THE REQUIREMENTS (MINIMUM BEND RADIUS, CONCRETE ENCASEMENT, CONDUIT, TYPE, ETC.) OF THE UTILITIES COMPANY. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY PRIOR TO BID AND INCLUDE ALL COSTS IN BID.
10. CONTRACTOR SHALL OBTAIN SOUTHERN CALIFORNIA EDISON CO. (SCE CO.) CONSTRUCTION DRAWINGS PRIOR TO CONSTRUCTION AND SHALL INSTALL POWER CONDUIT AND STRUCTURES ACCORDING TO SCE CO. DRAWINGS. EXTRA PAYMENTS WILL NOT BE GRANTED FOR FAILURE TO DO SO.
11. LOCATIONS OF EXISTING UTILITIES ARE NOT SHOWN AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING OR CONDUIT, ETC. AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.
12. REFER TO THE DRAWINGS AND SHOP DRAWINGS OF OTHER TRADES FOR ADDITIONAL DETAILS WHICH AFFECT THE PROPER INSTALLATION OF THIS WORK.
13. THE DRAWINGS INDICATE, IN A DIAGRAMMATIC MANNER, THE DESIRED LOCATIONS AND ARRANGEMENT OF THE COMPONENTS OF ELECTRICAL WORK. DETERMINE EXACT CONDUIT ROUTING, CONDUIT BENDS, AUXILLARY JUNCTION BOXES, SUPPORTS AND UNDEFINED CONSTRUCTION DETAILS AS A JOB CONDITION TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE CODE REQUIREMENTS. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING THE WORK SO AS TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE OF CONDITIONS ENCOUNTERED.
14. IN THE EVENT CHANGES IN THE INDICATED LOCATIONS OR ARRANGEMENTS ARE NECESSARY, DUE TO DEVELOPED CONDITIONS IN THE BUILDING CONSTRUCTION OR REARRANGEMENT OF EQUIPMENT, SUCH CHANGES SHALL BE MADE WITHOUT COST PROVIDING THE CHANGE IS ORDERED BEFORE THE CONDUIT RUNS, ETC., AND WORK DIRECTLY CONNECTED TO SAME IS INSTALLED AND NO EXTRA MATERIALS ARE REQUIRED.
15. ELECTRICAL PLANS DO NOT SHOW ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT CONTROL. REFER TO MECHANICAL AND PLUMBING PLANS AND SPECIFICATIONS. WHERE EQUIPMENT IS INDICATED TO BE BY ELECTRICAL CONTRACTOR PROVIDE ALL CONDUIT, WIRE, J-BOX, OUTLET BOXES, RELAY SWITCHES, TIME SWITCHES, CONTROL CIRCUITS, ETC. REQUIRED FOR A COMPLETE AND OPERABLE MECHANICAL AND PLUMBING INSTALLATION. ALL WIRE SHALL BE INSTALLED IN CODE SIZED CONDUIT.
16. LOCATIONS OF DISCONNECT SWITCHES AND CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. VERIFY ACTUAL CONNECTION LOCATIONS WITH EQUIPMENT SHOP DRAWINGS AND LOCATE DISCONNECT SWITCHES TO PROVIDE CODE REQUIRED CLEARANCES AND ACCESS. DISCONNECT SWITCHES ON ROOF SHALL BE 30" MINIMUM ABOVE ROOF. MOUNTING OF DISCONNECTS DIRECTLY ON MECHANICAL EQUIPMENT IS NOT ACCEPTABLE. PROVIDE ANGLE IRON SUPPORT BRACKETS BOLTED TO ROOF FRAMING. FIELD GALVANIZE ALL FIELD CUT ENDS OF SUPPORTS. PROVIDE ROOF FLASHING AS REQUIRED.
17. PROVIDE ALL EQUIPMENT WITH ENCLOSURES LISTED OR LABELED FOR USE AND LOCATION WHERE SUCH EQUIPMENT IS INSTALLED.
18. PROVIDE UL LISTED FIRE STOP FOR ALL PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS AND CEILINGS TO MAINTAIN ALL FIRE RATINGS. THE FIRE STOP MATERIALS SHALL BE RE-ENTERABLE AND REUSABLE.
19. GROUNDING SHALL BE EXECUTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS, BOTH OF THE STATE OF CALIFORNIA AND LOCAL AUTHORITIES HAVING JURISDICTION.
20. PROVIDE GROUND WIRE IN EACH CONDUIT CONTAINING CIRCUITS FEEDING RECEPTACLES. THE CONDUIT SHALL NOT BE PERMITTED TO SERVE AS THE ONLY ELECTRICAL GROUND RETURN PATH.
21. PROVIDE HANDLE TIES AT CIRCUIT BREAKERS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS OF MULTI-WIRE BRANCH CIRCUITS WITH A SHARED NEUTRAL.
22. UNLESS NOTED OTHERWISE ALL 120 VOLT HOMERUNS OVER 100 FEET SHALL BE #10 AWG MINIMUM, OVER 175 FEET SHALL BE #8 AWG MINIMUM. ADJUST CONDUIT SIZE ACCORDINGLY.
23. NOTIFY THE ARCHITECT IN WRITING WHEN INSTALLATION IS COMPLETE AND THAT A FINAL INSPECTION OF THIS WORK CAN BE PERFORMED. IN THE EVENT DEFECTS OR DEFICIENCIES ARE FOUND DURING THIS FINAL INSPECTION, THEY SHALL BE CORRECTED TO THE SATISFACTION OF THE ARCHITECT BEFORE FINAL ACCEPTANCE CAN BE ISSUED.

SYMBOL LIST

(ALL SYMBOLS NOT NECESSARILY USED ON THESE DRAWINGS)
ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION AS NOTED ON THE DRAWINGS. VERIFY EXACT LOCATIONS AND HEIGHTS OF OUTLETS WITH ARCHITECTURAL INTERIOR ELEVATIONS PRIOR TO ROUGH-IN.

- DUPLEX CONVENIENCE RECEPTACLE VERTICAL ON FLUSH WALL MOUNTED OUTLET BOX, +18".
- *②: JUNCTION BOX INDICATES CONNECTION TO EQUIPMENT AS REQUIRED, TYPICAL.
- A / E-1: PANELBOARD, ADJACENT LINE INDICATES PANEL FRONT. ADJACENT BALLOON INDICATES PANEL DESIGNATION 'A', SEE DRAWING E-3 FOR PANEL SCHEDULE.
- CIRCUIT BREAKER STATIONARY (NON-DRAWOUT), SECONDARY VOLTAGE.
- FUSED SAFETY SWITCH (DISCONNECT), HORSE POWER RATED. MOUNT ON WALL +45", OR ON EQUIPMENT +36". PROVIDE SWITCH AND FUSES SIZED PER EQUIPMENT MANUFACTURER REQUIREMENTS.
- MOTOR CONNECTION. PROVIDE FUSED SAFETY SWITCH (DISCONNECT), HORSE POWER RATED, WALL MOUNTED, +45" OR EQUIPMENT MOUNTED, +36". PROVIDE SWITCH AND FUSES SIZED PER EQUIPMENT MANUFACTURER REQUIREMENTS.
- CONDUIT, INSTALLED CONCEALED IN WALL OR IN CEILING SPACE.
  - 1/2" C - 2 #12
  - 1/2" C - 3 #12
  - 3/4" C - 4 #12
  - 3/4" C - 5 #12
  - 3/4" C - 6 #12
  - 1" C - 7 #12
  - 1" C - 8 #12
  - 1 1/4" C - 9 #12
- CONDUIT, INSTALLED CONCEALED IN OR UNDER FLOOR OR BELOW GRADE, 3/4" CONDUIT MINIMUM.
- B-5,7,9: HOMERUN TO PANEL 'B' FOR CIRCUITS 5, 7, 9 WITH SEPARATE NEUTRALS.
- +45": MOUNTING HEIGHT TO CENTER LINE OF DEVICE FROM FINISH FLOOR OR EXTERIOR GRADE
- ①: KEY NOTE CALLOUT. REFER TO CORRESPONDING NOTE ON DRAWING WHERE CALLOUT OCCURS.

A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
AWG	AMERICAN WIRE GAUGE
AMP, A	AMPERE
A.I.C.	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)
CIRC.,CKT.	CIRCUIT
CB	CIRCUIT BREAKER
C	CONDUIT
CLCB	CURRENT LIMITING CIRCUIT BREAKER
C.O.	CONDUIT ONLY.
CONN	CONNECTED
DIA	DIAMETER
EMT	ELECTRICAL METALLIC TUBING
EF	EXHAUST FAN
(E)	EXISTING EQUIPMENT TO REMAIN
FLA	FULL LOAD AMPS
GFI	GROUND FAULT CIRCUIT INTERRUPTER.
GFP	GROUND FAULT PROTECTION
GRD	GROUND
IG	ISOLATED GROUND AND ISOLATED NEUTRAL
J-BOX	JUNCTION BOX
KVA	KILOVOLT AMPERES
KW	KILOWATT
LCL	LONG CONTINUOUS LOAD
LTG, LTS	LIGHTING
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
PH. or Φ	PHASE
PROVIDE	FURNISH, INSTALL AND CONNECT.
REC, RECEPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
SECONDARY	600 VOLTS AND LESS
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
V	VOLTS
VA	VOLT AMPERES
WP	WEATHERPROOF
W	WIRE
1P	SINGLE POLE
2P	DOUBLE POLE
3P	TRIPLE POLE

Contractor to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the installation of pedestrian lighting and foundations at dog park and along path to dog park (electrical conduits existing), installation of pickle ball court light poles (footings and conduits existing); and volleyball court light poles and foundations (conduits existing).

SHEET INDEX

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:
FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER — No. E 10372 — Exp. 09-30-20 — ELECTRICAL — STATE OF CALIFORNIA

PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630

CITY OF LAKE FOREST — DECEMBER 20, 1991
THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER

PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
GENERAL NOTES, SINGLE LINE DIAGRAM, DETAILS & SYMBOL LIST

THE CITY OF LAKE FOREST
Public Works Department

E-1.01
PROJECT NO. PW 2017-16
SHEET 40 OF 45

PORTOLA COMMUNITY PARK — PROJECT NO. 535-012

VOLTS 277/480 — PANELBOARD HP — MAIN L.O. BUS 200A
PHASE 3PH, 4W
MTG SURFACE — LOCATION MSB

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION	CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
1	1344	-----	-----	L	20/1	13	PARKING/SIGN	A 2	1549	-----	-----	L	30/3	1	SPORT LIGHTING "S1"
3	-----	1934	-----	L	20/1	20	PED/TOT LOT/TOT STRUCTURE LTS	B 4	-----	1549	-----	L	-	-	----
5	-----	-----	3896	L	20/1	12	VOLLEYBALL/PICKBALL LTS	C 6	-----	-----	1549	L	-	-	----
7	1420	-----	-----	L	20/1	20	PED DOG PARK LTS	A 8	1549	-----	-----	L	30/3	1	SPORT LIGHTING "S2"
9	-----	-----	-----		20/1		SPARE	B 10	-----	1549	-----	L	-	-	----
11	-----	-----	-----		20/1		SPARE	C 12	-----	-----	1549	L	-	-	----
13	-----	-----	-----		20/1		SPARE	A 14	1549	-----	-----	L	30/3	1	SPORT LIGHTING "S3"
15	-----	-----	-----		20/1		SPARE	B 16	-----	1549	-----	L	-	-	----
17	-----	-----	-----		20/1		SPARE	C 18	-----	-----	1549	L	-	-	----
19	-----	-----	-----		20/1		SPARE	A 20	1549	-----	-----	L	30/3	1	SPORT LIGHTING "S4"
21	-----	-----	-----		20/1		SPARE	B 22	-----	1549	-----	L	-	-	----
23	-----	-----	-----		20/1		SPARE	C 24	-----	-----	1549	L	-	-	----

CONNECTED — VA — AMPS
PHASE A = 9960 — 32
PHASE B = 8130 — 29
PHASE C = 9492 — 34
TOTAL = 26582 — 32

L.C.L. @ 125% = 9993
RECEPT. ( ) 10 kVA @ 50% =
KITCHEN @ 65% =
OTHER LOAD @ 100% = 18588
TOTAL VA = 28581
TOTAL AMPS = 34

LOAD TYPE:
G - GENERAL (100%) — M - MOTOR (100%)
L - L.C.L. (125%) — M1 - MOTOR (125%)
R - RECEPTACLE (50%) — X - X-RAY (100%)
(10 kVA @ 100%) — X1 - X-RAY (50%)
K - KITCHEN (65%)

PORTOLA COMMUNITY PARK — PROJECT NO. 535-012

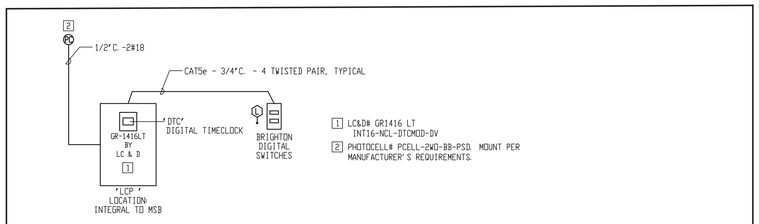
VOLTS 120/208 — PANELBOARD LP — MAIN L.O. BUS 225A
PHASE 3PH, 4W
MTG SURFACE — LOCATION MSB

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION	CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
1	4160	-----	-----	G	60/2	1	RESTROOM PANEL "RP"	A 2	4160	-----	-----	R	60/2	1	EVENT RECEPTACLES
3	-----	4160	-----	G	--	-	----	B 4	-----	4160	-----	R	--	-	----
5	-----	-----	-----		20/1	-	SPARE	C 6	-----	-----	4160	R	60/2	1	EVENT RECEPTACLES
7	200	-----	-----	G	20/1	1	IRRIGATION CONTROLLER	A 8	4160	-----	-----	R	--	-	----
9	-----	-----	-----		20/1		SPARE	B 10	-----	4160	-----	R	60/2	1	EVENT RECEPTACLES
11	-----	-----	-----		20/1		SPARE	C 12	-----	-----	4160	R	--	-	----
13	-----	-----	-----		20/1		SPARE	A 14	4160	-----	-----	R	60/2	1	EVENT RECEPTACLES
15	-----	-----	-----		20/1		SPARE	B 16	-----	4160	-----	R	--	-	----
17	-----	-----	-----		20/1		SPARE	C 18	-----	-----	-----		20/1		SPARE
19	-----	-----	-----		20/1		SPARE	A 20	-----	-----	-----		20/1		SPARE
21	-----	-----	-----		20/1		SPARE	B 22	-----	-----	-----		20/1		SPARE
23	-----	-----	-----		20/1		SPARE	C 24	-----	-----	-----		20/1		SPARE

CONNECTED — VA — AMPS
PHASE A = 16840 — 140
PHASE B = 16640 — 139
PHASE C = 8320 — 69
TOTAL = 41800 — 116

L.C.L. @ 125% =
RECEPT. ( ) 10 kVA @ 50% = 21640
KITCHEN @ 65% =
OTHER LOAD @ 100% = 8520
TOTAL VA = 30160
TOTAL AMPS = 84

LOAD TYPE:
G - GENERAL (100%) — M - MOTOR (100%)
L - L.C.L. (125%) — M1 - MOTOR (125%)
R - RECEPTACLE (50%) — X - X-RAY (100%)
(10 kVA @ 100%) — X1 - X-RAY (50%)
K - KITCHEN (65%)



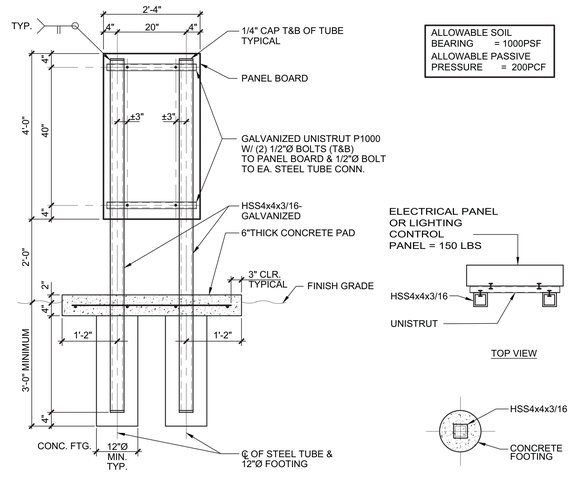
LIGHTING CONTROL PANEL "LCP"

MOUNTING: SURFACE — PHOTOCELL: Y

PANEL	CIRCUIT	RELAY	DESCRIPTION	LOCAL SWITCH	OVERRIDE SWITCH	MASTER SWITCH	ZONE TYPE	NOTES
HP	1	1	PARKING	-	-	-	P/T	-
HP	3	2	PEDESTRIAN SPORT	-	-	-	P/T	-
HP	3	3	PEDESTRIAN SPORT	-	-	-	P/T	-
HP	5	4	VOLLEYBALL	-	-	-	P/T	-
HP	5	5	PICKLEBALL	-	-	-	P/T	-
HP	3	6	TOT PLAYGROUND	-	-	-	P/T	-
HP	3	7	TOT STRUCTURE	-	-	-	P/T	-
HP	7	8	PEDESTRIAN DOG PARK	-	-	-	P/T	-
HP	7	9	PEDESTRIAN DOG PARK	-	-	-	P/T	-
-	-	10	SPARE	-	-	-	-	-
HP	1	11	ENTRY LIGHT	-	-	-	P/T	-
-	-	12	-	-	-	-	-	-
-	-	13	-	-	-	-	-	-
-	-	14	-	-	-	-	-	-
-	-	15	-	-	-	-	-	-
-	-	16	-	-	-	-	-	-

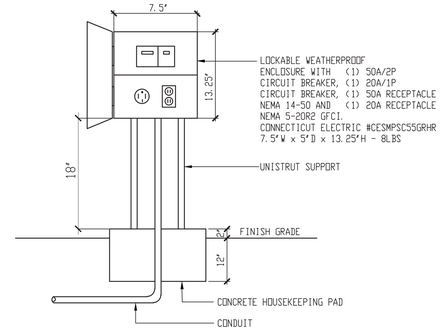
T/T TIMECLOCK ON/OFF
T/P TIMECLOCK ON/ PHOTOCELL OFF
P/T PHOTOCELL ON/TIMECLOCK OFF
P/P PHOTOCELL ON/PHOTOCELL OFF

LIGHTING CONTROL PANEL — SCALE NTS — 3



NIC

PANELBOARD/MUSCO PANEL MOUNTING DETAIL — SCALE NTS — 2



NIC

EVENTS POWER OUTLET DETAIL — SCALE NTS — 1

LIGHT FIXTURE SCHEDULE

FBA # 535.012

LIGHT FIXTURE SYMBOL	TYPE	LIGHT FIXTURE DESCRIPTION	FIXTURE MAXIMUM TOTAL INPUT WATTS	FIXTURE MINIMUM LUMEN OUTPUT EFFICIENCY	FIXTURE MOUNTING	LAMP TYPE	LAMP COLOR TEMPERATURE K°	LAMP CRI, NOT LESS THAN	EACH LAMP INITIAL MINIMUM LUMEN OUTPUT	TOTAL ALL LAMPS INITIAL MINIMUM LUMEN OUTPUT	LAMP QUANTITY
	1	LED POLE MOUNT FIXTURE, 30" DIAMETER ANGLED HOOD WITH SDLID	132		POLE MOUNT.	LED	4000		-	9486	-
		TRIM RINGS AND FLAT GLASS LENS. DARK BRONZE FINISH.			SEE POLE BASE DETAIL						
		TYPE III DISTRIBUTION. MOUNT TO POLE WITH 50"TALL x 34" LONG									
		CAST ALUMINUM ARM ASSEMBLY. CONCRETE POLE TAPERED ROUND									
		24'-6" TALL WITH ANTI-GRAFFITI COATING.									
		AAL #UCL-SR-ANG-T3-56LED-4K-700-DB-FTG-SLA17(5) SERIES									
		AMERON #VICTORIAN STYLE 11-T VBFX-X.X SERIES									
	2	LED POLE MOUNT FIXTURE, 20" DIAMETER ANGLED HOOD WITH	71		POLE MOUNT.	LED	4000		-	6561	-
		SDLID TRIM RINGS AND FLAT GLASS LENS. DARK BRONZE FINISH.			SEE POLE BASE DETAIL						
		TYPE II DISTRIBUTION WITH 40' TALL x 26' LONG CAST ALUMINUM									
		ARM ASSEMBLY. CONCRETE POLE TAPERED ROUND, 15'-5" TALL									
		WITH ANTI-GRAFFITY COATING.									
		AAL #UCM-SR-ANG-T2-32LED-4K-700-DB-FTG-SLA17(5) SERIES									
		AMERON #VICTORIAN STYLE 11 VBF-X.X SERIES									
	4	LED POLE MOUNT FIXTURE, TYPE IV DISTRIBUTION. DARK BRONZE	206		POLE MOUNT.	LED	4000		-	18349	-
		FINISH. 20'-0" TALL WITH ANTI-GRAFFITI COATING.			SEE POLE BASE DETAIL						
		PHILIPS GARDO-#P21-XXX-XX-1-4-20OLA-NW-UNV-BRP SERIES									
		WITH 5" STRAIGHT ROUND SPUN ALUMINUN POLE.									
	4A	SAME AS TYPE 4, EXCEPT DOUBLE HEAD.									
	4B	LED POLE MOUNT FIXTURE, TYPE IV DISTRIBUTION. DARK BRONZE	206		POLE MOUNT.	LED	4000		-	18349	-
		FINISH. CONCRETE POLE TAPERED ROUND, 20'-0" TALL WITH			SEE POLE BASE DETAIL						
		ANTI-GRAFFITI COATING.									
		PHILIPS GARDO-#P21-XXX-XX-1-4-20OLA-NW-UNV-BRD SERIES									
		AMERON #VICTORIAN STYLE 11 VBF-X.X SERIES									
	5	SPORTS FIELD LIGHTING POLE ASSEMBLY WITH 5 HEADS.	3150		POLE	LED					5
					SEE MUSCO DRAWINGS						
		MUSCO LIGHTING - SEE MUSCO PROJECT #181316 FOR ADDITIONAL INFORMATION.									
	6	LED SIGN LIGHT. DARK BRONZE FINISH.	8		IN GROUND	LED					
					W/CONCRETE BASE						
		HEVILITE #HL391-8W-GM-8 WITH TRANSFORMER AND CAST BRASS IN-GRADE BOX.									
	7	5" X 48" SURFACE MOUNT LED FIXTURE. VANDAL RESISTANT.	45		SURFACE MOUNT.	LED	4000		-		-
		KENALL #N548-C-45L40K-DCC-1-DV									
	8	WALL MOUNTED WITH STRAIGHT ARMS LED FIXTURE FOR RESTROOM. DARK BRONZE FINISH.	32		WALL MOUNT.	LED	3500		-		-
		AAL #UCS-LUM-ANG-12LED-WW-WST									

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:
FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. ZAJTCHUK — No. E 10372 — Exp. 09-30-20 — ELECTRICAL — STATE OF CALIFORNIA

PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630
THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER
CITY OF LAKE FOREST — DECEMBER 20, 1991

PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
FIXTURE SCHEDULE, PANELS AND DETAILS
THE CITY OF LAKE FOREST
Public Works Department

E-1.02
PROJECT NO. PW 2017-16
SHEET 41 OF 45

STATE OF CALIFORNIA
OUTDOOR LIGHTING
CEC-NRCC-LTO-01-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-01-E
Outdoor Lighting	(Page 1 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

A. General Information

Project Address: 28040 Glenn Ranch Rd Portola Hills, CA 92610		Total Illuminated Hardscape Area 53,344
Phase of Construction:	☑ New Construction	☐ Addition ☐ Alteration
Outdoor Lighting Zone (OLZ)	☐ OLZ-1 ☐ OLZ-2	☑ OLZ-3 ☐ OLZ-4

I have confirmed with the AHJ which OLZ applies to this site. For default lighting zone designations, see Title 24 Part 6, §10-114

B. Lighting Compliance Documents (check box for each document included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance documents, refer to the Nonresidential Manual published by the California Energy Commission.

☑	NRCC-LTO-01-E	Certificate of Compliance
☑	NRCC-LTO-02-E	Outdoor Lighting Controls Certificate of Compliance
☑	NRCC-LTO-03-E	Outdoor Lighting Power Allowance Certificate of Compliance

C. Summary of Allowed Outdoor Lighting Power			Watts
1.	**Sum Total ALLOWED** Outdoor Lighting Wattage from NRCC-LTO-03-E, page 1	=	5,699
	Complies ONLY if **Installed ≤ Allowed**		
2.	**Sum Total INSTALLED** Outdoor lighting Wattage from NRCC-LTO-01-E, page 3		4,068

D. Declaration of Required Installation Certificates
Declare by checking all Installation Certificates that will be submitted. (Retain copies and verify forms are completed and signed.)

☑ NRCI-LTO-01-E - Must be submitted for all buildings	☐ Field Inspector
☑ NRCI-LTO-02-E - Must be submitted for a lighting control system, or for an Energy Management Control System (EMCS), to be recognized for compliance.	☐ Field Inspector

E. Declaration of Required Certificates of Acceptance
Declare by checking all of the Certificates of Acceptance that will be submitted. (Retain copies and verify forms are completed and signed.)

☑ NRCA-LTO-02-A - Must be submitted for outdoor lighting controls.	☐ Field Inspector

F. Schedule of luminaires exempt from the outdoor lighting power requirements in §140.7

Name or Symbol	Description of exempt luminaire in accordance with the exemptions

STATE OF CALIFORNIA
OUTDOOR LIGHTING
CEC-NRCC-LTO-01-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-01-E
Outdoor Lighting	(Page 2 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

G. Schedule of luminaires exempt from the cutoff requirements in §130.2(b)

Name or Symbol	Description of exempt luminaire in accordance with the exemptions

H. Schedule of luminaires exempt from the outdoor lighting control requirements in §130.2(c)

Name or Symbol	Description of exempt luminaire in accordance with the exemptions

STATE OF CALIFORNIA
OUTDOOR LIGHTING
CEC-NRCC-LTO-01-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-01-E
Outdoor Lighting	(Page 3 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

I. Outdoor Lighting Schedule and Field Inspection Energy Checklist

Luminaire Schedule		Installed Watts					Location	Cutoff	Field Inspector	
A	B	C	D		E	F	G	H	I	
			How wattage was determined							
Name or Item Tag	Complete Luminaire Description	Watts per Luminaire	CEC Default from NA8	According to §130.0(c)	Number of Luminaires	Total Installed Watts in this area (C x E)	Primary Function area in which these luminaires are installed	BUG Rating	Pass	Fail
7	32W 4' LINEAR LED	32.0	☐	☑	4	128	Non Sales Canopy		☐	☐
1	132W LED POLE FIXTURE	132.0	☐	☑	10	1,320	Automotive Hardscape		☐	☐
8	32W WALL MTD LED	32.0	☐	☑	2	64	Pedestrian Hardscape		☐	☐
2	71W LED POLE FIXTURE	71.0	☐	☑	36	2,556	Pedestrian Hardscape		☐	☐
			☐	☐					☐	☐
			☐	☐					☐	☐
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			☐	☐					☐	☐
			☐	☐					☐	☐
		INSTALLED WATTS PAGE TOTAL:				4,068	Enter sum total of all pages (**Sum Total INSTALLED** Outdoor lighting wattage) into NRCC-LTO-01-E; Page 1		4,068	

STATE OF CALIFORNIA
OUTDOOR LIGHTING
CEC-NRCC-LTO-01-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-01-E
Outdoor Lighting	(Page 4 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Stephen R. Zajicek	Documentation Author Signature: [signature]
Company: FBA Engineering	Signature Date: 11/15/2016
Address: 150 Paularino Avenue, Suite A120	CEA Certification Identification (if applicable): E10372
City/State/Zip: Costa Mesa, California 92626	Phone: (949) 852-9995

RESPONSIBLE PERSON'S DECLARATION STATEMENT
I certify the following under penalty of perjury, under the laws of the State of California:
1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Stephen R. Zajicek	Responsible Designer Signature: [signature]
Company: FBA Engineering	Date Signed: 11/15/2016
Address: 150 Paularino Avenue	License: E10372
City/State/Zip: Costa Mesa, California 92626	Phone: (949) 852-9995

STATE OF CALIFORNIA
OUTDOOR LIGHTING CONTROLS
CEC-NRCC-LTO-02-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-02-E
Outdoor Lighting Controls	(Page 1 of 3)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

The NRCC-LTO-02-E shall be used to document all mandatory outdoor lighting controls that are applicable to the project.

A. Mandatory Outdoor Lighting Control Declaration Statements

Check all that apply:
- ☑ Lighting shall be controlled by self-contained lighting control devices which are certified to the Energy Commission according to the Title 20 Appliance Efficiency Regulations in accordance with §110.9(a).
- ☑ Lighting shall be controlled by a lighting control system or energy management control system in accordance with §110.9. An Installation Certificate shall be submitted in accordance with §130.4(b).
- ☑ All lighting controls and equipment shall comply with the applicable requirements in §110.9 and shall be installed in accordance with the manufacturer's instructions in accordance with §130.1
- ☐ Part-Night Outdoor Lighting Controls, as defined in Section 100.1(b), shall meet the requirements in Section 110.9(b)5
- ☐ All outdoor incandescent luminaires rated over 100 watts, determined in accordance with Section 130.0(c), shall be controlled by a motion sensor.
- ☑ All outdoor luminaires rated for use with lamps greater than 150 lamp watts, determined in accordance with Section 130.0(c), shall comply with Backlight, Uplight, and Glare (collectively referred to as "BUG") in accordance with Section 130.2(b)
- ☐ All installed outdoor lighting shall be controlled by a photocontrol or outdoor astronomical time-switch control in accordance with Section 130.2(c)1
- ☑ All installed outdoor lighting shall be circuited and independently controlled from other electrical loads by an automatic scheduling control in accordance with Section 130.2(c)2
- ☑ All installed outdoor lighting, where the bottom of the luminaire is mounted 24 feet or less above the ground, shall be controlled with automatic lighting controls in accordance with Section 130.2(c)3
- ☐ For Outdoor Sales Frontage, Outdoor Sales Lots, and Outdoor Sales Canopies lighting, an automatic lighting control in accordance with Section 130.2(c)4
- ☐ For Building Facade, Ornamental Hardscape and Outdoor Dining lighting, an automatic lighting control in accordance with Section 130.2(c)5
- ☑ Before an occupancy permit is granted for a newly constructed building or area, or a new lighting system serving a building, area, or site is operated for normal use, indoor lighting controls serving the building, area, or site shall be certified as meeting the Acceptance Requirements for Code Compliance in accordance with §130.4.(a). Outdoor lighting controls shall comply with the applicable requirements of Section 130.2(c) and Reference Nonresidential Appendix NA7.8

STATE OF CALIFORNIA
OUTDOOR LIGHTING CONTROLS
CEC-NRCC-LTO-02-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-02-E
Outdoor Lighting Controls	(Page 2 of 3)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

B. Mandatory Outdoor Lighting Control Schedule and Field Inspection Checklist

Outdoor Lighting Control Schedule			Standards Complying With (✓ all that apply, or enter 'E' if Exempted)						✓ if Acceptance Test Required	Field Inspector	
A	B	C	D	E	F	G	H	I	J	K	
Location and Application of Luminaires being controlled	Type/ Description of Lighting Control (i.e. motion sensor, photocontrol, outdoor astronomical time-switch control, centralized time-based zone lighting control)	# of Units	§130.2(a)	§130.2(c)1	§130.2(c)2	§130.2(c)3	§130.2(c)4	§130.2(c)5		Pass	Fail
PARKING LOT LIGHTING	LCP	1	E	✓	✓	✓	E	E		☐	☐
										☐	☐
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STATE OF CALIFORNIA
OUTDOOR LIGHTING CONTROLS
CEC-NRCC-LTO-02-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-02-E
Outdoor Lighting Controls	(Page 3 of 3)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Stephen R. Zajicek	Documentation Author Signature: [signature]
Company: FBA Engineering	Signature Date: 11/15/2016
Address: 150 Paularino Avenue, Suite A120	CEA Certification Identification (if applicable): E10372
City/State/Zip: Costa Mesa, California 92626	Phone: (949) 852-9995

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Responsible Designer Name: Stephen R. Zajicek	Responsible Designer Signature: [signature]
Company: FBA Engineering	Date Signed: 11/15/2016
Address: 150 Paularino Avenue	License: E10372
City/State/Zip: Costa Mesa, California 92626	Phone: (949) 852-9995

STATE OF CALIFORNIA
OUTDOOR LIGHTING POWER ALLOWANCES
CEC-NRCC-LTO-03-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-03-E
Outdoor Lighting Power Allowances	(Page 1 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

A. OUTDOOR LIGHTING POWER ALLOWANCE SUMMARY

1. General Hardscape Lighting Power Allowance (Site Total from Section B of NRCC-LTO-03-E) — 1. 5,571

2. Additional Specific "use it or lose it" Lighting Power Allowances listed in each of these cells shall be identical to total allowed watts determined in Section C-1 to C-4 of NRCC-LTO-03-E.

PER APPLICATION from Section C-1		PER UNIT LENGTH (SALES FRONTAGE) from Section C-2		PER HARDSCAPE AREA (ORNAMENTAL LIGHTING) from Section C-3		PER SPECIFIC AREA from Section C-4.		
0	+	0	+	0	+	128	=	2. 128

3. **Sum Total ALLOWED** Outdoor Lighting Wattage (add rows 1 and 2) — 3. 5,699

B. GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE FROM TABLE 140.7-A

Area Wattage Allowance (AWA)				Linear Wattage Allowance (LWA)			Initial Wattage Allowance (IWA)	Total General Hardscape Lighting Allowance
A	B	C	D	E	F	G	H	I
Name of area	Illuminated Hardscape Area	AWA Per Square Foot	AWA (B x C)	Perimeter Length of General Hardscape	LPA per Linear Foot	LWA (E x F)	IWA (Watts)	D + G + H
Parking	19,112	0.090	1,720	0	0.600	0	770	2,490
Pedestrian Hardscape	34,232	0.090	3,081	0	0.600	0	0	3,081
							TOTAL	5,571

STATE OF CALIFORNIA
OUTDOOR LIGHTING POWER ALLOWANCES
CEC-NRCC-LTO-03-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-03-E
Outdoor Lighting Power Allowances	(Page 2 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

C. ADDITIONAL "USE IT OR LOSE IT" OUTDOOR LIGHTING POWER ALLOWANCES FOR SPECIFIC APPLICATIONS
- ☐ The additional specific outdoor lighting power allowance shall be the smaller of the allowed lighting power or the actual lighting power used.
- ☐ Use Outdoor Lighting Zone (OLZ) that is documented on page 1 of NRCC-LTO-01-E to calculate the specific wattage allowances.

C-1. WATTAGE ALLOWANCE PER APPLICATION – Table 140.7-B
- ☐ Available only for qualifying locations, which include Building Entrances or Exits; Primary Entrances to Senior Care Facilities, Police Stations, Hospitals, Fire Stations, and Emergency Vehicle Facilities; Drive Up Windows; Vehicle Service Station Uncovered Fuel Dispenser
- ☐ If more than one luminaire type is used per location, use multiple rows for that location

A	B	C	D	E	F	G	H	I	J
	ALLOTTED WATTS			DESIGN WATTS					
Name of Location for which allowance is claimed	Number of qualifying locations	Wattage Allowance per qualifying location	Allotted Watts (B x C)	Luminaire Code or Symbol	Luminaire Description	Luminaire Quantity	Watts per luminaire	Design Watts (G x H)	Allowed Watts (smaller of D or I)
							Sum total allowance per application on this site:		0

C-2. WATTAGE ALLOWANCE PER UNIT LENGTH (Sales Frontage) from Table 140.7-B
- ☐ If more than one luminaire type is used per location, use multiple rows for that location

A	B	C	D	E	F	G	H	I	J
	ALLOTTED WATTS			DESIGN WATTS					
Name of Location for which allowance is claimed	Linear feet of Sales Frontage	Wattage Allowance per linear foot	Allotted Watts (B x C)	Luminaire Code or Symbol	Luminaire Description	Luminaire Quantity	Watts per luminaire	Design Watts (G x H)	Allowed Watts (smaller of D or I)
							Sum total allowance for sales frontage on the site:		0

STATE OF CALIFORNIA
OUTDOOR LIGHTING POWER ALLOWANCES
CEC-NRCC-LTO-03-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-03-E
Outdoor Lighting Power Allowances	(Page 3 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

C-3. WATTAGE ALLOWANCE PER SQUARE FOOT OF HARDSCAPE AREA (Ornamental Lighting) – Table 140.7-B
- ☐ Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130.0(c), and shall be post-top luminaires, lanterns, pendant luminaires, or chandeliers.
- ☐ If more than one luminaire type is used per location, use multiple rows for that location

A	B	C	D	E	F	G	H	I	J
	ALLOTTED WATTS			DESIGN WATTS					
Name of area for which ornamental allowance is claimed	Square feet of Hardscape	Wattage Allowance per square foot	Allotted Watts (B x C)	Luminaire Code or Symbol	Luminaire Description	Luminaire Quantity	Watts per luminaire	Design Watts (G x H)	Allowed Watts (smaller of D or I)
							Sum total allowance for ornamental lighting on the site:		0

C-4. WATTAGE ALLOWANCE PER SQUARE FOOT OF SPECIFIC AREA - Table 140.7-B
- ☐ Allowances for Building Facades; Outdoor Sales Lots; Vehicle Service Station Hardscape; Vehicle Service Station Canopies; Sales Canopies; Non-sales Canopies; Guard Stations; Student Pick-up/Drop-off zone: Outdoor Dining; Special Security Lighting for Retail Parking and Pedestrian Hardscape.
- ☐ If more than one luminaire type is used per location, use multiple rows for that location

A	B	C	D	E	F	G	H	I	J
	ALLOTTED WATTS			DESIGN WATTS					
Name of Location for which allowance is claimed	Illuminated Area of Application	Wattage Allowance per square foot	Allotted Watts (B x C)	Luminaire Code or Symbol	Luminaire Description	Luminaire Quantity	Watts per luminaire	Design Watts (G x H)	Allowed Watts (smaller of D or I)
Non Sales Canopy	676	0.408	276	7	32W 4' LINEAR LED	4	32.0	128	128
							Sum total allowance for specific area on the site:		128

STATE OF CALIFORNIA
OUTDOOR LIGHTING POWER ALLOWANCES
CEC-NRCC-LTO-03-E (Revised 08/15) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-03-E
Outdoor Lighting Power Allowances	(Page 4 of 4)
Project Name: Portola Community Park	Date Prepared: 11/15/2016

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Responsible Designer Name: Stephen R. Zajicek	Responsible Designer Signature: [signature]
Company: FBA Engineering	Date Signed: 11/15/2016
Address: 150 Paularino Avenue	License: E10372
City/State/Zip: Costa Mesa, California 92626	Phone: (949) 852-9995

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:
FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. ZAJICEK — No. E 10372 — Exp. 09-30-20 — ELECTRICAL — STATE OF CALIFORNIA

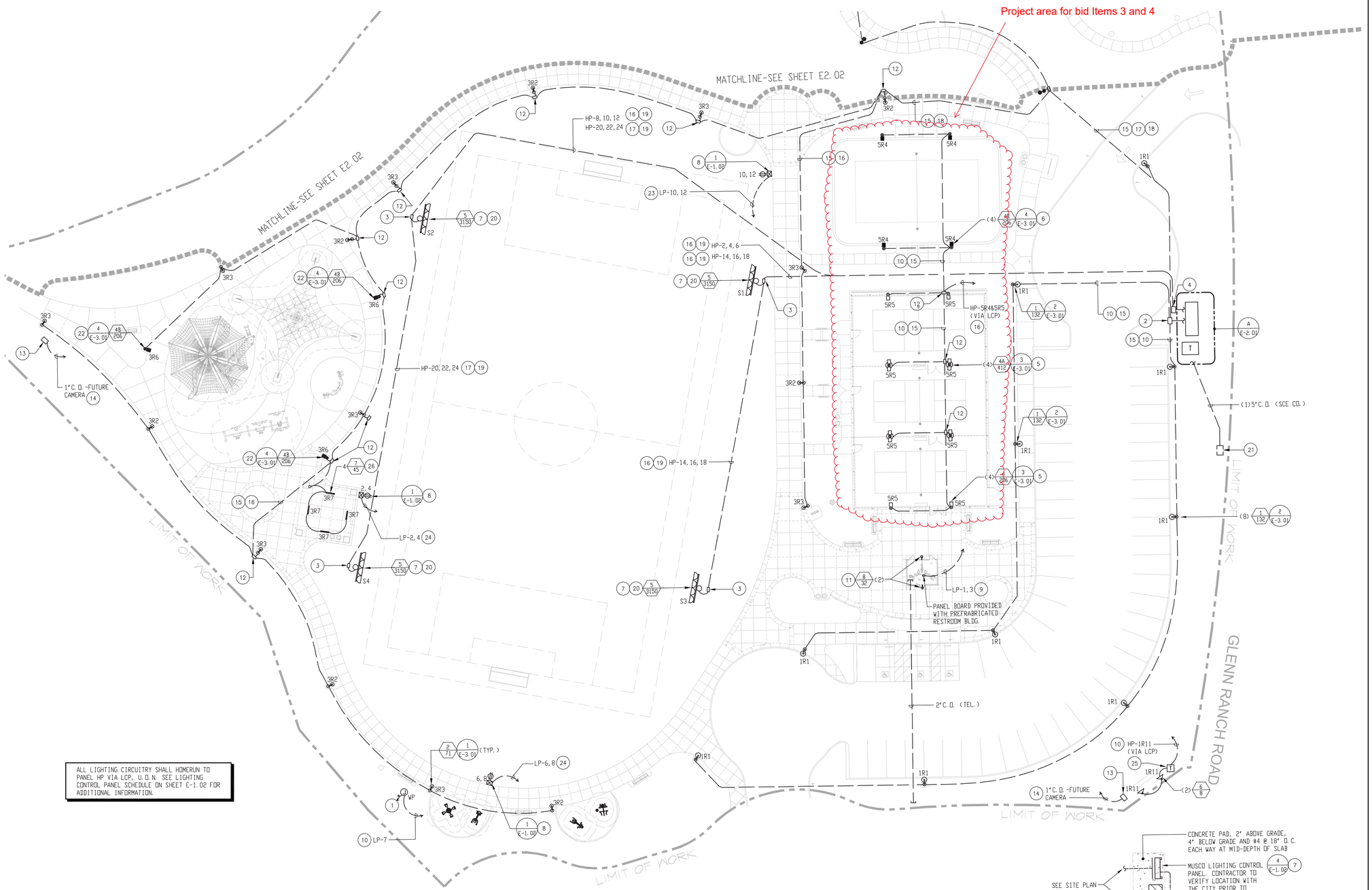
PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630
THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER

CITY OF LAKE FOREST — DECEMBER 20, 1991

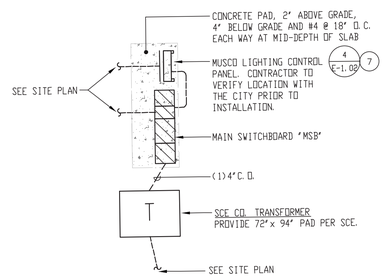
PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
TITLE-24

THE CITY OF LAKE FOREST
Public Works Department

E-1.03
PROJECT NO. PW 2017-16
SHEET 42 OF 45



ALL LIGHTING CIRCUITRY SHALL HOMERUN TO PANEL HP VIA LCP, U.O.N. SEE LIGHTING CONTROL PANEL SCHEDULE ON SHEET E-1.02 FOR ADDITIONAL INFORMATION.



PARTIAL SITE PLAN

1/8" = 1'-0"

A

PLAN NOTES:

1. CONNECT TO IRRIGATION CONTROLLER. COORDINATE EXACT LOCATION WITH IRRIGATION CONTRACTOR.
2. 24"X36" ELECTRICAL LIGHTING PULLBOX FOR SITE LIGHTING. LABEL LID 'LIGHTING'.
3. 11"X17" ELECTRICAL LIGHTING PULLBOX FOR SOCCER FIELD SPORT LIGHTING. LABEL LID 'LIGHTING'.
4. 24"X36" ELECTRICAL PULLBOX. LABEL LID 'ELECTRICAL'.
5. BID ALTERNATE #2- PICKLE BALL COURT LIGHTING.
6. BID ALTERNATE #2- VOLLEY BALL COURT LIGHTING.
7. BID ALTERNATE #3- SOCCER FIELD LIGHTING. W/MUSCO CONTROL PANEL.
8. LOCKABLE WEATHERPROOF EVENT POWER OUTLET IN ENCLOSURE. COORDINATE EXACT LOCATION WITH LANDSCAPE ARCHITECT AND/OR OWNER REP.
9. 1 1/4"C. -3#4, 1#8 GRD.
10. 3/4"C. -2#10, 1#10 GRD.
11. WALL MOUNTED FIXTURE PROVIDED AND INSTALLED BY SITE CONTRACTOR. COORDINATE EXACT LOCATION AND TERMINATION WITH PUBLIC RESTROOM PROVIDER.
12. 11"X17" ELECTRICAL LIGHTING PULLBOX FOR LIGHTING. LABEL LID 'LIGHTING'.
13. 11"X17" ELECTRICAL PULLBOX FOR FUTURE CAMERA. COORDINATE EXACT LOCATION WITH CAMERA INSTALLER.
14. ROUTE CONDUITS TO PORTABLE RESTROOM ELECTRICAL ROOM.
15. CONTINUE THRU ENTIRE BRANCH CIRCUIT RUN UNLESS OTHERWISE NOTED.
16. 1"C. -4#10, 1#10 GRD.
17. 1"C. -4#8, 1#10 GRD.
18. 1 1/4"C. -8#8, 1#10 GRD.
19. ROUTE THROUGH MUSCO LIGHTING CONTROL PANEL AS REQUIRED.
20. MUSCO LIGHTING BALLAST SHALL BE MOUNTED ON THE OPPOSITE SIDE OF THE FIELD.
21. EXISTING UTILITY VAULT. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH UTILITY COMPANY.
22. BID ALTERNATE #3-TOT LOT LIGHTING.
23. 1 1/4"C. -2#4, 1#8 GRD.
24. 2"C. -2#1/0, 1#6 GRD.
25. LOW VOLTAGE TRANSFORMER. MOUNT IN WEATHERPROOF J-BOX. COORDINATE EXACT LOCATION WITH LANDSCAPE ARCHITECT.
26. MOUNT LINEAR LED FIXTURE ON THE INSIDE FACE OF THE BEAMS. COORDINATE EXACT LOCATION WITH STRUCTURE MANUFACTURER.

BID SCHEDULE	
NO.	DESCRIPTION
2.	PERIMETER LIGHTING AT DOG PARK.
3.	PICKLEBALL COURT LIGHTING & VOLLEYBALL COURT LIGHTING.
NIC	ATHLETIC FIELD LIGHTS (MUSCO LIGHTS) & TOT LOT LIGHTING.

Contractor to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the installation of pedestrian lighting and foundations at dog park and along path to dog park (electrical conduits existing), installation of pickle ball court light poles (footings and conduits existing); and volleyball court light poles and foundations (conduits existing).

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

0 10' 20' 40'

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:

FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER STEPHEN M. ZACHAS No. E 10373 Exp. 09-30-20 ELECTRICAL STATE OF CALIFORNIA

PLANS APPROVED BY:

THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630

THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER

CITY OF LAKE FOREST DECEMBER 20, 1991

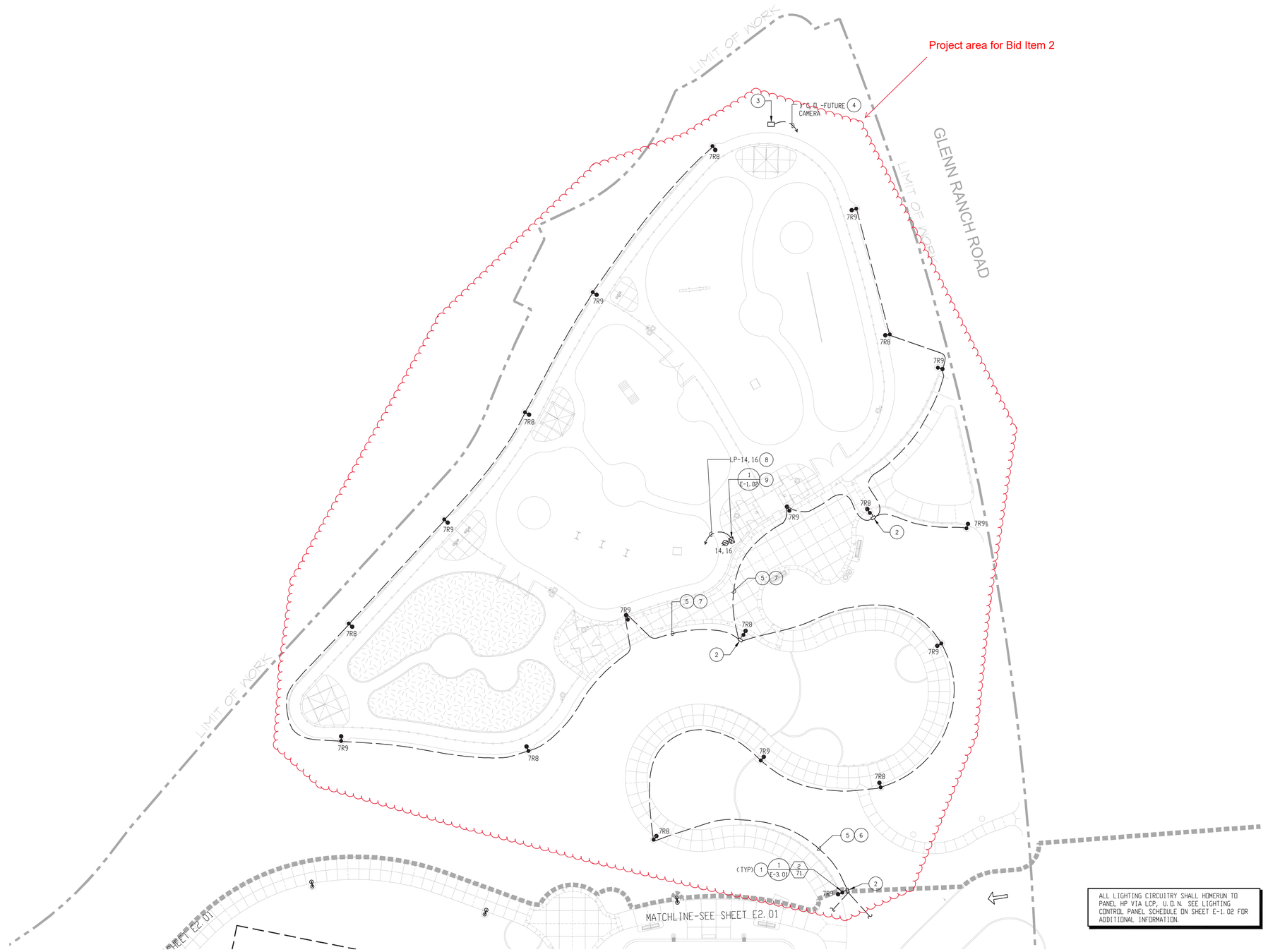
PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
SITE PLAN

THE CITY OF LAKE FOREST
Public Works Department

E-2.01
PROJECT NO. PW 2017-16
SHEET 43
OF 45

PLAN NOTES:

1. BID ALTERNATE #1- DOG PARK PERIMETER LIGHTING.
2. 11"X17" ELECTRICAL LIGHTING PULLBOX FOR LIGHTING. LABEL LID 'LIGHTING'.
3. 11"X17" ELECTRICAL PULLBOX FOR FUTURE CAMERA. COORDINATE EXACT LOCATION WITH CAMERA INSTALLER.
4. ROUTE CONDUITS TO PORTABLE RESTROOM ELECTRICAL ROOM.
5. CONTINUE THRU ENTIRE BRANCH CIRCUIT RUN UNLESS OTHERWISE NOTED.
6. 1"C. -4#8, 1#10 GRD.
7. 1"C. -4#10, 1#10 GRD.
8. 1 1/4"C. -2#2, 1#8 GRD.
9. LOCKABLE WEATHERPROOF EVENT POWER OUTLET IN ENCLOSURE. COORDINATE EXACT LOCATION WITH LANDSCAPE ARCHITECT AND/OR OWNER REP.



ALL LIGHTING CIRCUITRY SHALL HOMERUN TO PANEL HP VIA LCP, U.O.N. SEE LIGHTING CONTROL PANEL SCHEDULE ON SHEET E-1.02 FOR ADDITIONAL INFORMATION.

BID SCHEDULE

NO.	DESCRIPTION
2.	PERIMETER LIGHTING AT DOG PARK
3.	PICKLEBALL COURT LIGHTING & VOLLEYBALL COURT LIGHTING
NIC	ATHLETIC FIELD LIGHTS (MUSCO LIGHTS) & TOT LOT LIGHTING.

Contractor to furnish all labor, materials, equipment, tools, transportation, and services, and to discharge all duties and obligations necessary and required to perform and complete the installation of pedestrian lighting and foundations at dog park and along path to dog park (electrical conduits existing), installation of pickle ball court light poles (footings and conduits existing); and volleyball court light poles and foundations (conduits existing).

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

0 10' 20' 40'

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:

FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. ZACHES No. E 10372 Exp. 09-30-20 ELECTRICAL STATE OF CALIFORNIA

PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630

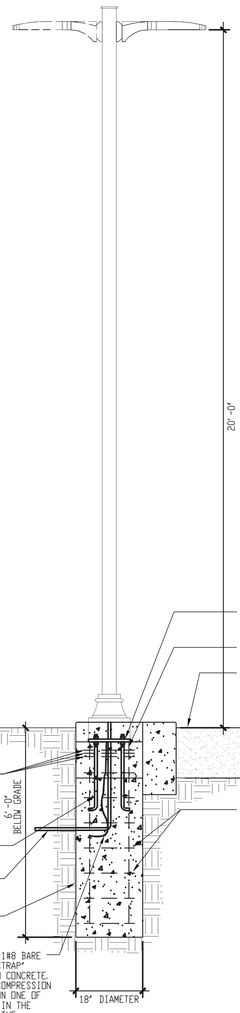
THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER

CITY OF LAKE FOREST · DECEMBER 20, 1991 ·

PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
SITE PLAN

THE CITY OF LAKE FOREST
Public Works Department

E-2.02
PROJECT NO. PW 2017-16
SHEET 44 OF 45

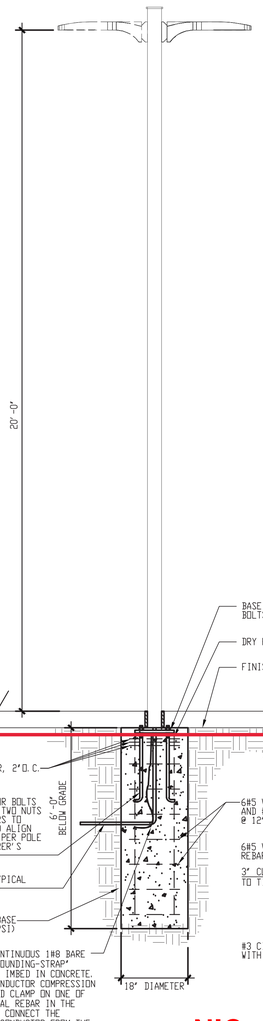


NOTES:

1. SEE LANDSCAPE DRAWINGS DETAIL L-2.04 FOR ADDITIONAL INFORMATION.

VOLLEYBALL BASE DETAIL

SCALE: NTS | 4



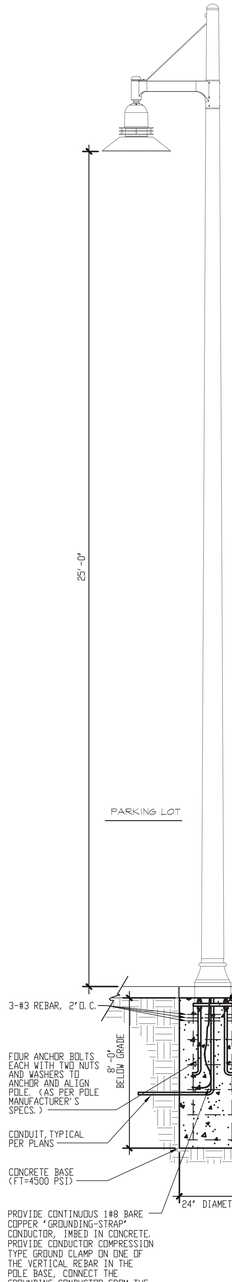
NOTES:

1. SEE LANDSCAPE DRAWINGS DETAIL L-2.04 FOR ADDITIONAL INFORMATION.

NIC
Footing Existing

PICKLEBALL BASE DETAIL

SCALE: NTS | 3



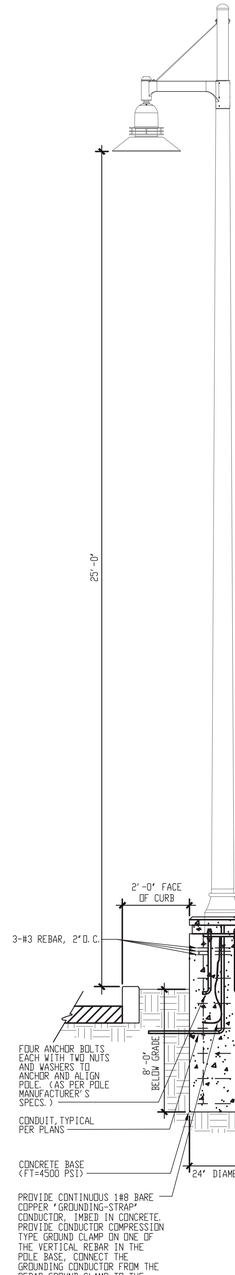
NOTES:

1. SEE LANDSCAPE DRAWINGS DETAIL L-2.04 FOR ADDITIONAL INFORMATION.

NIC

PARKING POLE BASE DETAIL

SCALE: NTS | 2A



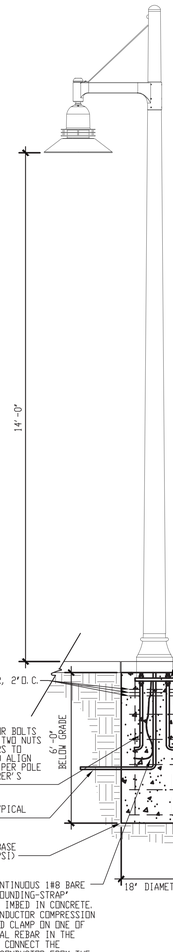
NOTES:

1. SEE LANDSCAPE DRAWINGS DETAIL L-2.04 FOR ADDITIONAL INFORMATION.

NIC

PARKING POLE BASE DETAIL

SCALE: NTS | 2



NOTES:

1. SEE LANDSCAPE DRAWINGS DETAIL L-2.04 FOR ADDITIONAL INFORMATION.

PEDESTRIAN POLE BASE DETAIL

SCALE: NTS | 1

UNDERGROUND SERVICE ALERT
CALL: 811
TWO WORKING DAYS BEFORE YOU DIG

NO.	DATE	REVISIONS	APP.	DATE

PLANS PREPARED BY:
FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 • 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 535.012

REGISTERED PROFESSIONAL ENGINEER — ROBERT N. FARRELL — No. E 16372 — Exp. 09-30-20 — ELECTRICAL — STATE OF CALIFORNIA

PLANS APPROVED BY:
THE CITY OF LAKE FOREST
25550 Commercentre Drive
Suite 100
Lake Forest, CA 92630

CITY OF LAKE FOREST — DECEMBER 20, 1991

THOMAS E. WHEELER, P.E., DIRECTER OF PUBLIC WORKS, CITY ENGINEER

PORTOLA CENTER PARK
28040 GLENN RANCH ROAD
POLE BASE DETAILS

THE CITY OF LAKE FOREST
Public Works Department

E-3.01
PROJECT NO. PW 2017-16
SHEET 45
OF 45

Addendum No. 1

To: All Perspective Bidders
Subject: Addendum to the Request for Bid for Portola Center Park Lighting (PW 2017-16A) – QUESTIONS AND ANSWERS

Bid Due Date: September 13th, 2022
Today's Date: September 8th, 2022

NOTICE TO ALL PROSPECTIVE BIDDERS

You are hereby notified of the following changes and/or additions to the Request for Bid for the above referenced project. Such changes and/or additions are hereby made a part of the Request for Bid and shall take precedence over anything to the contrary therein.

REVISIONS

The following revisions are being made to the project plans and specifications.

BID BOND FORM

Bid Bond form is updated from 2019 to 2022 in two locations. Replace the form in the specifications with the updated attached form.

RESPONSE TO QUESTIONS

	Question	Answer
1	Is there a Plan for bid alternate # 3 Soccer field lighting?	Athletic field lighting is not in contract (NIC) and is excluded from the scope of work. Hence, bid alternate #3 is eliminated.
2	Please confirm key notes 5,6,7on sheet 43 are not applicable	Pickle ball court and volleyball court lighting are now included in the base bid line item #3. Soccer field lighting is eliminated from the scope of work (NIC).
3	Key note 3 sheet 44 calls for a new 11x17 electrical box, please confirm if this is existing	Electrical boxes existing.
4	key note 4 sheet 44 calls for conduit to portable restroom, please confirm if this is existing	Conduits existing. Not in contract.

5	key note 9 sheet 44 calls for a weather proof power outlet in closure, please confirm if this outlet is existing, are there existing conduits for this item?	Weatherproof power outlet and conduits existing. Not in contract.
6	Will you be updating the bid bond form as it is dated 2019 and is a legal doc that should have the correct date. We need time to get it submitted and returned so it can be a part of the bid package.	Use updated bid bond form attached.
7	Please confirm light fixtures # 1, 5, 6, 7 & 8 are existing and not part of the scope of work	Only light fixtures that are within the defined project area for bid item 2 and bid items 3 and 4 are in the scope of work. Other light fixtures are not in contract.
8	Based on the drawings, it looks like there is an esthetic the city prefers for the fixture type. Can they provide a make and model number for the type of fixtures for both pedestrian pathways and pickleball locations	Refer to Light Fixture Schedule on sheet E-1.02
9	801-6 Asks for irrigation system tools and controls as well as turf replacement, we just want to confirm that was for contract example purposes only.	Contractor responsible for repair of damaged landscape/irrigation to prior to start of construction conditions.

Attachment 1- Updated Bid Bond Form

[END OF ADDENDUM NO.1]

SECTION 00410
BID BOND

The makers of this bond are _____, as Principal, and _____, as Surety and are held and firmly bound unto the City of Lake Forest, hereinafter called City, in the penal sum of TEN PERCENT (10%) OF THE TOTAL BID PRICE of the Principal submitted to City for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted the accompanying bid dated _____, 2022 for the **Portola Center Park Lighting (PW 2017-16A)**.

If the Principal does not withdraw its bid within the time specified in the Contract Documents; and if the Principal is awarded the Contract and provides all documents to City as required by the Contract Documents; then this obligation shall be null and void. Otherwise, this bond will remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents shall in affect its obligation under this bond, and Surety does hereby waive notice of any such changes.

In the event a lawsuit is brought upon this bond by City and judgment is recovered, the Surety shall pay all litigation expenses incurred by City in such suit, including reasonable attorneys' fees, court costs, expert witness fees and expenses.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____ day of _____, 2022, the name and corporate seal of each corporation.

(Corporate Seal)_____

Contractor/ Principal

By

Title

(Corporate Seal)_____

Surety

By

Attorney-in-Fact

(Attach Attorney-in-Fact Certificate) Title_____

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20___, before me, _____, Notary Public, personally
Date — Name And Title Of Officer (e.g. "Jane Doe, Notary Public")
appeared _____, who proved to me on the basis of satisfactory
Name(s) of Signer(s)
evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Place Notary Seal Above

_____
Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

Individual
Corporate Officer

_____
Title(s)

Partner(s) Limited / General
Attorney-In-Fact
Trustee(s)
Guardian/Conservator
Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

_____

_____

DESCRIPTION OF ATTACHED DOCUMENT

_____
Title or Type of Document

_____
Number of Pages

_____
Date of Document

_____
Signer(s) Other Than Named Above

Addendum No. 2

To: All Perspective Bidders
Subject: Addendum to the Request for Bid for Portola Center Park Lighting (PW 2017-16A) – REVISIONS & BID OPENING POSTPONED TO SEPTEMBER 15th at 4 pm

Bid Due Date and Time: September 13th, 2022 at 2pm – REVISED PER THIS ADDENDUM to September 15th, 2022 at 4 pm
Today's Date: September 12th, 2022

NOTICE TO ALL PROSPECTIVE BIDDERS

You are hereby notified of the following changes and/or additions to the Request for Bid for the above referenced project. Such changes and/or additions are hereby made a part of the Request for Bid and shall take precedence over anything to the contrary therein.

DESCRIPTION

1. The bid opening shall be postponed to September 15th, 2022 at 4:00pm.

REVISIONS

The following revisions are being made to the project specifications.

Section12. BID GUARANTEE (BOND)

On Page 6 of specifications replace the following text:
~~The Bid Security must be submitted directly to the City Clerk at City Hall, 25550 Commercentre Drive, Suite 100, Lake Forest, CA 92630, in an envelope clearly labeled with the Project Name/Number and Bidder's Name and Address.~~

With:
The Bid Security must be submitted directly to the City Clerk at City Hall, 100 Civic Drive, Lake Forest, CA 92630, in an envelope clearly labeled with the Project Name/Number and Bidder's Name and Address.

Section 14. DELIVERY AND OPENING OF BIDS

On Page 6 of specifications replace the following text:
~~The City Clerk's office is located at: 25550 Commercentre Drive, Suite 100, Lake Forest, CA 92630.~~

With:
The City Clerk's office is located at: 100 Civic Drive, Lake Forest, CA 92630.