

CITY OF RIALTO, CALIFORNIA

PUBLIC WORKS DEPARTMENT

NOTICE TO BIDDERS, PROPOSAL, CONTRACT,
AND

SPECIAL PROVISIONS

FOR CONSTRUCTION OF THE:

**FRISBIE PARK SEWER LIFT STATION
REQUEST FOR BID NO. 19-145
CITY PROJECT NO. 190501**

IN THE CITY OF RIALTO

JUNE 2019



Robert G. Eisenbeisz, P.E.
Public Works Director/City Engineer

Bids Open: July 11, 2019
Dated: May 2019

CITY PROJECT NO. 190501

The Special Provisions contained herein have been prepared by, or under the direct supervision of, the following Registered Civil Engineer, and are approved by:

Robert G. Eisenbeisz, P.E.
Public Works Director/City Engineer
RCE 54931

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CITY OF RIALTO

PUBLIC WORKS DEPARTMENT

**PART I - BIDDING AND CONTRACTUAL
DOCUMENTS AND FORMS**

**FRISBIE PARK SEWER LIFT STATION
CITY PROJECT NO. 190501**

Notice Inviting Bids
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- Agreement Form
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- Performance Bond
- Payment Bond

CITY OF RIALTO NOTICE INVITING BIDS

FRISBIE PARK SEWER LIFT STATION CITY PROJECT NO. 190501 REQUEST FOR BID NO. 19-145

N-1 NOTICE IS HEREBY GIVEN that sealed bids for **Frisbie Park Sewer Lift Station Project, City Project No. 190501** will be received by the City Clerk of the City of Rialto, California, until **3:00 P.M. on July 11, 2019**, at which time they will be opened and read aloud. The Engineer's estimate range is \$1,400,000 to \$1,700,000.

N-2 DESCRIPTION OF THE WORK: The Work comprises the furnishing of all materials, equipment, tools, labor, and incidentals as required by the Plans, Specifications, and Contract include traffic control, implementation and maintenance of Best Management Practices, for the Frisbie Park Sewer Lift Station.

The work shall be diligently prosecuted to completion before the expiration of: **90 working days**.

N-3 AWARD OF CONTRACT:

(a) The City reserves the right after opening bids to reject any or all bids, to waive any informality (non-responsiveness) in a bid, or to make award to the lowest responsive, responsible bidder, and reject all other bids, as it may best serve the interest of the City. If there are multiple and/or alternative Bid Schedules, Bidders are required to bid on all Bid Schedules.

(b) As a condition of award, the successful bidder will be required to submit payment and performance bonds and insurance.

N-4 BID SECURITY: Each bid shall be accompanied by a certified or cashier's check or Bid Bond in the amount of 10 percent of the total bid price payable to the City of Rialto.

N-5 BIDS TO REMAIN OPEN: The Bidder shall guarantee the Total Bid Price for a period of 90 calendar days from the date of bid opening.

N-6 CONTRACTOR'S LICENSE CLASSIFICATION: The Contractor shall possess a valid Class **A** Contractor license at the time of submitting bids.

N-7 CALIFORNIA WAGE RATE REQUIREMENTS: Pursuant to Division 2, Part 7, Chapter 1 of the Labor Code of the State of California (including sections 1771 and 1773.2), the City has obtained from the Department of Industrial Relations of the State of California the general prevailing rate of per diem wages, and the general prevailing rate of holiday and overtime work in the locality in which the public work is to be performed for each craft, classification or type of workers needed to perform the Work, and they are on file in the office of the Public Works Director located at 335 W. Rialto Ave., Rialto, CA 92376. The Contractor to whom the Contract is awarded, and its subcontractors, shall pay to all workers in the performance of the Work not less than the prevailing rate of wages needed to execute the contract. Copies of schedules of prevailing wage rates may be obtained on the California Department of Industrial Relations website at www.dir.ca.gov/dlsr/DPreWageDetermination.htm.

N-8 RETAINAGE FROM PAYMENTS: The Contractor may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention of any portion of the payment by the City, by depositing securities of equivalent value with the City in accordance with the provisions of Section 22300 of the Public Contract Code.

N-9 PRE-BID MEETING: Bidders are advised to attend a **pre-bid meeting** to acquaint Bidders with the contract requirements and existing site conditions that may affect the work. The pre-bid meeting will be held on **Wednesday, June 26, 2019 at 2:00 P.M. local time**. The pre-bid meeting will be held at 335 W. Rialto Palm Avenue, Rialto, CA.

N-10 APPRENTICESHIP PROGRAM: Attention is directed to §§ 1777.5, 1777.6 and 1777.7 of the California Labor Code and Title 8, California Administrative code, Section 200 et seq. to ensure compliance and complete understanding of the law regarding apprentices.

N-11 DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) COMPLIANCE: This project is a public work and is subject to compliance monitoring and enforcement by the Department of Industrial Relations (DIR). In bidding on this work, 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.

N-12 REGISTRATION WITH THE DEPARTMENT OF INDUSTRIAL RELATIONS: Pursuant to Labor Code sections 1725.5, 1771.1, and SB 854, Public Works Contractor Registration Program, all contractors and subcontractors who bid or work on Public Works projects must be registered with, and pay an annual fee to, the State Department of Industrial Relations (DIR), subject to the limited exceptions set forth in Labor Code Section 1771.1(a) (regarding the submission of a bid as authorized by Business & Professions Code Section 7029.1 or Public Contract Code Section 10164 or 20103.5), provided that contractors and subcontractors subject to such exceptions shall be registered with the DIR at the time the contract is awarded. No bid will be accepted, except as provided above, 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 subcontractor, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the Project.

N-13 OBTAINING OR INSPECTING CONTRACT DOCUMENTS:

(a) Contract Documents may be inspected without charge at the City of Rialto Public Works Department, 335 W. Rialto Ave., Rialto, CA 92376.

(b) A digital copy of said Contract Documents (saved in PDF format) are available free of charge by clicking the Bid Opportunities portal at the following **PlanetBids.com website**:

<https://www.planetbids.com/portal/portal.cfm?CompanyID=28159>

(c) Obtaining Bid Documents and registration as a Bidder: If you are interested in submitting a bid, Bidders shall register directly at the Planetbids.com website. **Bidders must be registered with the Planetbids.com website to submit a Bid**; failure to register shall be cause to find a Bid non-responsive.

(d) Bidders shall obtain any Bid Documents from the City of Rialto via the Planetbids.com website. **The Bid Forms in the Bid Documents shall be used to submit a bid.**

- (e) All questions about the meaning or intent of the Bid Documents are to be directed to the City Engineer. Questions shall be submitted electronically via the **Q&A tab** of the Project found at the **Planetbids.com website** under the Bid Opportunities portal. Questions must be submitted electronically at least 5 working days prior to bid opening. Questions submitted within 3 working days of bid opening may not be accepted.

N-14 ADDRESS AND MARKING OF BIDS: The envelope enclosing the Bid shall be sealed and addressed to the City of Rialto, and shall be delivered or mailed to the **City Clerk, City of Rialto, 290 W. Rialto Ave., Rialto, CA 92376**. The envelope shall be plainly marked in the upper left hand corner with the name and address of the Bidder and shall bear the words "Bid For.." followed by the title of the Project and the date and hour of opening Bids. The certified or cashier's check or Bid Bond shall be enclosed in the same envelope with the Bid.

By _____ Date _____
Robert G. Eisenbeisz, P.E.
Public Works Director/City Engineer
City of Rialto

CITY OF RIALTO INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS - Terms used in these Instructions to Bidders and the Notice Inviting Bids and not defined herein shall have the meanings assigned to them in the General and Special Provisions. The term "Bidder" shall mean one who submits a Bid directly to the City, as distinct from a sub-bidder, who submits a Bid to a Bidder. The term "Engineer" shall be as defined in the Special Provisions.

2. COMPETENCY OF BIDDERS - In selecting the lowest responsive, responsible Bidder, consideration will be given not only to the financial standing of the Bidder, but also to the general competency of the Bidder for the performance of the Work covered by the Bid. To this end, each Bid shall be supported by a statement of the Bidder's experience as of recent date on the form entitled "Bidder's General Information," included in these Special Provisions. Except as otherwise provided under Public Contract Code §20103.5, no Bid for the Work will be accepted from a contractor who does not hold a valid contractor's license in the State of California for the classifications named in the Notice Inviting Bids at the time of award.

3. DISQUALIFICATION OF BIDDERS - More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the City believes that any Bidder is interested in more than one Bid for the Work contemplated, all Bids in which such Bidder is interested will be rejected. If the City believes that collusion exists among the Bidders, all Bids will be rejected.

4. BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND THE SITE –

(a) It is the responsibility of each Bidder before submitting a Bid to examine the Contract Documents thoroughly; visit the site to become familiar with local conditions that may affect cost, progress, or performance of the Work; consider federal, state, and local laws and regulations that may affect cost, progress, or performance of the Work; study and carefully correlate the Bidder's observations with the Contract Documents; and notify the Engineer of all conflicts, errors, or discrepancies noted in the Contract Documents.

(b) Reference is made to the Special Provisions for identification of those reports of explorations and tests of subsurface conditions at the site which may have been utilized by the Engineer in the preparation of the Contract Documents. However, such reports are NOT a part of the Contract Documents. The interpretation of such technical data, including any interpolation or extrapolation thereof, together with non-technical data, interpretations, and opinions contained therein or the completeness thereof is the responsibility of the Bidder.

(c) Copies of such reports and drawings will be made available for inspection by the City to any Bidder upon request. Those reports and drawings are NOT part of the Contract Documents, but any technical data contained therein upon which the Bidder is entitled to rely is limited to that set forth in the Special Provisions.

(d) Subject to the provisions of Section 4215 of the California Government Code, information and data reflected in the Contract Documents with respect to underground utilities at or contiguous to the site is based upon information and data furnished to the City and the Engineer by the owners of such underground utilities or others, and the City does

not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Special Provisions.

(e) Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, underground utilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in the Standard Specifications and Special Provisions.

(f) Before submitting a Bid, each Bidder must, at Bidder's own expense, make or obtain any additional examinations and investigations which pertain to the physical conditions (surface, subsurface, and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the Work and which the Bidder deems necessary to determine its Bid for performing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

(g) Where feasible, upon request in advance, the City will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deems necessary for submittal of a Bid. The Bidder shall fill all exploration and test holes made by the Bidder and shall repair damage, clean up, and restore the site to its former condition upon completion of such exploration.

(h) The lands upon which the Work is to be performed, the rights-of-way and easements for access thereto, and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the Contractor. Easement for permanent structures or permanent changes in existing structures will be obtained and paid for by the City unless otherwise provided in the Contract Documents.

(i) The submittal of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Article; that without exception the Bid is premised upon performing the Work required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents; and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all the terms and conditions for performance of the Work.

5. INTERPRETATIONS - All questions about the meaning or intent of the Contract Documents are to be directed to the Engineer. Interpretations or clarifications considered necessary by the Engineer in response to such questions will be resolved by the issuance of Addenda mailed or delivered to all parties recorded by the Engineer or the City as having received the Contract Documents. Questions received less than 3 working days prior to the date of opening Bids may not be answered. Only questions that have been resolved by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal or contractual effect.

6. BID SECURITY, BONDS, AND INSURANCE - Each Bid shall be accompanied by a certified or cashier's check or approved Bid Bond in the amount stated in the Notice Inviting Bids. Said check or bond shall be made payable to the City and shall be given as a guarantee that the Bidder, if awarded the Work, will enter into an Agreement with the City

and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond. Each of said bonds and insurance certificates shall be in the amounts stated in the Standard Specifications or Special Provisions. In case of refusal or failure of the successful Bidder to enter into said Agreement, the check or Bid Bond, as the case may be, shall be forfeited to the City. If the Bidder elects to furnish a Bid Bond as its security, the Bidder shall use the Bid Bond form included within these Special Provisions, or one conforming substantially to it in form.

7. RETURN OF BID SECURITY - Within 14 days after award of the Contract, the City will return all bid securities accompanying such of the Bids that are not considered in making the award. All other Bid securities will be held until the Agreement has been finally executed. They will then be returned to the respective Bidders whose Bids they accompany.

8. BID FORM - The Bid shall be made on the Bid Schedule sheets included with the Bid Documents. Unless otherwise provided in the Notice Inviting Bids, in the event there is more than one Bid Schedule, the Bidder shall Bid on all individual Bid Schedules. All bid items shall be properly filled out. Where so indicated in the Bid Documents, Bid price shall be shown in words and figures, and in the event of any conflict between the words and figures, the words shall govern. The envelope enclosing the sealed bids shall be plainly marked in the upper left-hand corner with the name and address of the Bidder and shall bear the words "**DO NOT OPEN IN REGULAR MAIL—THIS IS A SEALED BID FOR,**" followed by the title of the Contract Documents for the Work, the name of the "**CITY OF RIALTO,**" the address where the bids are to be delivered or mailed to, and the date and hour of opening of bids. The Bid Security shall be enclosed in the same envelope with the Bid.

9. SUBMITTAL OF BIDS - The Bids shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the Bidder's sole responsibility to see that its Bid is received in proper time. Bids will not be accepted after the appointed time for opening of bids, no matter what the reason.

10. DISCREPANCIES IN BIDS - In the event that there is more than one Bid Item in the Bid Schedule, the Bidder shall furnish a price for all Bid Items in the schedule, and failure to do so will render the Bid as non-responsive and may cause its rejection. In the event that there are unit price Bid Items in a Bid Schedule and the "amount" indicated for a unit price Bid Item does not equal the product of the unit price and quantity listed, the unit price shall govern and the amount will be corrected accordingly, and the Contractor shall be bound by such correction, subject to the provisions of Section 5100 et seq. of the California Public Contract Code. In the event that there is more than one Bid Item in a Bid Schedule and the total indicated for the schedule does not agree with the sum of prices Bid on the individual items, the prices bid on the individual items shall govern and the total for the schedule will be corrected accordingly, and the Contractor shall be bound by said correction, subject to the provisions of Section 5100 et seq. of the California Public Contract Code.

11. QUANTITIES OF WORK –

(a) The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the Work; the City does not expressly or by implication agree that the actual amount of work or material will correspond therewith.

(b) In the event of an increase or decrease in a bid item quantity of a unit price contract, the total amount of work actually done or materials or equipment furnished shall be paid for according to the unit prices established for such work under the Contract Documents; provided, that on unit price contracts, increases of more than 25 percent, decreases of more than 25 percent, and eliminated items shall be adjusted as provided in Section 3 of the Standard Specifications and Special Provisions.

12. WITHDRAWAL OF BID - The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids prior to the scheduled closing time for receipt of Bids.

13. MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS - Unauthorized conditions, limitations, or provisos attached to the Bid will render it informal and may cause its rejection as being non-responsive. The completed Bid forms shall be without interlineation, alterations, or erasures. Alternative Bids will not be considered unless expressly called for in the Notice Inviting Bids. Oral, FAX, telegraphic, or telephone Bids or modifications will not be considered.

14. LIQUIDATED DAMAGES - Provisions for liquidated damages, if any, shall be as set forth in the Agreement and the provisions of the Special Provisions.

15. SUBSTITUTE OR "OR-EQUAL" ITEMS - The procedure for submittal of any application for a substitute or "or-equal" item by the Contractor and consideration by the Engineer is set forth in Section 4 of the Standard Specifications and Special Provisions.

16. AWARD OF CONTRACT - Award of Contract, if it is awarded, will be based primarily on the lowest overall cost to the City, and will be made to a responsive, responsible Bidder whose Bid complies with all the requirements prescribed. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the Bids are to remain open, unless extended by mutual agreement of the bidders. Unless otherwise indicated, a single award will not be made for less than all the Bid Items of an individual Bid Schedule. In the event the Work is contained in more than one Bid Schedule, the City may award schedules individually or in combination. In the case of 2 or more Bid Schedules which are alternative to each other, only one of such alternative schedules may be awarded.

17. EXECUTION OF AGREEMENT - The Bidder to whom award is made shall execute a written Agreement with the City on the form of agreement provided, shall secure all insurance, and shall furnish all certificates and bonds required by the Contract Documents **within 7 calendar days after receipt of the Agreement forms from the City**. Failure or refusal to enter into an Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for an annulment of the award and forfeiture of the Bid Security. If the lowest responsive, responsible bidder refuses or fails to execute the Agreement, the City may award the Contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the City may award the Contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third

lowest Bidder to execute the Agreement, each such bidder's Bid Securities shall be likewise forfeited to the City.

18. WORKER'S COMPENSATION REQUIREMENT - The Bidder should be aware that in accordance with laws of the State of California, the Bidder will, if awarded the Contract, be required to secure the payment of compensation to its employees and execute the Worker's Compensation Certification.

19. GUARANTEE

The Contractor shall guarantee the Work against defective material or workmanship for a period of one (1) year from the date of completion of the contract. Damages due to acts of God or from sabotage and/or vandalism are specifically exempted from the guarantee.

When defective material and/or workmanship are discovered which require repairs to be made under this guarantee, all such work shall be done by the Contractor at his own expense within five (5) days after written notice of such defects has been given to him by the City. Should the Contractor fail to repair such defective material or workmanship within five (5) days thereafter, the City of Rialto may cause the necessary repairs to be made and charge the Contractor with the actual cost of all labor and material required. Any repair work performed as herein specified shall be done under the provisions of the original contract specifications.

The Contractor shall arrange to have his faithful performance bond guaranteed for twenty-five percent (25%) of the total bid price to be held for a period of one (1) year after the date of completion of the contract and acceptance by the City Council to cover his guarantee as set forth herein.

20. DIVERSITY BUSINESS STATEMENT

The City of Rialto encourages the maximum participation on this contract by small businesses, Veteran-Owned Small Businesses (VOSB), Service-Disabled Veteran-Owned Small Businesses (SDVOSBC), HUB Zone Small Businesses, Small Disadvantaged Businesses (SDB/DBE), and Women-Owned Small Businesses (WOSB). It is the policy of the City of Rialto, to conduct business with these businesses whenever possible to the maximum extent that is feasible.

The City of Rialto shall, within the limits of State statutes and regulations, pursue the award of a fair share of all contracts with minority businesses and shall encourage and assist minority businesses in the methods of conducting business with the City of Rialto. The Contractor shall, to the greatest extent possible, solicit work from subcontractors and purchase materials from vendors for the Work of this contract to further the City's policy of ensuring maximum participation from diverse businesses identified herein.

21. CONTRACTOR REGISTRATION REQUIREMENTS

Bid Proposal and Contract Award Prohibited. Under California Labor Code Section 1771.1, as amended by Senate Bill (SB) 854 (2014), unless registered with the State of California Department of Industrial Relations (DIR), a contractor may not bid, nor be listed as a subcontractor, for any bid proposal submitted for public works projects on or after

March 1, 2015. Similarly, a public entity cannot award a public works contract to a non-registered contractor, effective April 1, 2015.

Contract and Project Reporting Requirements Imposed Upon Public Entities. SB 854 requires that bid invitations and public works contracts specify that a project is subject to compliance monitoring and enforcement by the DIR, that contractors and subcontractors must register in order to submit a bid and be awarded a contract.

The City of Rialto may only award public works projects to contractors and subcontractors that comply with the new Public Works Contractor Registration Law (SB 854). More information is available at the following links:

<http://www.dir.ca.gov/Public-Works/PublicWorks.html>

<http://www.dir.ca.gov/Public-Works/PublicWorksSB854.html>

Contractors doing public works must register and meet requirements using the online application before bidding on public works contracts in California. The application also provides agencies that administer public works programs with a searchable database of qualified contractors.

A bid submitted by a Contractor who is not appropriately registered with the state of California will be found non-responsive.

- END OF INSTRUCTIONS TO BIDDERS -

BID DOCUMENTS

Only the following listed documents, identified in the lower right corner as "Bid Forms" shall be fully executed and submitted with the Bid at the time of opening of Bids.

Bid (Proposal)

Bid Schedules

List of Subcontractors

Non-collusion Declaration

Non-Discrimination Certification

Bid Bond (Bid Security Form)

Bidder's General Information

Disclosure Statement - Required by persons or entities contracting with the City

Failure of a Bidder to fully execute and submit all of the listed documents with the Bid will render a Bid as non-responsive and subject to rejection.

BID PROPOSAL

BID TO: CITY OF RIALTO, CALIFORNIA

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the City in the form included in the Contract Documents (as defined in Article 4 of the Agreement) to perform the Work as specified or indicated in said Contract Documents entitled:

FRISBIE PARK SEWER LIFT STATION REQUEST FOR BID NO. 19-145 CITY PROJECT NO. 190501

Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the Notice Inviting Bids and the Instructions to Bidders dealing with the disposition of the Bid Security.

This Bid will remain open for the period stated in the Notice Inviting Bids, unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the Instructions to Bidders, and will furnish the insurance certificates, Payment Bond, Performance Bond, and all Permits required by the Contract Documents.

Bidder has examined copies of all the Contract Documents, including the following Addenda (receipt of which is hereby acknowledged):

Number _____	Date _____
Number _____	Date _____
Number _____	Date _____
Number _____	Date _____
Number _____	Date _____
Number _____	Date _____
Number _____	Date _____

Bidder has familiarized itself with the nature and extent of the Contract Documents, the Work, the site, the locality where the Work is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress, or performance of the Work, and has made such independent investigations as Bidder deems necessary.

In conformance with the current statutory requirements of California Labor Code Section 1860, et seq., the undersigned confirms the following as its certification:

I am aware of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for worker's compensation, or to undertake self-insurance in accordance with the provisions, before commencing the performance of the Work of this Contract.

To all the foregoing, and including all Bid Schedule(s), List of Subcontractors, Non-collusion Affidavit, Bidder's General Information, and Bid Bond contained in these Bid Forms, said Bidder further agrees to complete the Work required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefor the Contract Price based on the Lump Sum or Unit Bid Price(s) named in the aforementioned Bidding Schedule(s).

SPECIAL ACKNOWLEDGEMENT: The Lump Sum Price(s) identified in the Bid Schedule(s) identifies and commits the Bidder to a "Firm Fixed Price" cost, and all other incidental or additional costs required to complete the work as identified in the technical specification requirements. The Lump Sum Price(s) are inclusive of all other costs, including all materials, supplies, labor, vehicles, equipment and ancillary costs required to complete the work.

Dated: _____

Bidder: _____

By: _____
(Signature)

Title: _____

BID SCHEDULE
Schedule of Prices for Construction of:
FRISBIE PARK SEWER LIFT STATION
REQUEST FOR BID NO. 19-145
CITY PROJECT NO. 190501
In Rialto, California

The scope of work of the Bid Schedule includes all work identified in the Construction Plans and Specifications for this project.

Item	Spec	Description	Estimated Quantity	Unit	Unit Cost	Total
1	017113	Mobilization	1	LS		
2	015526	Traffic Control	1	LS		
3	312500	Erosion Control	1	LS		
4	312326	Imported Fill	460	CY		
5	323119	8' High Tubular Steel Fence	136	LF		
6	323119	8' High 10' Wide Tubular Steel Fence Swing Gate	1	EA		
7	330514	Masonry Pilaster	2	EA		
8	033000	Pedestrian Ramp	1	EA		
9	033000	Concrete Driveway	110	SF		
10	033000	Concrete Sidewalk	312	SF		
11	033000	Curb and Gutter	190	LF		
12	033000	Concrete Cross Gutter	280	SF		
13	312316	Lift Station Yard 3/4" Crushed Rock	11	CY		
14	312316	Facing Class Riprap	20	CY		
15	221423	Equipment: Duplex Submersible Package Lift Station Equipment (Q=150 gpm, 100' TDH)	1	EA		
16	221423	Duplex Submersible Package Lift Station Installation	1	LS		
17	221423	Equipment: Valve Vault	1	EA		
18	221423	Valve Vault Installation	1	LS		
19	221423	Equipment: Lift Station Control Panel	1	EA		
20	221423	Lift Station Control Panel Installation	1	LS		
21	321216	HMA (Hot Mix Asphalt)	14	Ton		
22	321216	Crushed Aggregate Base	10	CY		
23	321216	Slurry Seal	42,600	SF		
24	321216	Pavement Markings	1	LS		
25	330514	4' Sewer Manhole	9	EA		
26	330514	Force Main Discharge Manhole	1	EA		
27	330514	8' Diameter Emergency Storage Vault	1	LS		
28	330514	Shade Structure	1	LS		
29	330514	Concrete Grade Rings	1	LS		
30	334100	Misc Piping, Spools, and Fittings	1	LS		

Item	Spec	Description	Estimated Quantity	Unit	Unit Cost	Total
31	334100	4" C-900 PVC DR-14 Force Main	1,310	LF		
32	334100	8" VCP	1,801	LF		
33	334100	4" Eccentric Plug Valve	2	EA		
34	334100	Force Main Cleanout	9	EA		
35	334100	4" Sewer Lateral	200	LF		
36	334100	1" Service and Hose Bib	1	EA		
37	334100	1" Combination Sewage Air Release and Vacuum Valve	1	EA		
38	024113	Remove Septic Tanks (2) and Abandon Leach Field	1	LS		
39	024113	Landscaping Restoration	1	LS		
40	262116	Electrical Service Entrance Section	1	EA		
41	263213	Generator	1	EA		
42	262416	Distribution Panelboard	2	EA		
43	263213	ATS Cabinet	1	EA		
44	265600	Site Light	1	EA		
45	260519	Underground Street Light Electrical Service	1	EA		
46	262200	Mini Power Zone Transformer	1	EA		
47	260519	4-PR #16 AWG Conductors	100	EA		
48	260519	#8 AWG Conductors	300	LF		
49	260519	#12 AWG Conductors	100	LF		
50	260519	#3/0 AWG Conductors	800	LF		
51	260533	2" Sched 40 PVC Electrical Conduit	600	LF		
52	260533	2" RGS Conduit	20	LF		
53	262116	SCE Electrical Service	1	LS		

TOTAL OF ALL ITEMS OF THE BID SCHEDULE:

\$ _____
(Price in figures)

(Price in words)

QUANTITIES OF WORK:

The quantities of work or material stated in the unit price items of the Bid Schedule are supplied only to give an indication of the general scope of the Work. The City does not expressly nor by implication agree that the actual amounts of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price bid item, by an amount up to 25 percent of increase or decrease, without a change in the unit prices, and shall have the right to delete any bid item in its entirety, and receive full credit in the amount shown in the Bid Schedule for the deleted item of Work.

Name of Bidder or Firm

INFORMATION REQUIRED OF BIDDER

LIST OF SUBCONTRACTORS

As required under Section 4100, et seq., of the Public Contract Code, the Bidder shall list below the name, business address, California contractor license number, and public works contractor registration number (DIR number) of each subcontractor who will perform Work under this Bid in an amount in excess of one-half of one percent of the prime contractor's total bid Price, or \$10,000.00, whichever is greater, and shall also list the portion of the Work which will be done by such subcontractor. After the opening of Bids, no changes or substitutions will be allowed except as otherwise provided by law. The listing of more than one subcontractor for each item of Work to be performed with the words "and/or" will not be permitted. Failure to comply with this requirement will render the Bid as non-responsive and may cause its rejection. Use additional pages if necessary.

Special Note: The Prime Contractor shall perform not less than 50% of the Work identified in this Bid. In the event a Bidder lists subcontractors who will perform Work under this Bid in excess of 50% of the Work identified in this Bid, the Bid shall be considered non-responsive.

Bidders shall list the total % of Work to be performed by the Prime Contractor here: _____
(Shall not be less than 50%)

Work to be Performed	Subcontractor's CSLB License No. and DIR No.	Percent of Total Contract	Subcontractor's Name and Address
1			
2			
3			
4			
5			
6			

**NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER
AND SUBMITTED WITH BID**

The undersigned declares:

I am the _____ of _____, the
(Title of Officer) (Firm/Company)
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
_____, at _____,
(Date) (City) (State)

Signature

CERTIFICATION OF NON-DISCRIMINATION BY CONTRACTORS

As suppliers of goods or services to the City of Rialto, the firm listed below certifies that it does not discriminate in its employment with regard to age/handicap, race, color, religion, sex, or national origin; that it is in compliance with all federal, state, and local directives and executive orders regarding non-discrimination in employment; and that it agrees to demonstrate positively and aggressively the principle of equal employment opportunity in employment.

We agree specifically:

1. To establish or observe employment policies, which affirmatively promote opportunities for minority persons at all job levels.
2. To communicate this policy to all persons concerned, including all company employees, outside recruiting services, especially those serving minority communities, and to the minority communities at large.
3. To take affirmative steps to hire minority employees within the company.

FIRM _____

NAME OF PERSON SIGNING _____

TITLE OF PERSON SIGNING _____

DATE _____

Please include any additional information available regarding equal opportunity employment programs now in effect within your company.

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Principal, and

_____ as Surety,
are held and firmly bound unto the City of Rialto, California, hereinafter called the "City" in the sum of:

_____ dollars
(not less than 10 percent of the total amount of the bid)

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.

WHEREAS, said Principal has submitted a Bid to said City to perform the Work required under the Bid Schedule(s) of the City's Contract Documents entitled:

**FRISBIE PARK SEWER LIFT STATION
CITY PROJECT NO. 190501**

NOW THEREFORE, if said Principal is awarded a Contract by said City, and within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders" enters into a written Agreement on the Form of Agreement included with said Contract Documents, furnishes the required Certificates of Insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this Bond by said City, and City prevails, said Surety shall pay all costs incurred by said City in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this _____ day of _____, 20____.

EXECUTED FOR THE PRINCIPAL:

By

Signature
(NOTARIZED)

Print Name and Title:

By

Signature
(NOTARIZED)

Print Name and Title:

EXECUTED FOR THE SURETY:

By

Signature
(NOTARIZED)

Print Name and Title:

BIDDER'S GENERAL INFORMATION

The Bidder shall furnish the following information. Failure to complete all Items will cause the Bid to be non-responsive and may cause its rejection.

1. BIDDER/CONTRACTOR'S Name and Street Address:

Telephone Number: () _____

Facsimile Number: () _____

E-Mail: _____

Tax Identification Number: _____

DIR Registration Number: _____

2. TYPE OF FIRM

_____ Individual _____ Partnership _____ Corporation (State _____)

_____ Minority Business Enterprise (MBE)

_____ Women Business Enterprise (WBE)

_____ Small Disadvantaged Business (SDB)

_____ Veteran Owned Business

_____ Disabled Veteran Owned Business

- 3a. CONTRACTOR'S LICENSE: Primary Classification _____

State License Number(s) _____

Supplemental License Classifications _____

- 3b. Contractor's Department of Industrial Relations (DIR) #

4. BUSINESS LICENSE: _____ Yes _____ No License No.: _____

5. Surety Company and Agent who will provide the required Bonds:

Name of Surety _____

Address _____

Surety Company _____

Telephone Numbers: Agent () _____ Surety () _____

BIDDER'S GENERAL INFORMATION (Continued)

6. List the names and addresses of the principal members of the firm or names and titles of the principal officers of the corporation or firm:

_____	_____
_____	_____
_____	_____

7. Number of years experience as a contractor in this specific type of construction work:

8. List at least three related projects completed to date:

a.	Owner _____	Address _____
	Contact _____	Class of Work _____
	Phone _____	Contract Amount _____
	Project _____	Date Completed _____
	Contact Person _____	Telephone number _____
b.	Owner _____	Address _____
	Contact _____	Class of Work _____
	Phone _____	Contract Amount _____
	Project _____	Date Completed _____
	Contact Person _____	Telephone number _____
c.	Owner _____	Address _____
	Contact _____	Class of Work _____
	Phone _____	Contract Amount _____
	Project _____	Date Completed _____
	Contact Person _____	Telephone number _____

9. Name of Project Manager/Superintendent: _____

10. Name(s) of person(s) who inspected job site: _____

**CITY OF RIALTO
DISCLOSURES REQUIRED BY PERSONS OR ENTITIES
CONTRACTING WITH THE CITY OF RIALTO**

Pursuant to Rialto Municipal Code section 2.48.145, all persons or business entities supplying any goods or services to the City of Rialto shall disclose whether such person or entity is related to any officer or employee of the City by blood or marriage within the third degree which would subject such officer or employee to the prohibition of California Government Sections 87100 et. seq., Fair Political Practices Commission Regulation Section 18702, or Government Code Section 1090.

By submitting this proposal, or supplying any goods or services to the City, the undersigned hereby attests under penalty of perjury, personally or on behalf of the entity submitting this proposal or supplying any goods or services to the City, as well the entity's officers, representatives and the undersigned, that it/they have no relationship, as described above, or financial interests, as such term is defined in California Government Section 87100 et. seq., Fair Political Practices Commission Regulation Section 18702, or Government Code Section 1090, with any City of Rialto elected or appointed official or employee, except as specifically disclosed immediately below:

Vendor/Contractor/Consultant: _____

City of Rialto Official/ Employee Name(s)	The nature of the relationship with the person listed is:
_____	_____
_____	_____
_____	_____

By: _____

Name: _____

Title: _____

AGREEMENT (CONSTRUCTION CONTRACT)

THIS AGREEMENT made this (Date) day of (Month), (Year), by and between the City of Rialto, a municipal corporation, organized and existing in the County of San Bernardino, under and by virtue of the laws of the State of California, hereinafter designated as the City, and (Vendor Name), a (State) corporation, hereinafter designated as the Contractor.

The City and the Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 -- THE WORK

For and in consideration of the payments and agreements to be made and performed by City, Contractor agrees to furnish all materials and perform all work required to complete the Work as specified in the Contract Documents, and as generally indicated under the Bid Schedule(s) for the Project entitled:

FRISBIE PARK SEWER LIFT STATION CITY PROJECT NO. 190501

The Work includes (Provide a brief summary of the work to be performed). The Work is located at (Address of work location).

ARTICLE 2 -- COMMENCEMENT AND COMPLETION

The Work to be performed under this Contract shall commence on the date specified in the Notice to Proceed by the City, and the Work shall be fully completed within the time specified in the Notice to Proceed.

The City and the Contractor recognize that time is of the essence of this Agreement, and that the City will suffer financial loss if the Work is not completed within the time specified in Article 2, herein, plus any extensions thereof allowed in accordance with applicable provisions of the Standard Specifications, as modified herein. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by the City if the Work is not completed on time. Accordingly, instead of requiring any such proof, the City and the Contractor agree that as liquidated damages or delay (but not as a penalty), the Contractor shall pay the City the sum specified in Section 6-9 of the Special Provisions for each calendar day that expires after the time specified in Article 2, herein. In executing the Agreement, the Contractor acknowledges it has reviewed the provisions of the Standard Specifications, as modified herein, related to liquidated damages, and has made itself aware of the actual loss incurred by the City due to the inability to complete the Work within the time specified in the Notice to Proceed.

ARTICLE 3 -- CONTRACT PRICE

The City shall pay the Contractor for the completion of the Work, in accordance with the Contract Documents, in current funds the Contract Price(s) named in the Contractor's Bid Proposal and Bid Schedule(s), and any duly authorized Construction Contract Change

Orders approved by the City. The amount of the initial contract award in accordance with the Contractor's Bid Proposal is **(Dollar Amount Written Out) (\$XXX.XX)**.

Contractor agrees to receive and accept the prices set forth herein, as full compensation for furnishing all materials, performing all work, and fulfilling all obligations hereunder. Said compensation shall cover all expenses, losses, damages, and consequences arising out of the nature of the Work during its progress or prior to its acceptance including those for well and faithfully completing the Work and the whole thereof in the manner and time specified in the Contract Documents; and, also including those arising from actions of the elements, unforeseen difficulties or obstructions encountered in the prosecution of the Work, suspension or discontinuance of the Work, and all other unknowns or risks of any description connected with the Work.

ARTICLE 4 -- THE CONTRACT DOCUMENTS

The Contract Documents consist of the Notice Inviting Bids, Instructions to Bidders, the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations, the accepted Bid and Bid Schedule(s), List of Subcontractors, Non-Discrimination Certification, Non-Collusion Affidavit, Bidder's General Information, Bid Security or Bid Bond, this Agreement, Worker's Compensation Certificate, Performance Bond, Payment Bond, Standard Specifications, Special Provisions, the Drawings, Addenda numbers [redacted] to [redacted], inclusive, and all Construction Contract Change Orders and Work Change Directives which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto.

ARTICLE 5 -- MUTUAL OBLIGATIONS

For and in consideration of the payments and agreements to be made and performed by the City, the Contractor agrees to furnish all materials and perform all work required for the above stated project, and to fulfill all other obligations as set forth in the aforesaid Contract Documents.

City hereby agrees to employ, and does hereby employ, Contractor to provide the materials, complete the Work, and fulfill the obligations according to the terms and conditions herein contained and referred to, for the Contract Price herein identified, and hereby contracts to pay the same at the time, in the manner, and upon the conditions set forth in the Contract Documents.

Contractor specifically acknowledges and agrees to be bound by the Wage Rates and Labor Code requirements specified in the Contract Documents, and shall pay the general prevailing rate of per diem wages as determined by the Director of the Department of Industrial Relations of the State of California.

ARTICLE 6 -- PAYMENT PROCEDURES

The Contractor shall submit Applications for Payment in accordance with the Standard Specifications as amended by the Special Provisions. Applications for Payment will be processed by the City Engineer as provided in the Contract Documents.

ARTICLE 7 -- NOTICES

Whenever any provision of the Contract Documents requires the giving of a written Notice, it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the Notice.

ARTICLE 8 -- INDEMNIFICATION

The Contractor agrees to indemnify and hold harmless the City, and all of its officers and agents from any claims, demands, or causes of action, including related expenses, attorney's fees, and costs, based on, arising out of, or in any way related to the Work undertaken by the Contractor hereunder.

ARTICLE 9 -- NON-DISCRIMINATION

The Contractor represents and agrees that it does not and will not discriminate against any subcontractor, consultant, employee, or applicant for employment because of race, religion, color, sex, or national origin in any matter including without limitation employment upgrading, demotion, transfers, recruitment, recruitment advertising, layoff, termination, rates of pay, or other forms of compensation and selection for training, including apprenticeship.

ARTICLE 10 -- MISCELLANEOUS

Terms used in this Agreement which are defined in the Standard Specifications and the Special Provisions will have the meanings indicated in said Standard Specifications and the Special Provisions. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

The City and the Contractor each binds itself, its partners, successors, assigns, and legal representatives, to the other party hereto, its partners, successors, assigns, and legal representatives, in respect of all covenants, agreements, and obligations contained in the Contract Documents.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, the City and the Contractor have caused this Agreement to be executed the day and year first above written.

CITY OF RIALTO, CALIFORNIA

CONTRACTOR

By _____
Deborah Robertson
Mayor

(VENDOR NAME)
a **(State)** corporation

ATTEST:

By _____
Signature

By _____
Barbara A. McGee
City Clerk

Name _____

Title _____

(This Agreement must be signed in the above space by one of the following: Chairman of the Board, President or any Vice President).

APPROVED AS TO FORM:

By _____
Signature

By _____
Fred Galante, Esq.
City Attorney

Name _____

Title _____

(This Agreement must be signed in the above space by one of the following: Secretary, Chief Financial Officer or any Assistant Treasurer)

Two signatures are required if a corporation.

WORKER'S COMPENSATION CERTIFICATE

(AS REQUIRED BY SECTION 1861
OF THE CALIFORNIA LABOR CODE)

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

Contractor _____

By _____

Title _____

PERFORMANCE BOND – PUBLIC WORKS

KNOW ALL MEN BY THESE PRESENTS,

WHEREAS, the City of Rialto, a California municipal corporation, organized and existing in the County of San Bernardino, California, as Obligee, (hereinafter referred to as the "City"), has awarded to the undersigned Contractor, (hereinafter referred to as the "Contractor"), an agreement for the work described as follows:

FRISBIE PARK SEWER LIFT STATION CITY PROJECT NO. 190501 REQUEST FOR BID NO. 19-145

(hereinafter referred to as the "Public Work"); and

WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain Agreement (Construction Contract) for the said Public Work awarded to the Contractor and approved by the City for the Project hereinabove named, (hereinafter referred to as the "Contract"), which Contract is incorporated herein by this reference; and

WHEREAS, the Contractor is required by said Contract to perform the terms thereof, and to provide a bond both for the performance and guaranty thereof.

NOW, THEREFORE, we, the undersigned Contractor, as Principal, and:

_____,
a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the City in the sum of _____ Dollars (\$ _____), said sum being not less than 100 percent of the total amount payable by the City under the terms to the said Contract, for which amount 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 the bounden 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 said Contract and any alteration thereof made as therein provided, on his or its parts, 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 the one year guarantee of all materials and workmanship; and indemnify and save harmless the City, its officers and agents, as stipulated in said Contract, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration of addition to the terms of the Contract, or to the Public Work or to the Specifications.

No final settlement between the City and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

**PERFORMANCE BOND – PUBLIC WORKS
(CONTINUED)**

Contractor and Surety agree that if the City is required to engage the services of an attorney in connection with enforcement of the bond, each shall pay City's reasonable attorney's fees incurred, with or without suit, in addition to the above sum.

SIGNED AND SEALED, this ____ day of _____, 20__.

CONTRACTOR: _____

Check one: ____ individual, ____ partnership, ____ corporation

(Corporations require two signatures; *one from each* of the following groups: A. Chairman of Board, President, or any Vice President; *AND* B. Secretary, Assistant Secretary, Treasurer, Assistant Treasurer, or Chief Financial Officer).

CONTRACTOR:

By:

signature
(NOTARIZED)

Print Name and Title:

By:

signature
(NOTARIZED)

Print Name and Title:

SURETY:

By

signature
(NOTARIZED)

Print Name and Title:

By submitting this Performance Bond, the Contractor and Surety acknowledge the provisions of the Contract Documents with regard to Section 6-4 "Default by the Contractor", as further amended by the Special Provisions.

**PERFORMANCE BOND – PUBLIC WORKS
(CONTINUED)**

The rate of premium on this bond is \$_____ per thousand.

The total amount of premium charged: \$_____

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

IMPORTANT: Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in Section 105 of the California Insurance Code, and if the work or project is financed, in whole or in part, with Federal, grant, or loan funds, it must also appear on the Treasury Department's most current list (Circular 570 as amended). **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)

**PERFORMANCE BOND – PUBLIC WORKS
(CONTINUED)**

ALL-PURPOSE ACKNOWLEDGMENT

State of _____

County of _____

On _____ before me, _____,
Date Name, Title of Officer
personally appeared _____,
NAME(S) OF SIGNER(S)

who proved to me on the basis of satisfactory 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 signatures(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 identified herein, that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature of Notary

ATTENTION NOTARY: Although the information requested below is **OPTIONAL**, it could prevent fraudulent attachment of this certificate to unauthorized document.

THIS CERTIFICATE Title or Type of Document _____
MUST BE ATTACHED
TO THE DOCUMENT Number of Pages _____ DATE of DOCUMENT _____
DESCRIBED AT RIGHT:
Signer(s) Other Than Named Above _____

PAYMENT BOND – PUBLIC WORKS

KNOW ALL MEN BY THESE PRESENTS,

WHEREAS, the City of Rialto, a municipal corporation, organized and existing in the County of San Bernardino, California, as Obligee, (hereinafter referred to as the "City"), has awarded to the undersigned Contractor, (hereinafter referred to as the "Contractor"), an agreement for the work described as follows:

FRISBIE PARK SEWER LIFT STATION CITY PROJECT NO. 190501 REQUEST FOR BID NO. 19-145

(hereinafter referred to as the "Public Work"); and

WHEREAS, the work to be performed by the Contractor is more particularly set forth in that certain Agreement (Construction Contract for the said Public Work awarded to the Contractor and approved by the City for the Project hereinabove named, (hereinafter referred to as the "Contract"), which Contract is incorporated herein by this reference; and

WHEREAS, said Contractor is required to furnish a bond in connection with said Contract and pursuant to Section 3247 of the California Civil Code.

NOW, THEREFORE, we, the undersigned Contractor, as Principal, and:

_____, a corporation organized and existing under the laws of the State of _____, and duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the City, and to any and all persons, companies, or corporations entitled to file stop notices under Section 3181 of the California Civil Code, in the sum of _____ Dollars (\$_____), said sum being not less than 100 percent of the total amount payable by the City under the terms to the said Contract, for which amount 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 Contractor, his or its heirs, executors, administrators, successors, or assigns, or Subcontractors, shall fail to pay for any materials, provisions or other supplies, implements, machinery, or power used in, upon, for, or about the performance of the Public Work contracted to be done, or to pay any person for any work or labor of any kind, or for bestowing skills or other necessary services thereon, or for amounts due under the Unemployment Insurance Code with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Contractor and his Subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor as required by the provisions of Section 3247 through 3252 of the Civil Code, the Surety or Sureties hereon will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In addition to the provisions herein above, it is agreed that this bond will insure to the benefit of any and all persons, companies, and corporations entitled to serve stop notices under Section 3181 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

**PAYMENT BOND – PUBLIC WORKS
(CONTINUED)**

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or additions to the terms of the said Contract or to the work to be performed thereunder or the Specifications accompanying the same 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 or to the work or to the Specifications.

No final settlement between the City and the Contractor hereunder shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Contractor and Surety agree that if the City is required to engage the services of an attorney in connection with the enforcement of this bond, each shall pay Obligor's reasonable attorney's fees incurred, with or without suit, in addition to the above sum.

SIGNED AND SEALED, this ____ day of _____, 20__.

CONTRACTOR:

Check one: ____ individual, ____ partnership, ____ corporation

(Corporations require two signatures; *one from each* of the following groups: A. Chairman of Board, President, or any Vice President; *AND* B. Secretary, Assistant Secretary, Treasurer, Assistant Treasurer, or Chief Financial Officer).

EXECUTED FOR THE CONTRACTOR:

By:

signature
(NOTARIZED)

Print Name and Title:

By:

signature
(NOTARIZED)

Print Name and Title:

EXECUTED FOR THE SURETY:

By

signature
(NOTARIZED)

Print Name and Title:

**PAYMENT BOND – PUBLIC WORKS
(CONTINUED)**

The rate of premium on this bond is \$_____ per thousand.

The total amount of premium charged: \$_____

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

IMPORTANT: Surety companies executing bonds must possess a certificate of authority from the California Insurance Commissioner authorizing them to write surety insurance defined in Section 105 of the California Insurance Code, and if the work or project is financed, in whole or in part, with Federal, grant, or loan funds, it must also appear on the Treasury Department's most current list (Circular 570 as amended). **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)

**PAYMENT BOND – PUBLIC WORKS
(CONTINUED)**

ALL-PURPOSE ACKNOWLEDGMENT

State of _____

County of _____

On _____ before me, _____,
Date Name, Title of Officer
personally appeared _____,
NAME(S) OF SIGNER(S)

who proved to me on the basis of satisfactory 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 signatures(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 identified herein, that the foregoing paragraph is true and correct.

Witness my hand and official seal.

Signature of Notary

ATTENTION NOTARY: Although the information requested below is **OPTIONAL**, it could prevent fraudulent attachment of this certificate to unauthorized document.

THIS CERTIFICATE Title or Type of Document _____
MUST BE ATTACHED
TO THE DOCUMENT Number of Pages _____ DATE of DOCUMENT _____
DESCRIBED AT RIGHT:
Signer(s) Other Than Named Above _____

CITY OF RIALTO
PUBLIC WORKS DEPARTMENT
PART II -- SPECIAL PROVISIONS
FRISBIE PARK SEWER LIFT STATION PROJECT
CITY PROJECT NO. 190501
RFB 19-145

- Section 1 - Terms, Definitions, Abbreviations, and Symbols
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CITY OF RIALTO
PUBLIC WORKS AND ENGINEERING DEPARTMENT
SPECIAL PROVISIONS

FRISBIE PARK SEWER LIFT STATION PROJECT
CITY PROJECT NO. 190501
RFB 19-145

SECTION 1 -- TERMS, DEFINITIONS, ABBREVIATIONS, AND SYMBOLS

INTRODUCTION

Standard Specifications. - The Work hereunder shall be done in accordance with the Standard Specifications for Public Works Construction ("Greenbook"), 2015 Edition, including all current supplements, addenda, and revisions thereof, these Special Provisions, and the Standard Plans identified in the Appendix, insofar as the same may apply to, and be in accordance with, the following Special Provisions.

In case of conflict between the Standard Specifications for Public Works Construction ("Greenbook") and these Special Provisions, the Special Provisions shall take precedence over, and be used in lieu of, such conflicting portions.

Supplementary Reference Specifications. - Insofar as references may be made in these Special Provisions to the Caltrans Standard Specifications and Plans 2018 Edition, such work shall conform to the referenced portions of the technical provisions only of said reference specifications, provided, that wherever the term "Standard Specifications" is used without the prefix "Caltrans," it shall mean the Standard Specifications for Public Works Construction ("Greenbook"), 2015 Edition, as previously specified in the above paragraph.

Amended Standard Specifications. - The amendments identified herein this Part II – Special Provisions are revisions to certain provisions of the Standard Specifications, and shall apply to the Contractor's work on this contract.

1-1 GENERAL. DELETE in its entirety and SUBSTITUTE with the following:

Whenever the terms "directed," "required," "permitted," "ordered," "designated," "prescribed," or terms of like import are used, it shall be understood that the direction, requirements, permission, order, designation, or prescription of the Engineer is intended. Similarly, the terms "approved," "acceptable," "satisfactory," "or equal," or terms of like import shall mean approved or acceptable to or satisfactory to the Engineer, unless otherwise expressly stated.

The word "provide" shall be understood to mean furnish and install, unless otherwise expressly stated.

1-2 TERMS AND DEFINITIONS.

Contract Price – DELETE in its entirety and SUBSTITUTE with the following:

The total amount for which the Contract is awarded plus approved Change Order(s).

Engineer – ADD the following:

Authorized agents of the Engineer may be referred to as Resident Engineer, Principal Engineer, or Deputy Director, who are charged with conducting detailed administration and inspection of the Contract.

ADD the following definitions:

Acceptance - Formal action of the City in determining that the Contractor's Work has been completed in accordance with the Contract Documents, filing a NOC with the County Recorder, and notifying the Contractor in writing of the acceptability of the Work.

Act(s) of God - A cataclysmic phenomenon of nature, such as an earthquake, flood, or cyclone (tornado). Events which shall not be construed as Acts of God include wind, wind shear, micro-bursts, rain, high water, storm water runoff, or other natural phenomena which might reasonably have been anticipated from historical records of the general locality of the Work.

Agent - Any individual, firm, association, partnership, corporation, trust, joint venture or other legal entity, e.g., the Project Manager and Consultants, employed by the City for services on this Project.

Allowance – Payment under "AL" Allowance Bid items will be based on the actual expenditures for pre-authorized items of Work in accordance with Contract Documents.

Apparent Low Bidder - The Bidder whose Bid, having been publicly opened and read aloud, meets the material requirements of the Bid Documents, and whose Bid price is the lowest received.

Applicable Laws - Laws, statutes, ordinances, rules, orders, and regulations of governmental authorities and courts having jurisdiction.

Application for Payment - The document prepared by the Contractor which is submitted to the City showing the Contractor's entitlement to progress payments.

As-builts - The Red-lines drawings cleaned-up and approved appropriately from the original conception of the design to reflect the actual product built.

Award of Contract - Date of - Date on which the Mayor or designee executes the Contract Documents and conditions precedent to award have been satisfied.

Board – The City Council of the City of Rialto.

Business Day - See Working Day.

CEQA - The California Environmental Quality Act.

City - The City of Rialto. See Agency.

City Forces - Employees of City who perform construction field work on public works projects as outlined in the Contract Documents.

Change Proposal - Proposal for a Change Order submitted by the Contractor to the City, either at the request of the City, or at the Contractor's own initiative.

Consultant - The individual, partnership, corporation, joint-venture, or other legal entity named as such in the Contract Documents or succeeding entity (e.g., architects and engineers) employed by the City for Project design or other specialized services and who function under the direction of the Engineer.

Construction Documents – Construction Documents shall be the Contractor's plans and details, including plans showing installation of major systems, equipment, fixed furnishings and graphics, the technical specifications and all other technical drawings, schedules, diagrams and specifications, accepted Shop Drawings, Working Drawings, and submittals that are necessary to set forth in detail the requirements for the Project.

Construction Manager - The person designated, in writing, by the City to act as its representative at the Site and to perform construction inspection services and administrative functions relating to this contract e.g., to make initial decisions regarding questions which may arise as to the quality or acceptability of materials furnished and Work performed, as to the manner of performance, and rate of progress of the Work under the Contract. Initial contact by the Contractor with the City shall be through the Construction Manager. The Construction Manager oversees and enforces the Contract Documents and makes initial decisions with respect to the Contractor's fulfillment of the Contract obligations and the Contractor's entitlement to compensation.

The Construction Manager may be an employee of the City or an independent Consultant contracted to represent the City. If a Construction Manager is not provided by the City, references to Construction Manager shall be the same as Resident Engineer.

Contract Time - The number of successive days or Working Days stated in the Contract Documents for the completion of the Work.

County – County of San Bernardino.

Defective Work - Work that is unsatisfactory, faulty, deficient, does not conform to the Contract Documents, does not meet the requirements of any inspection, reference

standard, test, or approval referred to in the Contract Documents; unauthorized material substitutions; or Work that has been damaged by anyone other than City prior to Final Acceptance.

Demobilization - The complete dismantling and removal by the Contractor of all of the Contractor's temporary facilities, equipment, materials, and personnel at the Site.

Drawings – See Plans.

Execution of Contract - Date of – See Award of Contract.

Field Order - A Field Order is a written order by the Engineer to compensate the Contractor for items of work, as further defined in 9-3.6, "Field Orders." A field order shall not increase Contract Price, Contract Time, or both.

Final Acceptance – See Acceptance.

Final Completion - Satisfactory completion of Work required by this contract as evidenced by the recorded NOC with San Bernardino County.

Final Payment - The last payment for this contract made by City to the Contractor when all applicable requirements have been met.

Hazardous Materials or Waste - Items identified in Section 104 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time or, 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, whichever is more restrictive.

Holiday - The City-observed holidays are listed below (if any holiday listed falls on a Friday or Saturday, then the preceding Thursday is considered a legal holiday. If the holiday falls on a Sunday, then the following Monday will be considered a legal holiday):

Holiday Observed On

New Year's Day (January 1)
Martin Luther King Day (Third Monday in January)
President's Day (February 15-21 varies)
Caesar Chavez Day (March 31)
Memorial Day (Last Monday in May)
Independence Day (July 4)
Labor Day (First Monday in September)
Veteran's Day (November 11)
Thanksgiving Day (Fourth Thursday in November)
Christmas Eve (December 24)
Christmas Day (December 25)

Legal Address - The official address of the City shall be City of Rialto, 335 W. Rialto Ave., Rialto, CA 92376, or such other address as the City may subsequently designate in written notice to the Contractor. The official address of the Engineer shall be the Public Works Director/City Engineer, City of Rialto, Public Works Department, 335 W. Rialto Ave., Rialto, CA 92376, or such other address as the Engineer may subsequently designate in writing to the Contractor.

Limited Notice To Proceed – A written notice given from the City authorizing initiation of a limited amount of work that is not Construction Work, e.g., finalizing subcontract agreements, ordering materials, mobilization, furnishing a field office, Design Work, and any other preliminary work done prior to performing Construction Work.

Milestone(s) - Principal event(s) specified in the Contract Documents relating to an intermediate completion date of a portion of the Work, or a period of time within which the portion of the Work shall be performed prior to Completion of the Work. Liquidated damages are frequently associated with Milestones.

Markout - The temporary marking/painting of the ground, pavement, or sidewalk by the facility or utility owner or its representative. Markouts identify the approximate location of the existing buried utilities in the vicinity of planned construction for the convenience of the Contractor.

Mayor or designee - The City of Rialto Mayor or a designated representative.

Normal Working Hours - **Unless specified otherwise**, 7:00 AM to 4:00 PM, Monday through Friday, inclusive. Saturdays, Sundays, and City holidays are excluded.

Notice of Completion (NOC) - If, in the City's judgment, the Work has been completed, the City will file with the County Recorder a NOC which stipulates the date that the Work was accepted. The conditions of warranty in accordance with 6-8, "COMPLETION, ACCEPTANCE, AND WARRANTY" shall commence on the date of NOC unless stated otherwise in the Contract Documents.

Owner – See City.

Party or Parties - The City, the Contractor, or both, their respective permitted successors or assigns, and any other future signatories to this contract.

Prime Contractor – See Contractor.

Product Data - Illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for any portion of the Work.

Project - The Project is the object of this contract to be constructed by the Contractor as described and shown in the Contract Documents.

Project Manager - The individual charged with overall responsibility for the Project.

Project Site - All areas where Work is to be performed pursuant to this contract. Project Site may also be referred to as Site and Work Site.

Red-lines - Plans with annotations of changes made during construction, in red, to reflect the actual product built during construction.

Request for Information (RFI) - The written request for information made by the Contractor to City to clarify any parts of the Contract Documents.

Retention - The amount withheld by the City from the money due to the Contractor in accordance with 9-3.2, "Partial and Final Payment".

Punchlist - List of items or corrections required to comply with Contract Documents.

Samples - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Project and that establish the standards by which such portion of the Project will be judged.

Schedule – Contractor prepared and City accepted Critical Path Method (CPM) schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK."

Separate Contractors - Those individuals or entities who have entered into arrangements with the City for the provision of labor, materials, or other services in connection with the Project who are not under contract with the Contractor.

Services - Professional services, including design, engineering, and construction management of the Project that are required in accordance with the Contract Documents.

Shop Drawings – Drawings submitted by the Contractor showing details of manufactured or assembled products proposed to be incorporated into Work.

Subconsultant – See Subcontractor.

Subcontract - Agreement between the Contractor and another person or entity engaged to perform a portion of the Work.

Submittals - The information, materials, or Sample(s) specified for submission to the City in accordance with this contract.

Supplier - Manufacturer, fabricator, distributor, or vendor.

Walk-through - The procedure used by the City to evaluate status of the Project and generate a Punchlist.

Work – The term “the Work” or “Work” generally defines all of the activities of the Contractor in completing the Project in accordance with the Contract Documents.

Working Drawings – Drawings submitted by the Contractor showing details of work not shown on the Plans.

Working Day – Any day within the period between the date of the start of the Contract Time in accordance with 6-1, “CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK” and the date of Final Acceptance other than the days specified in 6-7.2, “Working Days”.

Writing - See California Evidence Code, Section 250.

- END OF SECTION -

SECTION 2 -- SCOPE AND CONTROL OF WORK

2-1 Award and Execution of the Contract. ADD the following:

Bid protests are to be delivered to the following address:

City of Rialto
Purchasing Division
249 S. Willow Ave.
Rialto, CA 92376

Bid protests shall be reviewed by the Public Works Director and City Attorney to determine the validity of the protest to the terms and conditions of the original bid documents. Bidders are advised that only those protests that identify a material defect with the bid documents will be considered. The Public Works Director and City Attorney reserve the right to reject any protests that they have determined identify a bid submitted with an immaterial defect with the bid documents. All bid protests, and the Public Works Director's bid protest determination, will be included as part of the City Council's consideration of award of a construction contract to the lowest, responsive bidder as recommended by the Public Works Director. Bidders may present their arguments for or against a bid protest to the City Council at the time award of a construction contract is scheduled for consideration. The City Council, in its sole discretion, reserves the right to waive any informality (non-responsiveness) with a bid.

The award of the contract, if it be awarded, will be to the lowest responsive, responsible bidder whose proposal complies with all the requirements prescribed.

The contract shall be executed by the successful bidder and shall be returned, together with the contract bonds, to the City so that it is received within the time prescribed in the Instructions to Bidders. Failure to do so shall be just cause for forfeiture of the proposal guaranty. **The executed contract documents shall be delivered to the following address:**

City of Rialto
Public Works Department
335 W. Rialto Ave.,
Rialto, CA 92376

ADD: 2-1.1 STANDARD CONTRACT PROVISIONS.

2-1.1.1 Document Ownership. Once the Contractor has received any compensation for the Work performed, all documents, e.g., original plans, studies, sketches, drawings, computer printouts and files, and specifications prepared in connection with or related to the Work shall be the property of City. The City's ownership of these documents includes use of, reproduction or reuse of, and all incidental rights, whether or not the item of Work for which they were prepared has been performed.

The City's ownership entitlement arises upon payment or any partial payment for Work performed and includes ownership of any and all Work product completed under this contract. This Section shall apply whether the Contractor's services are terminated: (a) by the completion of the Project; or (b) in accordance with other provisions of this contract.

Notwithstanding any other provision of this section or the Contract, the Contractor shall have the right to make copies of all such plans, studies, sketches, drawings, computer printouts and files, and specifications.

The Contractor shall not be responsible for damage caused by subsequent changes to or uses of the plans or specifications, where the subsequent changes or uses are not authorized or approved by the Contractor, provided that the service rendered by the Contractor was not a proximate cause of the damage.

2-1.1.2 Specification Tone. Where used in the Contract Documents, statement or command type phrases (i.e., active voice and imperative mood) refer to and are directed to the Contractor.

2-1.1.3 Special Notices. When specified in these specifications or as directed by the Engineer, any notice required to be given in accordance with this subsection shall be in writing, dated, and signed by the duly authorized representative of such party giving the notice. The special notices shall be served by any of the following methods:

- a) Personal delivery to an authorized representative; proof of delivery of notice may be made by declaration under penalty of perjury of any person over the age of eighteen years. The proof of delivery shall show that delivery was done in conformity with this provision; service shall be effective on the date of delivery. Notices given to the Contractor by personal delivery may be made to the Contractor's authorized representative at the Site.
- b) Certified mail addressed to the recipient at the address established for the conduct of the Work under this contract postage prepaid; return receipt requested; service shall be effective on the date of mailing.

Simultaneously, the City may send the same notice by regular mail. If a notice that is sent by certified mail is returned unsigned, then delivery shall be effective pursuant to regular mail, provided the notice that was sent by regular mail is not returned.

Notice given to the Surety will be addressed to the Surety at the address of the Surety last communicated by to the City.

2-1.1.4 Joint Venture Contractors. If the Contractor is a joint venture, all grants, covenants, provisions and claims, rights, powers, privileges and liabilities of the Contract shall be construed and held to be several as well as joint. Any notice, order, direct request or any communication given by the City to the Contractor, shall be given to all entities being the Contractor if given to any one or more of such entities. Any notice, request or other communication given by any one of such entities to the City under this contract shall

be deemed to have been given by and shall bind all entities being the Contractor. The Joint Venture shall designate an on-site representative and an alternate in writing. The on-site representative and the alternate shall have the full authority to bind all Joint Venture partners.

The Joint Venture shall provide a copy of the Joint Venture agreement and the Joint Venture license to the City at the time of Contract award.

2-1.1.5 Successor's Obligations. All grants, covenants, provisions and claims, rights, powers, privileges and abilities contained in the Contract Documents shall be read and held as made by and with, and granted to and imposed upon, the Contractor and the City and their respective heirs, executors, administrators, successors, and assigns.

2-1.1.6 Waiver of Legal Rights. The failure of the City to insist, in any one or more instances, upon the performance of any provision of the Contract, or to exercise any right therein, shall not be construed as a waiver or relinquishment of such provisions or rights. Any waiver of any breach of this contract shall not be held to be a waiver of any other or subsequent breach.

Any waiver issued by the City of any provision of the Contract shall only be effective if issued in writing by the City and shall be specific, shall apply only to the particular matter concerned and not to other similar or dissimilar matters.

2-1.1.7 Requests for Information (RFI). In the event the work to be done, or matters relative thereto, are not sufficiently detailed or explained in the Contract Documents, the Contractor shall apply to the Engineer for further explanations as may be necessary and shall conform thereto so far as may be consistent with the terms of the Contract. In the event of doubt or question arising respecting the true meaning of the Specifications or Plans, reference shall be made to the Engineer for the Engineer's decision pursuant to 2-10, "AUTHORITY OF THE BOARD AND THE ENGINEER."

2-3.2 Self Performance. ADD the following:

The requirement that the Contractor perform, with its own organization, Contract work amount to at least 50% of the Contract Price applies only to the base Contract amount awarded, and shall not apply to Additive or Deductive Alternate Work described in the Bid documents.

ADD: 2-3.4 Subcontract Requirements. The Contractor shall require each Subconsultant and Subcontractor, to the extent of the Work to be performed by such Subconsultant and Subcontractor, to assume towards the Contractor all the obligations and responsibilities which the Contractor by the Contract Documents assumes towards the City and shall incorporate the terms of this contract and the Contract Documents to the extent applicable to the Work to be performed by the Subconsultants and Subcontractors.

All Subcontractors must be qualified and sufficiently experienced. The Contractor shall ensure that all Subcontractors are appropriately licensed for the duration of the Work that is performed under the Subcontracts. In the event the Subcontractor is not properly licensed, the Contractor shall cease payments to the Subcontractor for all work performed when the Subcontractor was not properly licensed. The Contractor shall return to the City any payment made to a Subcontractor for work performed when the Subcontractor was not licensed.

Where the Contract Documents require that a particular product be installed or applied by an applicator approved by the manufacturer, the Contractor shall ensure the Subcontractor or Supplier employed for such work is approved by the manufacturer.

The Contractor shall obtain or require that each Subcontractor obtain insurance policies in accordance with 7-3, "INSURANCE" which shall be kept in full force and effect during Work on this project and for the duration of this contract.

In any dispute between the Contractor and the Subcontractor, the City shall not be made a party to any judicial or administrative proceeding to resolve the dispute. The Contractor agrees to defend and indemnify the City in accordance with 7-15, "INDEMNIFICATION AND HOLD HARMLESS AGREEMENT" in any dispute between the Contractor and the Subcontractor should the City be made a party to any judicial or administrative proceeding to resolve the dispute in violation of this provision.

2-4 CONTRACT BONDS. First paragraph, DELETE second and third sentences and SUBSTITUTE the following:

Bonds shall be executed by a responsible surety as follows:

If the Work is being funded with state or local money, consistent with California Code of Civil Procedure §995.670, the Surety shall be an "admitted surety" authorized by the State of California Department of Insurance to transact surety insurance in the State.

If the Work is being funded with federal money, the Surety shall be listed in the U.S. Treasury Department Circular 570 and in conformance with the Underwriting Limitations as expressed therein.

ADD the following:

If the Surety on any bond furnished by the Contractor is declared bankrupt, becomes insolvent, or its right to do business is terminated in any state where any part of the Project is located, the Contractor shall immediately notify the Engineer and immediately substitute another bond and surety acceptable to the City.

The Contractor shall require the Surety to mail its standard "Bond Status" form to the City's Legal Address.

2-5 PLANS AND SPECIFICATIONS.

2-5.1 General. ADD the following:

If during the performance of the Work, the Contractor finds a conflict, error, omission, or discrepancy in the Contract Documents or in the City's field work, which is necessary for a clear understanding of the Work, or if any errors appear in either the various instruments or in the work done by other contractors affecting the Work included in the Specifications, the Contractor shall report it to the Engineer in writing at once and before proceeding with the Work affected thereby. If the Contractor fails to give such notice, the Contractor shall make good any damage or defect in the Work caused thereby.

If the Engineer finds an error or omission has been made, the Engineer will determine the corrective actions and advise the Contractor accordingly. If the corrective work associated with an error or omission increases or decreases the amount of Work called for in the Contract, the City will issue an appropriate Change Order or Field Order (as applicable).

After discovery of a claimed error or omission by the Contractor if the Contractor continues with the Work without written direction from the Engineer, the related work performed by the Contractor shall be at the Contractor's risk.

The execution of Work specially detailed or explained, without a previous written request for an Extra Work charge, shall constitute an acceptance by the Contractor.

It is the intent of the Specifications and Plans to describe a complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the Specifications or Plans as being required to produce the intended result shall be supplied whether or not it is specifically called for, at no additional cost to the City.

When words in the Specifications or on the Plans, which have a well-known technical or trade meaning, are used to describe Work, material, or equipment such words shall be interpreted per such meaning.

Reference to specified software, guides, standard specifications, manuals or codes of any technical society, organization or association, or to the code of any governmental authority, whether such reference be specific or by implication, shall mean the latest edition or version in effect at the time of opening of Bids (or, on the effective date of the Contract if there were no Bids), except as may be otherwise specifically stated. No provision of any referenced standard specifications, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the Engineer or the Contractor or any of their agents or employees from those set forth in the Contract Documents. Clarifications and interpretations of the Contract Documents will be issued by the Engineer within 5 working days of receipt.

2-5.2 Precedence of Contract Documents. DELETE in its entirety and SUBSTITUTE the following:

If there is a conflict between Contract Documents, the document highest in precedence shall control. The precedence shall be as follows with item (1) being the highest:

- 1) Permits; from other agencies as may be required by law
- 2) Change Orders and Supplemental Agreements; whichever occurs last
- 3) Contract Agreement
- 4) Addenda
- 5) Bid/Proposal
- 6) Supplementary Special Provisions (SSP)
- 7) Special Provisions
- 8) Plans
- 9) Standard Drawings
- 10) Standard Specifications
- 11) Reference Specifications

The figured dimensions shown on the drawings and in the specifications may not, in every case, agree with scale dimensions. Figured dimensions shall take precedence over scaled dimensions, and large-scaled drawings shall take precedence over small-scale drawings.

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 and Change Order drawings govern over Plans
- 4) Plans govern over Standard Drawings

When a conflict exists between the ADA Standards for Accessible Design, Title 24, and the City Supplements, the most restrictive requirement shall be followed.

2-5.3 Submittals

General. DELETE in its entirety and SUBSTITUTE with the following:

1. When required by the Contract Documents or when requested by the Engineer, the Contractor shall provide the submittals as specified in 2-5.3.2, 2-5.3.3, and 2-5.3.4 to the Engineer.
2. Do not incorporate any materials in the Work for which submittals are required before the required submittals have been reviewed and accepted by the Engineer.
3. Neither review nor acceptance of submittals by the Engineer shall relieve the Contractor from responsibility for errors, omissions, or deviations from the Contract Documents, unless the Contractor explicitly and clearly called such deviations to the Engineer's attention in the letter of transmittal.
4. The Contractor shall be responsible for the correctness of the submittals.

5. Allow a minimum of 20 Working Days for review of submittals **unless otherwise specified in the Special Provisions**. Each submittal must be accompanied by a letter of transmittal.
6. Payment for submittals will be included in the various Bid items.

2-5.3.4 Supporting Information. ADD the following:

For landscaping and irrigation materials, submit samples and test results to the Engineer within 15 days of the NTP.

Submit samples of the materials with cut sheets of the products. Organize cut sheets in a binder for review and approval by the Engineer prior to use on the Project. Identify deviation from any of the specified material clearly, including cut sheets and samples of both the specified material and basis for the substitution. Include the City's Project Name, Project Number, and the Engineer's name, Contractor Name, and Submittal Number and clearly indicate the specific product to be used.

When photos of material are required, they must be clear in resolution, identifying the specific item for review, indicating name of the item, source and date taken. The material shown in the photo must be currently available for use on the Project.

ADD: 2-5.4 Red-lines Drawings. The Contractor shall keep accurate records on a set of full size Plans of additions and deletions to the Work, and of changes in location, elevation, and character of the Work not otherwise shown or noted on Contract documents.

Red-lines drawings shall be coordinated with field measurements, Shop Drawings, Working Drawings, Samples, Product Data, and available records. The Contractor shall immediately give written notice of any conflicts between these documents to the City.

On building construction Contracts, the Contractor shall record the location by dimension and the depth by elevation of underground line, valves, plugged tees, capped ends, etc. The Contractor shall record, by dimension or scale plans, wiring, conduits, and pull boxes as installed. All information necessary to maintain, service, or both any concealed Work shall be noted on these Red-line Drawings. This data shall be legibly recorded to the satisfaction of the Engineer. Records shall be kept current with entries checked by the Engineer before the Work is buried or covered. These plans shall be delivered to the Engineer upon completion of the job.

The Contractor's failure to update and deliver Red-lines information monthly to the Engineer for review and approval may result in withholding of monthly progress payments.

The payment for Red-lines drawings shall be included in the various Bid items.

ADD: 2-5.5 As-built Drawings. For Design-Build contracts or if required in the Special Provisions, As-built Drawings shall be the responsibility of the Contractor.

As-built drawings shall be prepared from the Red-lines information and shall provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of design to proceed without lengthy and expensive site measurement, investigation, and examination.

Prior to Final Completion, the Contractor shall prepare and submit one complete set of full sized (24" x 36") original Mylar final As-built Drawings (CADD plots) prepared in accordance with the City's CADD standards. Each CADD Mylar drawing sheet shall be wet stamped and signed by qualified responsible engineers registered in the State of California, and shall be stamped and wet signed by the architect/engineer of record, as required by law. Other applicable portions of the drawing title blocks shall also be signed by Contractor. Drawing Mylar shall be 3 mils minimum thickness.

The payment for As-built drawings shall be included in the various Bid items.

ADD: 2-5.6 Measurements and Dimensions. Scaled dimensions are approximate. Before ordering materials or commencing Work, measure site for proper size and fit. The Contractor shall verify dimensions and quantities by taking measurements in the field and shall be responsible for their correctness.

2-6 WORK TO BE DONE. ADD the following:

The City assumes no responsibility for any conclusions or interpretations made by the Contractor based on any information made available by the City. Nor does the City assume responsibility for any understanding reached or representation made by any of the City's officers or agents before Award of this contract concerning conditions which could affect the Work, unless that understanding or representation is expressly stated in the Contract Documents.

Where approval or acceptance by the City is required, it is understood to be general approval only and does not relieve the Contractor of responsibility for complying with all applicable laws, codes, and best practices.

2-7 SUBSURFACE DATA. ADD the following:

The Plans for the Work show conditions as are believed by the Engineer to exist, but it is not to be inferred that all of the conditions as shown thereon actually exist, nor shall the City or any of its officers be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Plans and the actual conditions revealed during the progress of the Work or otherwise.

If reports of explorations and tests of subsurface conditions at the Site are included in the Contract Documents e.g., Supplementary Special Provisions (SSP), the Bidders are encouraged to inspect the Site, acquire, and review these reports and to take other necessary steps to thoroughly familiarize themselves with the Site conditions. If a review of the documents and Site inspection indicate a conflict, the Bidder shall immediately notify

the City. For access and cost information to obtain those reports contact the City Project Manager, during regular business hours.

The City does not represent that the listed documents, or the logs, and test results, show the conditions that will be encountered in performing the Work. The City represents only that the logs, and test results show the conditions encountered at the particular locations and at the particular times they were obtained. The Bidders and other users of the subsurface data are cautioned that interpretations and conclusions contained in the documents were formulated for design purposes only and were based on work performed in such a way as to expressly provide information required for design.

2-8 RIGHT-OF-WAY. After first sentence, ADD the following:

The Contractor shall be responsible for coordinating with property owners as to timing, when access is provided through rights of entry, and shall protect private improvements in accordance with 7-9, "PROTECTION AND RESTORATION OF THE EXISTING IMPROVEMENTS."

2-9.1 Permanent Survey Markers. DELETE in its entirety and SUBSTITUTE with the following:

Survey monuments of various types generally exist along the centerline of City streets that may be affected by the scope of the Work. The Contractor shall be required to reset any existing survey monuments or markers that are disturbed or otherwise removed by construction of the project. The Contractor's surveyor shall file corner records with San Bernardino County as required by law. Existing survey monuments set into the existing asphalt concrete surface (i.e. tag and nail) shall be replaced as necessary to reestablish the survey monument control after construction of the project.

It shall be the Contractor's responsibility to protect all the existing survey monuments, bench marks, survey marks and stakes. Removal of such monuments and markers, or displacement thereof, shall require their resetting per City requirements, including corner record filing, for the existing type of monument in question at the Contractor's expense.

The Contractor shall maintain a survey location check on the monuments without cost to the City. The Contractor is advised that any resetting of monuments will be the responsibility of the Contractor, to be reset by a California licensed Land Surveyor or Registered Civil Engineer appropriately licensed to practice land surveying. Should the Contractor anticipate the removal of any survey monuments, notification shall be given to the Engineer prior to removal. The Contractor shall be responsible for reinstalling existing or installing new monument wells, after resetting any disturbed survey monument.

The cost to perform this work shall be considered as included in the various bid items, and no additional payment will be made therefore.

2-9.2 Survey Service. DELETE in its entirety and SUBSTITUTE with the following:

The Contractor shall provide all construction surveying by a California registered Land Surveyor or Registered Civil Engineer appropriately licensed to practice land surveying. The Contractor's surveyor shall provide monument tie-out and corner record filing, as required by the Engineer or his representative.

The Contractor's surveyor shall set all stakes and hubs, furnish all lines, grades and measurements necessary for the proper prosecution and control of the work contracted for under these specifications. No direct payment will be made for this labor, materials, or other expenses therewith.

The Contractor must give weekly copies of all survey notes to the Engineer so that the Engineer may check them as to accuracy and method of staking. All areas that are staked by the Contractor must be checked and approved by the Engineer prior to beginning any work in the area. The Engineer will make periodic checks of the grades and alignment set by the Contractor. In case of error on the part of the Contractor, his/her employees, or surveyor, resulting in establishing grades and/or alignment that are not in accordance with the plans or as established by the Engineer, all construction or staking not in accordance with the established grades and/or alignment shall be replaced without additional cost to the City.

Payment for any and all construction surveying required by this Project, by the Contractor's Surveyor, shall be considered as included in the various bid items of work, and no additional compensation shall be allowed therefore.

2-10 AUTHORITY OF BOARD AND ENGINEER. ADD the following:

Any plan or method of Work suggested to the Contractor by the City, but not specified or required by this contract, which is adopted or followed by the Contractor in whole or in part, shall be done at the sole risk and responsibility of the Contractor. The City assumes no responsibility and shall not be held liable for any defects in the Work which may result from or be caused by use of such plan or method or Work.

2-11 INSPECTION. ADD the following:

If required by the Engineer, the Contractor shall provide information related to the inspection of the Work. The Contractor shall provide access in accordance with Cal-OSHA Standards where necessary.

The Contractor shall request inspections in accordance with the prevailing Codes and by the Public Works Department. The Contractor shall coordinate these inspections at all times through the Engineer. The Contractor shall remove and replace any items of Work performed without the benefit of inspection. For required subsequent inspection, the Contractor shall remove and replace Work at the discretion of the Engineer at no additional cost to the City. Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

The Contractor shall give at least 5 days notice for off-site inspection. Notices shall not be deemed effective until the City has responded and agreed to the Contractor's date and time.

The City may either perform inspection services with its own forces or contract with third parties. The Contractor shall call for, coordinate, and schedule all inspections.

The City will make any inspections and tests as the City deems necessary to ensure the Work is accomplished in accordance with the requirements of the Contract Documents, other than inspections for Work performed in accordance with a permit. The Contractor shall be responsible for coordinating required inspection of all Work performed in accordance with a permit. Unless otherwise specified, the City will provide all required inspections and tests. In the event inspections or tests reveal non-compliance with the requirements of the Construction Documents, the Contractor shall bear the cost of any and all corrective measures deemed necessary by the City, as well as the cost of the City's subsequent re-inspection and re-testing.

The City has the right, for a reasonable time, to stop or suspend Work which will cover, and thereby prevent or impede the City's or another agency's ability to inspect, test, or approve a portion of the Work. The Contractor shall have no right to additional costs or time that it may incur as a result of the Work stoppage or suspension.

The Work shall not be covered prior to inspection, testing, or approval required by the Contract Documents, the City's prior written request, or by other agencies. If any item of Work is covered prior to obtaining the required approvals, the Contractor shall, when requested by the City, uncover the Work for inspection, testing, approval, or all. Upon successful completion of the inspection, testing, or approval, the Contractor shall cover the Work where required again. The Contractor shall bear all direct and indirect costs and damages of such uncovering and re-covering and shall not be entitled to an increase in the Contract Price or the Contract Time, unless the Contractor has given the City and any other affected agencies written notice of the Contractor's intention to cover the Work and the City has not acted with in response to such notice.

Tests, inspections, and approvals of items of the Work required by the Contract Documents, Applicable Laws or normal construction practices shall be made at an appropriate time, and in accordance with the Contract Documents. Unless otherwise specified, the City will make arrangements for such tests, inspections and approvals. The Contractor shall give the City notice of when and where tests and inspections are to be made so that the City may observe such procedures.

Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and delivered to the City.

ADD: 2-13 PARTNERING. The Contractor may request the formation of a Partnering relationship by submitting a request in writing to the Engineer after approval of the Contract. If the Contractor's request for Partnering is approved by the Engineer, scheduling of a Partnering workshop, selecting the Partnering facilitator and workshop,

selecting the Partnering facilitator and workshop site, and other administrative details shall be as agreed to by both Parties.

The establishment of a Partnering relationship will not change or modify the terms and conditions of the Contract and will not relieve either party of the legal requirements of the contract.

The goals of partnering shall include:

- a) The Construction Manager, the City's representatives, and the Contractor's representatives including Subcontractors actively working together as partners;
- b) Avoidance of destructive confrontation and litigation among the parties;
- c) Mutual understanding on how the Work is to be conducted;
- d) Establishment of mutual key results to facilitate Project success; and,
- e) Establishment of an atmosphere of team work, trust, and open communication.

2-13.1 Payment. The payments involved in providing a facilitator and a workshop site will be borne equally by the City and the Contractor. The Contractor shall pay all compensation for the wages and expenses of the facilitator and of the expenses for obtaining the workshop site. The City's share of such costs will be reimbursed to the Contractor in a Change Order written by the Engineer unless a Bid item has been established for Partnering. Markups will not be added. Other costs associated with the Partnering relationship shall be borne separately by the party incurring the costs.

ADD: 2-14 SITE EXAMINATION. The Contractor shall have the sole responsibility of satisfying itself concerning the nature and location of the Work, and the general and local conditions, such as, but not limited to, all other matters which could in any way affect the Work or the costs thereof. The failure of the Contractor to acquaint itself with all available information regarding any applicable existing or future conditions shall not relieve it from the responsibility for properly estimating the difficulties, responsibilities, or costs of successfully performing the Work according to the Contract Documents.

ADD: 2-15 FLOW AND ACCEPTANCE OF WATER. Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Work. Therefore, the Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, and has prepared its Bid accordingly; and the Contractor, by submitting such a Bid, assumes all said risk.

- END OF SECTION -

SECTION 3 – CHANGES IN WORK

3-2 CHANGES INITIATED BY THE AGENCY.

3-2.1 General: DELETE the first paragraph in its entirety and SUBSTITUTE with the following:

Without invalidating the Contract and without notice to any surety, the City may at any time order additions, deletions, or revisions in the Project in the following manner:

- a) When the City desires a change; the City will issue a request for proposal to the Contractor.
- b) The Contractor shall submit a response within 7 Working Days.
- c) After the City reviews the Contractor's response, the City changes will be authorized by a written Change Order prepared and issued by the City.
- d) Upon receipt of any such Change Order, the Contractor shall promptly sign and return the Change Order to the City and only thereafter proceed under the applicable conditions of the Contract Documents when the City has approved the Change Order.

Should any item(s) of Work be deleted, the reduction in Contract Price shall reflect a credit for the full value of the deleted Work, including anticipated profit and overhead. If the deleted Work exceeds 25% of the Contract Price, the Contractor may reduce the credited amount by a maximum of 5% of the amount in excess of the 25% of the Contract Price to cover overhead expenses.

If the City requests the Contractor to submit a Change Proposal, and the preparation of such Change Proposal impacts the Contract Time (e.g., other Work is suspended pending a decision on such Change Proposal or the Design Work is delayed due to the preparation of the Change Proposal) an equitable adjustment in the Contract Time shall be made.

ADD: 3-2.6 Request for Proposal. The Contractor's proposal in response to the City's Request for Proposal (RFP) shall be on forms acceptable to the Engineer. The Contractor's proposal shall certify in writing that the amounts included cover all direct, supplemental, indirect, consequential and cumulative costs and delays, as applicable, and that those costs and delays would be or were necessarily incurred, despite the Contractor's reasonable and diligent efforts to mitigate them. Mitigation efforts under taken by the Contractor shall be described.

3-2.6.1 Proposal Content. Where the change in Contract Price is to be determined on the basis of the "cost of the work involved", the Contractor's itemized estimates shall detail all applicable elements of cost, including, but not limited to, labor hours and payroll costs, quantities, crew mixes, production rates, material costs, Subcontractor and Supplier costs, equipment costs, and supplemental costs. Where the change in Contract Price arises from changes in the schedule of all or part of the Work, or where a change in Contract Time is sought, the submittal shall include analysis required by 6-6.5, "Contract Time Extension and Schedule Analysis". With respect to work during other than normal hours, the labor charges associated with such work shall consist of straight time wages and burden plus

the appropriate overtime or shift premium with no additional burden (i.e., fringe benefits) on the premium portion.

3-3 EXTRA WORK.

3-3.1 General. ADD the following:

The City reserves the right to direct the Contractor to solicit competitive Bids for Extra Work. If required by the City, the Contractor shall obtain competitive Bids from Subcontractors acceptable to Contractor and shall deliver such Bids to the City who will then determine which Bids will be accepted.

Any request by the Contractor to change the Contract Price to include the price of Extra Work shall be by written notice to the City and shall include itemized estimates. The Contractor's itemized estimates shall detail all applicable elements of price e.g., labor and payroll costs, quantities, crew composition, production rates, material costs, Subcontractor and Supplier costs, equipment costs, and supplemental costs. If the Contractor's request to change the Contract Price arises from changes in the Schedule affecting all or part of the Project, or if the Contractor seeks a change in the Contract Time, the Contractor's request shall include the analysis required by 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK."

3-3.2.2 Basis for Establishing Costs.

a) Labor: ADD the following:

The Engineer reserves the right to request certified payrolls to substantiate the actual cost of labor. The Contractor shall produce payroll certified by a California licensed Certified Public Accountant. The certified payroll shall list the labor rates of the Contractor personnel, consultants and Subcontractors that are working on or are associated with this Project and shall be provided at the request of the Engineer.

If the Contractor's proposal for Extra Work is based upon services and work to be performed outside normal working hours, the labor charges associated with such Extra Work shall consist of straight time wages and burden plus the appropriate overtime or shift premium with no additional burden (i.e., fringe benefits) on the premium portion.

In no case shall the Contractor be required to pay more than state and or federal wage rates, whichever governs the Work or any portions thereof.

c) Tool and Equipment Rental: DELETE second paragraph in its entirety, and SUBSTITUTE the following:

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed those listed in the latest edition of the Caltrans publication entitled "Labor Surcharge and Equipment Rental Rates" preceding the date the Work is accomplished. Where the Contractor can substantiate that the rental rates prevailing locally exceed the

published rates by more than 15%, the Contractor will be entitled to a rental rate adjustment. For equipment not listed in said publication, rental rates shall not exceed listed rates prevailing locally at equipment rental agencies or distributors, at the time the Work is performed.

Whenever possible, Extra Work shall be accomplished using equipment available on Site or owned by the Contractor. If a specific piece of equipment must be rented to be used exclusively for the Extra Work, the rental rate will be the invoiced rate.

3-3.2.3 Markup. DELETE in its entirety and SUBSTITUTE the following:

For Change Orders, whether additive or deductive, and for work classified as Extra Work, the allowance for overhead and profit shall include full compensation for superintendence, insurance premiums, taxes, field office expense, extended overhead, home office overhead, and any other items of expense e.g., Change Order estimating and preparation cost, claims preparation cost, schedule analysis, project management, and field engineering.

Extended overhead shall be any and all costs incurred either in the field or at the Contractor's office resulting from Extra Work excluding direct costs related to direct hourly labor, equipment, or materials necessary to complete the Extra Work.

- a) The allowance for overhead and profit shall not exceed the values in Table 3-2.2.3(A) unless specified otherwise in the Special Provisions.

Table 3-2.2.3(A)

Component	Overhead	Profit
Labor	10%	10%
Material	10%	5%
Equipment	10%	5%

- b) To the sum of the costs and markups provided for in this subsection, actual increase in the Contractor's bond premium caused by the Extra Work shall be added as compensation for Bonds.
- c) Work paid under Allowance Bid items is not subject to the mark-up limitations specified in Table 3-2.2.3(A) unless specified otherwise in the Special Provisions.
- d) When all or any part of the Extra Work is performed by a Subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the

Subcontractor, to which the Contractor may add 5% of the Subcontractor's total cost for the Extra Work.

Regardless of the number of hierarchical tiers of Subcontractors, the 5% which is the Contractor's allowance 3.5% (for overhead) and 1.5% (for profit) may be applied one time only to the performing Subcontractor's total cost.

ADD: 3-4.1 Disallowance of Entitlement. The Contractor shall not be entitled to any adjustment in the Contract Price or Times if:

The Contractor knew of the existence of such conditions at the time the Contractor made a final commitment to the City in respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

The existence of such condition could reasonably have been discovered or revealed as a result of any record search, examination, investigation, exploration, test or study of the Site and contiguous areas suggested or required by the Bidding Documents.

ADD: 3-6 DISPUTE RESOLUTION PROCESS.

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. Section 9204 of the Public Contract Code prescribes a process for negotiation and mediation to resolve disputes on construction claims. The intent of this Section is to implement Sections 20104 *et seq.* and Section 9204 of the California Public Contract Code. This Section shall be construed to be consistent with said statutes.

For purposes of these procedures, "Claim" means a separate demand by the Contractor, after the City has denied Contractor's timely and duly made request for payment for extra work and/or a time extension in accordance with the Special Provisions, for (A) a time extension, (B) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract for a public work and payment of which is not otherwise expressly provided for or the Contractor is not otherwise entitled to, or (C) an amount the payment of which is disputed by the City.

The following requirements apply to all claims to which this section applies:

A. Claim Submittal

The claim shall be in writing and include the documents necessary to substantiate the claim. Claims governed by this procedure must be filed on or before the date of final payment. Nothing in this section 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.

B. Supporting Documentation

The Contractor shall submit all claims in the following format:

- (1) Summary of the claim, including references to the specific Contract Document provisions upon which the claim is based.
- (2) List of documents relating to claim: (a) Specifications, (b) Drawings, (c) Clarifications (Requests for Information), (d) Schedules, and (e) Other.
- (3) Chronology of events and correspondence related to the claim.
- (4) Statement of grounds for the claim.
- (5) Analysis of the claim's cost, if any.
- (6) Analysis of the claim's time/schedule impact, if any.

C. City's Response

Upon receipt of a claim pursuant to this section, City shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor 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 statement.

- (1) If the City needs approval from the City Council to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the City Council does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the City shall have up to three days following the next duly publicly noticed meeting of the City Council after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.
- (2) Within 30 days of receipt of a claim, the City may request in writing additional documentation supporting the claim or relating to defenses or claims the City may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of City and the Contractor.
- (3) The City's written response to the claim, as further documented, shall be submitted to the Contractor within 30 days (if the claim is less than \$50,000, within 15 days) after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

D. Meet And Confer

If the Contractor disputes the City's written response, or the City fails to respond within the time prescribed, the Contractor may so notify the City, in writing, either within 15 days of receipt of the City's response or within 15 days of the City's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand, the City shall schedule a meet and confer conference within 30 days for settlement of the dispute.

E. Mediation

Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the City shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the City issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the City and the Contractor sharing the associated costs equally. 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 City and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code Section 20104.4 to mediate after litigation has been commenced.
- (4) All unresolved claims shall be considered jointly in a single mediation, unless a new unrelated claim arises after mediation is completed.

F. City's Responses

The City's failure to respond to a claim from the Contractor within the time periods described in this section or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the City's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the Contractor. City's failure to respond shall not waive City's rights to any subsequent procedures for the resolution of disputed claims.

G. Government Code Claims

If following the mediation, the claim or any portion remains in dispute, 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. 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, including any required mediation, have been followed by Contractor. If no such Government Code claim is submitted, or if the prerequisite contractual requirements are not satisfied, no action against the City may be filed. A Government Code claim must be filed no earlier than the date that Contractor completes all contractual prerequisites to filing a Government Code claim, including any required mediation. A Government Code claim shall be inclusive of all unresolved claims unless a new unrelated claim arises after the Government Code claim is submitted. For purposes of Government Code Section 900 *et seq.*, 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 to the City until the time the claim is denied, including any period of time utilized by the meet and confer conference or mediation that does not result in a complete resolution of all claims.

H. Civil Actions for Claims of \$375,000 or Less

The following procedures are established for all civil actions filed to resolve claims totaling \$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 procedures in this Section. 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.

- (3) Upon stipulation of the parties, arbitrators appointed for these purposes shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division.
- (4) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

- END OF SECTION -

SECTION 4 – CONTROL OF MATERIALS

4-1.3.3 Inspection of Items Not Locally Produced. ADD the following paragraph:

When required by the Special Provisions or as noted on the Plans, the Engineer may elect to perform inspection of an out-of-town manufacturer. The Contractor shall incur all inspection costs. These costs shall include travel expenses, a per diem allowance for lodging, meals, and car rental per day. If the manufacturing plant operates a double shift, a double shift shall be figured in the inspection costs. At the option of the Engineer, full time inspection will continue for the length of the manufacturing period. If the manufacturing period will exceed 3 consecutive weeks, the expenses of the Engineer's supervisor will be included in the figures for one 2-day trip to the site per month. Inspection costs paid by the Contractor will not include the wages of the Engineer and their supervisor if employed by the City, when required by the Special Provisions or as shown on Plans.

ADD: 4-1.3.4 Inspection Paid For By the Contractor. The Contractor shall employ and pay for the services of a qualified inspection agency to perform any specialty inspection services required by the Contract Documents.

If no Bid item is provided, payment shall be included in various Bid items.

4-1.6 TRADE NAMES OR EQUALS. DELETE in its entirety and SUBSTITUTE the following:

In accordance with California Public Contract Code §3400(a), and as specified herein this Section 4-1.6, the Contractor shall submit its list of proposed substitutions for “an equal” (“or equal”) item **within 20 days after award of the contract**. If an offered substitution by the Contractor for the trade names specified in the Contract necessitates changes to, or coordination with, other items of the Work, the information submitted shall include details showing such changes. The Contractor shall perform these changes as part of the substitution of material or equipment and at no additional cost to the City. The lack of action on the Engineer's side by taking no exceptions to the proposed substitution shall not relieve the Contractor from responsibility for the efficiency, sufficiency, quality, and performance of the substitute material or equipment, in the same manner and degree as the material and equipment specified by name.

Whenever materials or equipment are indicated in the Contract Documents 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 stated otherwise, materials or equipment of other Suppliers may be accepted if sufficient information is submitted to the Engineer for review to determine whether the material or equipment proposed is equivalent or equal to that named.

Request for approvals of “or equal” items prior to Bid Opening will not be considered. Bidders are responsible to ensure their Bid includes the price required for the item as specified, and assumes all risk in including a price for an “or equal” item that is not

approved by the Engineer, and any additional cost associated with furnishing and installing the item as specified in the specifications or plans.

The Contractor may bring forward a substitution proposal for an “or equal” item provided the request and supporting documentation is submitted within 20 days of contract award. The following information shall be included with any substitution request:

1. Whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents to adopt the design to the proposed substitute.
2. Whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.
3. All variations of the proposed substitute from the items originally specified will be identified.
4. Available maintenance, repair, and replacement service requirements. The manufacturer must have a local service agency within 50 miles of the site which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.
5. Certification that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.

There is no guaranteed time frame for the Engineer’s review of the substitution requests.

The Contractor is responsible to demonstrate that the type, function, and quality of any such substitute product, material or equipment is equivalent to the specified item. The Engineer shall require at the Contractor’s expense additional data about the proposed substitution he deems necessary.

If the Engineer takes no exceptions to the proposed substitution, it will not relieve the Contractor from responsibility for the efficiency, sufficiency, quality, and performance of the substitute material or equipment, in the same manner and degree as the material and equipment specified by name.

The lack of any action by the Engineer does not constitute acceptance of the substitution; all approved “or equal” substitutions must be approved in writing by the Engineer.

Acceptance by the Engineer of a substitute item does not relieve you of the responsibility for full compliance with the Contract Documents.

The Bid submittal must be based on the material and equipment specified by name in the Contract. If the proposal is rejected by the Engineer, you will not be entitled to either an extension in Contract Time, and/or an increase in the Contract Price.

As applicable, no Shop Drawing or Working Drawing submittals will be made for a substitute item nor will any substitute item be ordered, installed, or utilized without the Engineer's prior written approval.

You must reimburse the City for the charges of the Engineer for evaluating each proposed substitution.

ADD: 4-2 PLACING ORDERS.

The Contractor shall place the orders for all long lead-time supplies, materials and equipment **within 3 working days after execution of the contract by the City of Rialto.** The Contractor shall furnish the Engineer with a statement from the vendors that the orders for said supplies, materials, and equipment has been received and accepted by said vendors **within 15 working days** from the date of execution of Contract.

- END OF SECTION -

SECTION 5 - UTILITIES

5-1 LOCATION. ADD the following:

The City does not warrant the accuracy or completeness of the location and type of existing utilities and substructures shown on the Plans. The Contractor is responsible to accurately locate, by potholing or other suitable methods, all existing utilities such as service connections and substructures as shown on the Plans and marked out by Underground Service Alert (USA), to prevent damage to such facilities and to identify any conflicts with the proposed work.

The Contractor shall fill all potholes on the same day of excavation, and, if no trenching is performed within 10 Working Days, fully restore all potholes and any damaged surrounding areas to their original condition unless otherwise allowed by the Engineer.

There will be no other compensation for potholing at any specific location required by the Plans. Neither will showing some specific locations on the Plans relieve the Contractor of the responsibility to pothole as previously mentioned in this Subsection.

The Contractor shall notify the Engineer, in writing, of any conflicts between existing utilities and the proposed work a minimum of 5 Working Days, and 300 feet in advance of the work to provide adequate time, and space for any changes to the work needed to avoid unforeseen conflicts. The Contractor shall perform utility location far enough in advance of the Work to provide the written notification specified in this section.

The written notification shall include; date of utility location, method of utility location, type, size, and material of utility, horizontal location (to the nearest Station), depth for existing pavement or ground surface to top and bottom of utility, suspected ownership of utility, and the date on which any conflict with the utility will impact the critical path(s).

For existing utilities shown on the Plans or marked out by USA, the Contractor shall not be entitled to an extension of Contract Time or compensation for delay if direction is provided by the Engineer within 5 Working Days from receipt of the Contractor's written notification of the utility conflict. If the Engineer does not provide direction to the Contractor within the 5 Working Days, an extension of Contract Time may be granted in accordance with Section 6, beginning on the sixth Working Day after receipt of the Contractor's written notification.

5-2 PROTECTION. ADD the following:

When existing underground utilities are undercut the Contractor shall backfill for at least 12" all around the undercut utility. The backfill material shall conform to 306-1.2.1, "Bedding."

When a one-inch or smaller water service is damaged during trenching operations, repairs shall be made in accordance with applicable standards required by the Water Utility Owner.

The City may decide to perform the repairs to water and sewer mains, water services, and sewer laterals with the City Forces at the discretion of the Engineer at the Contractor's expense.

The Contractor shall notify the City at least 2 Working Days prior to start of excavation, unless, earlier notice is required by another permit or plan.

5-4 RELOCATION. ADD the following:

When existing surface utilities are identified on the project plans to be adjusted to grade by others (primarily Gas and Electric), it shall be the responsibility of the contractor to coordinate with the individual utility owners for the adjustment of their surface utilities to the new pavement grade. The contractor shall be responsible for paying any and all fees that the utility owner may charge for processing or permitting related to utility adjustments. Surface utilities shall be adjusted to grade per the standards and requirements of the utility owner.

ADD: 5-7 Payment. Unless otherwise specified in the Contract Documents, payment for items of work related to Utilities, Utility coordination, adjustment of surface utilities by others and any fees or costs associated with utility coordination shall be included in the various items of work and no additional compensation shall be allowed therefore.

Potholing for existing utilities which are not shown on the Plans, but marked out by USA shall be as directed by the Engineer and paid for according to 3-3, "EXTRA WORK."

- END OF SECTION -

SECTION 6 – PROSECUTION, PROGRESS, AND ACCEPTANCE OF WORK

6-1.1 Construction Schedule. ADD the following:

- a) Upon the request of the Contractor, the City may delay the issuance of the Notice to Proceed (NTP) up to 10 Working Days from the date of the preconstruction conference. No time extension of this delay will be allowed.
- b) The Contractor shall be responsible for developing, coordinating, revising, updating, and maintaining the cost loaded construction schedule (Schedule) utilizing the Critical Path Method (CPM).
- c) The Contractor shall submit a color coded map and street list indicating the street segments to be slurry sealed and the scheduled date of application. The schedule shall allow residents on the streets to be slurry sealed ample on-street parking within a reasonable distance from their homes. A distance of less than 600 feet will be considered a reasonable distance.
- d) All versions of the Schedule shall be based solely on the Work as awarded, and shall exclude any substitute proposals even if the Contractor pursues a substitution in accordance with provisions of the Contract.
- e) The approved proposals and approved Change Orders shall be included in the Schedule updates.
- f) Total float is the number of days by which a part of the Work in the Schedule may be delayed from its early dates without necessarily extending the Contract Time. The Contract float is the number of days between the Contractor's anticipated date for early completion of the Work, or specified part, and the corresponding Contract Time. Total float and Contract Time float belong to the Project and are not for the exclusive benefit of any Party. They shall be available to the City or the Contractor to accommodate changes in the Work or to mitigate the effect of events which may delay performance or completion.
- g) Monthly progress payments are contingent upon the submittal of an updated Schedule to the Engineer. The City may refuse to recommend the whole or part of any monthly payment if, in the Engineer's opinion, the Contractor's failure, or refusal to provide the required Schedule information precludes a proper evaluation of the Contractor's ability to complete Project within the Contract Time.
- h) The Schedule shall show a breakdown of Work into activities and relationships to the extent required to effectively manage the Work. The Schedule shall show the division of the Work into activities and specify the progression from the Notice to Proceed (NTP) to the end of the Contract Time.

- i) The Schedule shall include appropriate time allowances and constraints for submittals, items of interface with Work performed by others, and specified construction, start-up and performance tests.
- j) The Contractor shall include in the Schedule inclusive in the Contract Time allotted, three 3 Working Days for the City to conduct a thorough walk-through.
- k) The Contractor shall include in the Schedule inclusive in the Contract Time allotted 10 Working Days for generation of the punchlist. The Contractor shall Work diligently to complete all punchlist items within 20 Working Days after officially being provided the punchlist by the Engineer.
- l) If the Contractor modifies or changes the Schedule, for Change Order Work or otherwise, the Engineer shall be notified in writing with an explanation.
- m) Comments made by the Engineer on the Schedule during review will not relieve the Contractor from compliance with requirements of the Contract. The Engineer may request that the Contractor and major Subcontractors (defined herein as being any Subcontractor or Supplier with 5% or more of the value of the Contract) participate in review of any Schedule submission. The Schedule revisions shall be submitted within 10 Working Days after the Engineer's review.
- n) The Schedule shall show work to be done by the City personnel, such as but not limited to, submittal reviews (separate tasks for each), sewer televising, water main connections, water testing, and operational performance tests as separate tasks. The Schedule shall show appropriate time allowances for Work performed by other agencies.
- o) If completion of any part of the Work, delivery of equipment or materials, or provision of the Contractor submittals is behind schedule and will impact the completion date of the Work, the Contractor shall submit a written recovery plan acceptable to the Engineer for completing the Work by the current Contract completion date.
- p) The Contractor shall not be entitled to any extension in Contract Time, or recovery for any delay incurred because of extensions in an early completion date, until all Contract float is used, performance of the Work extends beyond the corresponding Contract Time, and a recovery plan is submitted demonstrating that the delay cannot be mitigated or offset through actions such as rescheduling Work.
- q) Misrepresentation of actual Work durations in order to suppress available float time shall be cause for rejection of the Schedule and any revisions or updates.
- r) The Schedule shall include procurement related activities which lead to the delivery of permanent materials to the Site in a timely manner. Procurement activities include activities such as preparation of Shop Drawings and Working Drawings, review and acceptance of Shop Drawings and Working Drawings, materials fabrication, materials delivery, etc., as appropriate.

- s) The Schedule shall be reasonably balanced over the construction duration. Upon receipt, the Engineer will review the Schedule and provide comments, as appropriate, for revision by the Contractor.
- t) Each Schedule activity shall be assigned a budget. Separate Bid items shall be separate activities. The Schedule shall specify costs for each phase of the Contract. The cost value of all Schedule activities shall equal the Contract values shown in the Bid both individually and in total and include Change Orders.
- u) If the Engineer questions the logic of the Schedule, the Engineer may at any time request a Schedule narrative that describes the approach to the Work and the rationale used to develop the Schedule relationships and logic.
- v) When specified in the Contract Documents, the 90-day Plant Establishment Period is included in the stipulated Contract Time and will begin with the acceptance of the planting in accordance with the Special Provisions.

ADD: 6-1.1.1 Contracts Less Than \$1,000,000 In Value. The Contractor shall provide the Schedule to the Engineer at the preconstruction meeting. At a minimum, the Schedule shall conform to the following:

- a) Provide a fully developed horizontal bar-chart type schedule.
- b) Provide a separate time bar for each significant construction activity.
- c) Provide a continuous vertical line to identify the first Working Day of each week.
- d) Within each time bar, indicate estimated completion percentage in 10% increments. As Work progresses, place a contrasting mark in each bar to indicate actual completion.
- e) Indicate graphically sequences necessary for completion of related portions of the Work.
- f) Be of sufficient size to show data for the entire Contract Time.

ADD: 6-1.1.2 Contracts With More Than \$1,000,000 In Value. The Contractor shall provide the Schedule to the Engineer no later than the date of the pre-construction meeting. The Contractor may provide a look-ahead schedule for the first 90 days of the Contract Time to the Engineer, prepared in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK." If the Contractor selects to provide a 90 days look-ahead schedule, the Schedule covering the full Contract Time shall be submitted and approved within 4 weeks after NTP.

The Contractor shall use any scheduling product capable of producing the required information in accordance with 6-1, "CONSTRUCTION SCHEDULE AND

COMMENCEMENT OF THE WORK”, for the computerized CPM scheduling and monthly update reports. Electronic file submittals shall be compatible with formats used by the City.

In addition to the electronic submittal of the Schedule, the Contractor shall provide hard copy tabular reports in accordance with 2-5.3, “Submittals.” The Schedule shall contain as a minimum the following information:

- a) The Schedule shall include the Project Name, City’s Project identification numbers, the Contractor’s name, address and phone number, dates of original schedule and latest revision, revision number, and Contract Time.
- b) The Schedule shall be of sufficient detail to assure adequate planning has been done for proper execution of the Work such that, in the sole judgment of the Engineer, it provides an appropriate basis for monitoring progress.
- c) The Schedule shall show the sequence, duration, both early and actual start and end dates of each activity, interdependence, critical path and percentage of completion status of all activities required for the complete performance of Work. It shall begin with the date of issuance of the NTP and include construction activities including submittal review, operation checks, final walk-through, and punchlist generation.
- d) The Schedule shall include the cost associated with each activity and the total cost for each phase of the Contract. The cost information shown in the Schedule will be used for schedule evaluation and budgetary forecasting purposes only, and shall not be construed as entitlement for payment.
- e) The graphical reports when specified or required by the Engineer shall be in a precedence diagram format, shall be plotted on a time-scaled calendar, and shall expressly identify the Contract Time, the critical path(s) and activities.
- f) Activities shall be shown on their early dates, with their total float noted beside them. Connections between activities whether on the same sheet or on different sheets, shall identify both predecessor and successor Work. Activity data shall include description of Work, activity costs (budget), activity duration and special codes.
- g) Activity data shall include description of the Work, activity duration, percent completed, and any special codes required with the following information:
 - i. Current status of the activity.
 - ii. Remaining duration of the activity.
 - iii. Actual start and finish dates for the activity in progress or completed.
- h) The Schedule updates shall include both forecast and actual cost and schedule data.
- i) The sub-tasks for lump sum Bid items shown on the Schedule shall be submitted in accordance with 9-2, “LUMP SUM ITEMS.”

- j) The Schedule shall indicate the estimated person days and material quantities for each construction activity.
- k) For those activities started but not yet completed at the time of submittal, the updated Schedule shall reflect the percentage of costs remaining, as agreed between the Contractor and the Engineer, for an estimate of the remaining budget.

6-1.2 Commencement of Work. ADD the following:

Unless specifically authorized by City in writing, the Contractor shall not begin any construction activities on the Project until CEQA (and NEPA, if applicable) review has been completed as evidenced by certification of an environmental impact report, mitigated negative declaration, negative declaration, or by issuance of an exemption, as applicable.

ADD: 6-1.3 Work Outside Normal Hours. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise indicated in the Contract Documents, Work at the Site shall be performed during normal working hours. Normal working hours refers to the working hours identified in the Contract Documents. The Contractor shall not work during non-normal working hours or on Saturday, Sunday, or any the City observed holiday without the Engineer's written consent. If approved, night work shall be completed at night between the hours of 7:00 P.M. - 5:00 A.M. unless otherwise specified on the Plans, in the Special Provisions, or on the traffic control permits.

The Engineer will coordinate inspection staff, to the extent possible, to accommodate Project inspection requirements. If the Contractor's request is approved, the Contractor will be responsible for reimbursing the City for all costs to provide inspection services required to monitor the Work outside of normal working hours. The Contractor shall be billed at the stipulated hourly rate to cover the City's expenses for the inspection services and a deductive Change Order will be issued.

The Contractor shall be required to obtain a noise abatement permit when such a permit is required to perform Work outside the normal working hours.

Special Note: Insofar as the City's Municipal Code Section 9.50.060 may exempt public works projects from requirements to mitigate the generation of noise as a result of the Contractor's operations, the Contractor will be required to comply with applicable mitigation measures related to noise that may be included in the City's CEQA and/or NEPA environmental document. Any work occurring outside normal hours that may generate noise will be required to mitigate the noise to the greatest degree possible at the Contractor's expense, as required by the Engineer.

The Engineer retains the sole authority to deny any work occurring outside normal hours if in his determination such work would generate noise too disruptive to the public.

ADD: 6-1.5 Contract Time Extensions. The Contract Time shall not be modified except by Change Order. The Contractor shall immediately submit to the City a written request for a Change Order to modify the Contract Time, but in no event later than 24 hours after the occurrence and discovery of the event(s) giving rise to the request. The Contractor shall include in its request a general description of the basis for and the estimated length of any extension and submit supporting data. Any City approval of a request shall be contingent upon the Contractor's submission of a written statement that the Contract Time extension reflects the entire extension to which the Contractor is entitled as a result of the occurrence of the event(s).

The City will not grant an extension in Contract Time unless the Contractor demonstrates through an analysis of the critical path that: 1) the increases in the time to perform all or part of the Project, beyond the Contract Time, arise from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, their agents, officers, and/or employees; and 2) the causes actually rendered performance of all or part of the Project beyond the corresponding Contract Time, despite the Contractor's reasonable and diligent actions to avoid the extension.

Delays attributable to and within the control of the Contractor's Subcontractors shall be deemed to be delays within the control of the Contractor. The City will not allow time extensions for these delays.

The City will issue a periodic (usually weekly or monthly) document that will stipulate the Contract Time. If the Contractor does not agree with this document, the Contractor shall within 15 days after receipt of the statement submit to the City for review a written protest supporting the Contractor's objections to the document. The Contractor's failure to file a timely protest shall constitute the Contractor's acceptance of the City's weekly document.

The Contractor shall be fully responsible for any delays arising from the Contractor's design of the Project when engineering services are included in the Work.

ADD: 6-1.6 Excusable Delays. To the extent any of the following events results in an actual delay in the Work affecting Work activities on the critical path, such shall constitute an "Excusable Delay", to the extent not set forth below, a delay will be considered an "Inexcusable Delay":

- a) Failure or inability of the City to make available any portion or the entire Site in accordance with the requirements of the Schedule.
- b) Failure or inability of the City or the Contractor to obtain necessary zoning changes, variances, code changes, permits or approvals from any governmental authority, or failure to obtain any street or alley vacations required for the performance of the Work, except to the extent due to the fault or neglect of the Contractor as determined by the City.

- c) Delays resulting from the acts or omissions of Separate Contractors, except to the extent Separate Contractors perform their work properly and in accordance with the Schedule.
- d) Delays resulting from Force Majeure.
- e) Differing, unusual or concealed site conditions that could not reasonably have been anticipated by the Contractor in preparing the Schedule.
- f) Delays resulting from the existence or discovery of hazardous materials or waste on the Site not brought to the Site by the Contractor.
- g) Delays resulting from changes in Applicable Laws occurring after the date of execution of this contract;
- h) Delays occurring due to the acts or omissions of the City and those within the control of the City.
- i) Delays resulting from the City-mandated suspensions of Work.

ADD: 6-1.7 Payment. Payment for the Construction Schedule shall be included in the various Bid items unless a Bid item has been provided.

6-4 TERMINATION OF THE CONTRACT FOR DEFAULT. DELETE the first paragraph in its entirety and SUBSTITUTE the following:

If one or more of the following events occur prior to acceptance of the Work, the Contractor shall be considered in default of the Contract:

- a) becomes insolvent, assigns its assets for the benefit of its creditors, is unable to pay debts as they become due, or is otherwise financially unable to complete the Work;
- b) abandons the Work by failing to report to the Work Site and diligently prosecute the Work;
- c) disregards or violates provisions of the Contract Documents or City's instructions;
- d) fails to prosecute the Work according to the approved schedule without excusable delays in conformance with 6-6, "DELAYS AND EXTENSIONS OF TIME;"
- e) disregards Laws or Regulations of any public body having jurisdiction;
- f) commits continuous or repeated violations of approved or legislated safety requirements; or
- g) failure to notify the Engineer upon discovery of items of Native American, Archaeological, or Paleontological interests.

Notices under this section shall be in accordance with 2-1.1.3, "Special Notices."

The City will notify the Contractor and the Surety of the City's intent to find the Contractor in default. If Contractor fails to commence satisfactory correction of a default within 5 Working Days after receipt of a notice to cure, or to diligently continue satisfactory and timely correction of the default thereafter, then the City:

- a) may terminate the Contractor's right to perform under this Agreement by issuing a default notification to the Contractor and its Surety,
- b) may use any materials, equipment, tools or other facilities furnished by the Contractor to complete the Contractor's work without any further compensation to the Contractor for such use, and
- c) may furnish those materials, equipment, tools and other facilities to others to the extent the City deems necessary to maintain the orderly progress of the Work.

The Contractor shall be entitled to no further payment until the remaining portion of the Work has been completed. The Contractor will be paid the actual amount due based on Contract Unit Prices or lump sum Bid and the quantity of the Work completed at the time of default, less damages caused to the City by acts of the Contractor.

Costs incurred by the City in performing the Contractor's work, plus a markup of 15% on those costs for overhead, shall be deducted from any money due or to become due to the Contractor. The Contractor shall pay to the City any amount by which those costs and markup exceed the unpaid balance of the Contract Price.

Upon receipt of the Notice of Termination for Default, the Surety shall immediately takeover and assume the control of and perform the Work as the successor to the Contractor. The Surety shall assume all rights, obligations, and liabilities, including liquidated damages that have accrued under the Contract. The Surety shall maintain the Site and all of its safety controls. If the Surety fails to maintain the Site, the City may correct unsafe conditions and charge the Surety for all costs incurred. When the Surety assumes any part of the Work, it shall take the Contractor's place in all respects for that part, and will be paid by the City for Work performed by it in accordance with the Contract. When the Surety assumes the entire Contract, all money due the Contractor at the time of its default shall be payable to the Surety as the Work progresses, subject to the terms of the Contract.

Within 15 Working Days of the notice of Termination for Default, the Surety shall provide a written plan detailing the course of action it intends to take to remedy the default. The City will review and notify the Surety if the plan is satisfactory.

If the Surety fails to submit the plan or to maintain progress on the plan once it's been approved by the City, the City may exclude the Surety from the premises. The City may then take possession of all material and equipment and complete the Work by the City

forces, by letting the unfinished Work to another Contractor, or by a combination of such methods. In any event, the cost of completing the Work shall be charged against the Contractor and its Surety and may be deducted from any money due or becoming due from the City. If the amounts due under the Contract are insufficient for completion, the Contractor or Surety shall pay to the City within 30 days after the City submits an invoice for all costs in excess of the remaining Contract Price.

The provisions of this subsection shall be in addition to all other rights and remedies available to the City under law.

6-5 TERMINATION OF THE CONTRACT FOR CONVENIENCE. DELETE in its entirety and SUBSTITUTE the following:

The City may terminate the Contract if it becomes impossible or impracticable to proceed, because of conditions or events beyond the control of the City.

Notices under this section shall be in accordance with 2-1.1.3, "Special Notices."

Upon receipt of written notice of termination the Contractor shall immediately cease all work, except work the Contractor is directed to complete or required to complete for public safety and convenience. The Contractor shall immediately notify Subcontractors and suppliers to immediately cease their work. In case of Termination for Convenience, the Contractor shall be paid (without duplication);

- a) for completed and acceptable work executed in accordance with the Contract prior to the effective date of termination;
- b) for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, suppliers and others; and
- c) for reasonable expenses directly attributable to termination.

After termination, the Contractor shall submit a final termination settlement proposal to City in the form and with the certification prescribed by the City. The Contractor shall submit the proposal no later than 3 months from the effective date of termination, unless extended, in writing, by the City upon written request of the Contractor within the 6 month period.

If the Contractor fails to submit the proposal within 3 months, the City may determine the fair and reasonable amount, if any, due the Contractor as a result of the termination. The City will pay the Contractor the amount determined. If the Contractor disagrees with the amount determined by the City as fair and reasonable, the Contractor shall provide notice to the City within 30 days of receipt of payment. Any amount due shall be as later determined by arbitration, if the City and the Contractor agree thereto, or as fixed in a court of law.

All settlements related to termination of the contract in accordance with this section will be subject to the approval of the City Council before ultimately becoming final.

ADD: 6-5.1 Termination of the Contractor's Performance of Work. The City may terminate, subject to the express terms and conditions set forth below, the Contractor's performance of Work under this contract, in whole or, from time to time, in part, if the City Council does not appropriate sufficient monies to fund the Contract. The Engineer will terminate, on behalf of the City, by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

ADD: 6-5.2 Notice of Termination. Notice of Termination is from City to the Contractor terminating the Contract in accordance with 6-5, "TERMINATION OF CONTRACT."

After receipt of the Notice of Termination, and except as otherwise directed by the Engineer, the Contractor shall immediately proceed as follows:

- a) Stop Work immediately or in accordance with the Notice of Termination.
- b) Immediately place no further subcontracts for materials, services, or facilities, except as necessary to complete any authorized continued portion of the Contract.
- c) Immediately terminate all subcontracts to the extent that they relate to the Work terminated;
- d) With approval by the Engineer, settle all outstanding obligations arising from the termination of subcontracts; the approval of which will be final for purposes of this section.
- e) As directed by the Engineer, transfer the title and deliver to the City, completed or partially completed drawings, plans, calculations, specifications and any other documents and records that, if the Contract had been completed, would be required to be furnished to the City.
- f) Complete performance of the Work not terminated.
- g) Take all necessary steps and actions to minimize all costs to the City as a result of the termination.
- h) Take any action that may be necessary, or that the Engineer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the City has or may acquire an interest.

ADD: 6-5.3 Termination Settlement. After termination, the Contractor shall submit a final termination settlement proposal to the Engineer in the form and with the certification prescribed by the Engineer. The Contractor shall submit the proposal promptly, but no later than 3 months from the effective date of termination, unless extended, in writing, by the Engineer upon written request of the Contractor within this 3 month period. If the

Engineer determines that the facts justify it, a termination settlement proposal may be received and acted on after 3 months or any extension. If the Contractor fails to submit the proposal within the time allowed, the City may, in good faith, determine, on the basis of information available, the fair and reasonable amount, if any, due the Contractor as a result of the termination and pay the amount determined. If the Contractor does not agree that the amount determined by the Engineer is fair and reasonable and if the Contractor gives notice of such disagreement to the City in accordance with this subsection, within 30 days of receipt of payment, then the amount due shall be as later determined by arbitration, if the City and the Contractor agree thereto, or as fixed in a court of law.

ADD: 6-5.4 Payment to the Contractor Due to Termination. Subject to 6-5.3, "Termination Settlement" the Contractor and the Engineer may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. The agreed amount, whether in accordance with this subsection or 6-5.5, "Failure to Agree on Payment," exclusive of costs shown in 6-5.5, "Failure to Agree on Payment," subparagraph C, may not exceed the total dollar amount authorized by the City as reduced by (1) the amount of payments previously made; and (2) the Contract Price of work not terminated. The contract shall be amended, and the Contractor paid the agreed amount. Subsection 6-5.5, "Failure to Agree on Payment," shall not limit, restrict, or affect the amount that may be agreed upon to be paid in accordance with this subsection.

ADD: 6-5.5 Failure to Agree on Payment. If the Contractor and the City fail to agree on the whole amount to be paid because of the termination of Work, the City will pay the Contractor the fair and reasonable amounts determined in good faith by the City as follows, but without duplication of any amounts agreed on in accordance with 6-5.4, "Payment to Contractor Due to Termination" above:

- a) The Contract Price for completed services accepted by the City not previously paid for adjusted for any saving of freight and other charges.
- b) The total of:
 - i. The costs incurred in the performance of the Work terminated, including initial costs and preparatory expense allocable thereto, but excluding any costs attributable to services paid or to be paid in accordance with 6-5.6, "Failure to Agree on Payment";
 - ii. The fair and reasonable cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the Contract if not included in subdivision "a", above;
 - iii. A sum, as provided in subdivision "a", above, determined by the Engineer to be fair and reasonable under the circumstances; however, if it appears that the Contractor would have sustained a loss on the entire contract, had it been completed, the City will allow no profit and shall reduce the settlement to reflect the indicated rate of loss.

- iv. The reasonable costs of settlement of the Work terminated, including:
 - a. Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination of settlement proposals and supporting data;
 - b. The termination and settlement of subcontracts (excluding the amounts of such settlements); and
 - c. Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of property in which the City has or may acquire an interest.

ADD: 6-5.6 Payment for Property Destroyed, Lost, Stolen, or Damaged. Except to the extent that the City expressly assumed the risk of loss, the Engineer shall exclude from the amounts payable to the Contractor in accordance with 6-5.5, "Failure to Agree on Payment", the fair value, as determined by the Engineer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the City.

ADD: 6-5.7 Determination of Amount Due the Contractor. In arriving at the amount due the Contractor in accordance with this section, there shall be deducted:

- a) all un-liquidated advance or other payments to the Contractor under the terminated portion of this contract;
- b) any claim which the City has against the Contractor under this contract; and
- c) the agreed price for or the proceeds of sale of materials, supplies, or other things acquired by the Contractor or sold under the provisions of this section and not recovered by or credited to the City.

ADD: 6-5.8 Partial Termination. If the termination is partial, the Contractor may file a proposal with the Engineer for an equitable adjustment of the price(s) of the continued portion of the Contract. The City will make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this section shall be requested within 90 days from the effective date of termination, unless extended, in writing, by the Engineer.

ADD: 6-5.9 Partial Termination Payments. The City may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the Contract if the Engineer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

If the total payments exceed amounts finally determined to be due, the Contractor shall repay the excess to the City upon demand, together with interest. Interest shall be at a rate of 6% per annum compounded daily and shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's

termination settlement proposal because of retention or disposition, or a later date determined by the Engineer because of the circumstances.

ADD: 6-5.10 Records and Documents Relating to Termination. Unless otherwise provided in the Contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs, expenses, and settlement under this contract. The Contractor shall make these records and documents available to the City, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Engineer, photographs, microphotographs, and other authentic reproductions may be maintained instead of original records and documents.

ADD: 6-5.11 Rights of the City Preserved. Where the Contract has been terminated by the City in accordance with 6-5, "Termination of the Contract for Convenience" the termination will not affect any rights or remedies of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies paid to the Contractor by the City shall not release the Contractor from liability.

6-6 DELAYS AND EXTENSIONS OF TIME.

6-6.1 General. ADD the following:

Whenever the Contractor foresees any delay in the prosecution of the Work, and in any event immediately upon the occurrence of any delay which the Contractor regards as unavoidable, the Contractor shall notify the Engineer, in writing, of the probability of the occurrence of such delay and its cause.

It will be assumed that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found by him to have been unavoidable.

The Contractor shall make no claims that any delay not called to the attention of the Engineer at the time of its occurrence has been an unavoidable delay.

ADD: 6-6.1.1 Damages Caused By Act Of God. As provided in §7105 of the California Public Contract Code, if this contract is not financed by revenue bonds, the Contractor shall not be responsible for the cost of repairing or restoring damage to the Project when damage was proximately caused by an Act of God, in excess of 5% of the Contract Price if:

- a) the Project damaged was built in accordance with the Contract requirements, and
- b) there are no insurance requirements in the Contract for the damages.

ADD: 6-6.3.1 City Right to Stop Work. The City, may, at any time and without cause, suspend the Project or any portion thereof for a period of not more than 90 days by written notice to the Contractor. The Contractor shall resume the Project on receipt from the City of a notice of resumption of Work.

The City reserves the right to shut down any trenching operation if the Contractor is not proceeding within a reasonable period of time to restore the pavement and clean up after himself. A reasonable period of time is considered to be 5 Working Days after backfilling any trench excavated in public streets. The period of time allowed will be determined by the Engineer and is not subject to dispute by the Contractor.

ADD: 6-6.5 Contract Time Extension and Schedule Analysis. A claim for extension in Contract Time will not be granted unless the Contractor can demonstrate through a Critical Path Method (CPM) analysis of the Schedule's critical path(s) that the increases in the time to perform or complete the Work, or specified part of the Work, beyond the corresponding Contract Time(s) arise from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, and that such causes in fact lead to performance or completion of the Work, or specified part in question, beyond the corresponding Contract Time, despite the Contractor's reasonable and diligent actions to guard against those effects.

Fragnet is a group of schedule network activities representing a delay or change event. The Schedule analysis shall use delay fragnets to show the impact of the Work that is the basis of the Claim on specific impacted critical path Schedule activities.

Where the Contractor is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay to a "critical path" activity beyond the control of both the City and the Contractor, an extension of the Contract Times (or Milestones) in an amount equal to the time lost on the critical path of the Project due to such delay shall be the Contractor's sole and exclusive remedy for such delay.

The City may elect, at its sole discretion, to grant an extension in Contract Time, without the Contractor's request, because of delays or other factors.

ADD: 6-6.6 The City Not Liable. In no event shall the City be liable to the Contractor or other parties for damages arising out of or resulting from (i) delays caused by or within the control of the Contractor, or (ii) delays beyond the control of both parties e.g., fires, floods, epidemics, abnormal weather conditions, acts of God, war, or terrorist attack, closure of the City facilities mandated by State or Federal agencies, or acts or neglect by utility owners or other contractors performing other work as contemplated by Section 7, "RESPONSIBILITIES OF THE CONTRACTOR."

ADD: 6-6.7 Event of Force Majeure (Event). Any party to this contract may be excused for any delay or failure to perform its duties and obligations except for obligations to pay money, caused by and to the extent that such failure or delay is caused by an Event.

If an Event causes a delay or failure in performance of only a portion of the obligations of a Party, then only that portion of performance which was delayed or prevented by such cause shall be deemed excused. Performance of all other obligations of a Party shall not be excused by an Event. Any delay or failure to perform shall only excuse the Party for a period no longer than the delay or failure in performance caused by such Event. The Contractor shall not be entitled to damages or additional payment for any delay caused by an Event.

6-7 TIME OF COMPLETION.

6-7.1 General. DELETE in its entirety and SUBSTITUTE the following:

Particular attention is directed to the provisions of Section 6-1, "Construction Schedule and Commencement of Work," Section 6-7, "Time of Completion," and Section 6-9, "Liquidated Damages" of the Standard Specifications.

After the Contract has been approved by the City, and a written Notice to Proceed has been issued to the Contractor, the Contractor shall start the Work within 10 working days after the date specified in said Notice to Proceed.

Said Work shall be diligently prosecuted to completion before the expiration of:

250 WORKING DAYS

from the date specified in the Notice to Proceed issued by the City. Said time of completion does not include time associated with ordering long lead-time items. Contractor shall refer to Section 4-2 of these Special Provisions for requirements associated with ordering long lead-time items.

In accordance with Section 6-9, "Liquidated Damages," and as set forth in the Agreement, the Contractor shall pay to the City as liquidated damages the sum set forth in the Agreement per day for each and every calendar day's delay in finishing the Work in excess of the number of working days prescribed above.

The following shall be included in the stipulated Contract Time: Any number of Working Days required for walk through and preparation and completion of Punchlist items specified in 6-1, "Construction Schedule and Commencement of the Work."

If the Contract Documents require the Contractor to prepare engineered Traffic Control Plans (TCP) prior to the issuance of the NTP, the Contractor is entitled to an additional 20 Working Days to prepare and obtain approval of the TCP. These 20 Working Days include time for preparation of the TCP and the City's review. If the Contractor chooses to exercise this right, the Contractor shall inform the Engineer at the Pre-Construction meeting. In no event shall the NTP be issued more than 20 Working Days from the Pre-Construction meeting.

The Contractor may choose at any time after the Pre-Construction meeting to request the Engineer's approval to start Work in other areas that do not require engineered TCP. In this case, the Contractor shall forfeit the 20 Working Days to prepare the engineered TCP, and the NTP will be issued. The engineered TCP shall be done concurrently and no additional time will be granted.

6-7.2 Working Days. DELETE in its entirety and SUBSTITUTE the following:

A working day is any day within the period between the date of the start of the Contract time as specified in Section 6-1 and the date of field acceptance of the Work by the Engineer, other than:

1. Saturday,
2. Sunday,
3. Any day designated as a holiday by the City,
4. Any other day designated as a holiday in a Master Labor Agreement entered into by the Contractor or on behalf of the Contractor as an eligible member of a contractor association,
5. Any day the Contractor is prevented from working at the beginning of the workday for cause as specified in Section 6-6.1, or
6. Any day the Contractor is prevented from working during the first 5 hours with at least 60 percent of the normal work force for cause as specified in Section 6-6.1.

6-7.3 Contract Time Accounting. After the Second sentence ADD the following:

The Engineer's periodic report for Contract Time accounting will be issued at least once a month.

6-8 COMPLETION, ACCEPTANCE, AND WARRANTY. DELETE second paragraph in its entirety and SUBSTITUTE the following:

The Contractor's obligation to perform and complete the Work in accordance with the Contract shall be absolute. Neither any payment by the City to the Contractor, nor any use or occupancy of the Work or any part thereof by the City, nor any review of a Shop Drawings and Working Drawing or sample submittal, will constitute an acceptance of Work or any portion of it.

If the Engineer finds materials, equipment, or workmanship which does not meet the terms of the Contract, the Engineer will prepare a Punchlist and submit it to the Contractor. If, in the Engineer's judgment, the Work has been completed, the Engineer will file a NOC with the County Recorder.

ADD: 6-8.4 Defective Work. If the Work, or any part thereof, is found to be defective, whether or not manufactured, fabricated, installed, completed or overlooked and accepted by the City, the Contractor shall, promptly and in accordance with the written instructions of the City e.g., a "punchlist" and within the reasonable time limits stated therein, either correct such defective Work, or, if it has been rejected by the City, remove it from the Site and replace it with non-defective and conforming Work.

If, upon notice, the Contractor fails to immediately correct the Defective Work, or the Contractor fails to correct the Defective Work in a manner conforming to the Contract Documents, the City may order the Contractor to stop all or part of the Project; however, the City's right to stop the Project shall not give rise to any duty on the part of the City to stop Work for the benefit of the Contractor or any other party. The Contractor shall bear all direct and indirect costs and damages that result from the City's stop work notice.

The City may determine in its sole discretion to accept Defective Work in lieu of requiring the Contractor to correct or remove and replace the Defective Work. However, the Contractor shall bear all direct and indirect costs of the Defective Work, and the diminished value to the Project, as determined by the City evaluation. If the City's acceptance of Defective Work occurs prior to Final Payment, the City will issue a Change Order incorporating the necessary revisions in the Contract Documents with respect to the Defective Work and affording the City the appropriate decrease in the Contract Price.

If the Contractor fails to correct, remove, or replace Defective Work within 5 Working Days from the date of written notice from the City, the City may proceed expeditiously with any correction of Defective Work undertaken in accordance with this section. The City may remedy at a sooner time in the event of an emergency. The City may remedy after 5 Working Days from the date of written notice when the Contractor fails to correct the Defective Work in accordance with the Contract Documents, or when the Contractor fails to comply with any other provision of the Contract Documents.

When undertaking remedial action under this section, the City may: exclude the Contractor from all or part of the Site; take possession of all or part of the Work, and suspend the Contractor's Work and or Services related thereto; and incorporate into the Project all materials and equipment stored at the Site or for which the City has paid but the Contractor has stored elsewhere.

The Contractor shall pay for any claims, costs, losses, and damages incurred by the City in remedying any deficiency e.g., all costs of repair or replacement of Defective Work and all costs of repair of any other Work on the Project destroyed or damaged by correction, removal, or replacement of the Contractor's Defective Work.

The Contractor shall not be allowed an extension of the Contract Time or Milestones because of any delay in the performance of the Project attributable to the City's undertaking remedial action to correct Defective Work.

ADD: 6-8.5 Warranties. As a precedent to final inspection, required by the Contract Documents, the Contractor shall deliver to the City all the manufacturers' warranties required by the Contract Documents, with the City named as beneficiary. For all equipment and machinery bearing a manufacturer's warranty that extends for a longer period of time than the Contractor's warranty, the Contractor shall secure and deliver the warranties to the City in the same manner.

The Contractor's warranty shall be in addition to the manufacturers' and suppliers' standard warranties, special warranties, or special warranties of longer durations as may be required.

If the Contractor completes the Project or portions thereof prior to the time the NOC are issued, the Contractor shall preserve equipment by developing and implementing a preventive maintenance program in compliance with manufacturer's recommendations.

ADD: 6-8.5.1 Format Requirements.

- a) Written warranties, except manufacturer's standard printed warranties, shall be on the Contractor's and its agents', material suppliers', installers', or manufacturers' own letterhead, addressed to and for the benefit of the City. Warranties shall be submitted in the format described in this section, modified as approved by City to suit the conditions pertaining to the warranty.
- b) The Contractor shall obtain warranties, executed in triplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of Work. Except for items put into use with City's permission with date mutually agreed upon in writing, The Contractor shall ensure the beginning time of warranty is the Project Completion date.
- c) The Contractor shall verify that documents are in proper form, contain full information, and are notarized.
- d) The Contractor shall verify that warranties are signed by both The Contractor and the appropriate agent.
- e) The Contractor shall retain warranties until the time specified for submittal to City.
- f) The warranties shall be provided to City with a neatly typed Table of Contents, identifying each warranty with the number and title of the applicable specification section requiring the warranty and the name of the product or Work item.
- g) Each warranty shall be separated with index tab sheets keyed to the Table of Contents listing. Complete information shall be provided, using separate typed sheets as necessary. The information shall include a list of Subcontractors, supplier, and manufacturer, with name, address and telephone number of responsible principal.

ADD: 6-8.6 Requirements Preparatory To Requesting a Walk-through. Walk-through is the procedure used by the City to generate a Punchlist prior to Acceptance.

The following items shall be required prior to requesting a walk-through:

- a) Remove temporary facilities from the Site.
- b) Thoroughly clean the Site.

- c) Provide completed and signed Red-lines in accordance with 2-5.4, "Red-lines Drawings."
- d) Provide all material and equipment maintenance and operation instructions and/or manuals.
- e) Provide all warranties and guarantees required by the Contract Documents.
- f) Provide all tools which are a permanent part of equipment installed in the Project.
- g) Provide and properly identify all keys, construction and permanent.
- h) Provide all final Special Inspection reports required by the Uniform Building Code.
- i) Provide all certificates for materials, back-flows, glulam beams, underground storage tanks, etc.
- j) Provide all items that this contract requires to be supplied as extra stock. All items shall be wrapped, sealed, or placed in a container as necessary to allow for storage by the City for future use. The amount specified in this contract shall be verified by the City and the Contractor.
- k) Ensure all EOCP documents and certified wage rate documents (if applicable) have been submitted from the beginning of the job to complete close-out.

ADD: 6-8.7 Walk-through and Punchlist Procedure. The following procedure outlines the steps to be taken upon the Contractor's assertion that the Project is complete:

- a) When the Contractor considers that the Work and Services are complete, the Contractor shall in writing notify the City that the Project is complete and request that the City perform a walk-through for generation of a Punchlist. The Contractor shall notify the City at least 7 days in advance of the time the walk-through is to be performed.
- b) The City will determine if the Contractor is ready for a walk-through by verifying whether the Contractor has provided or completed all items as required by 6-8.1, "Defective Work," whether the Contractor has obtained the applicable certifications, and by evaluating completeness by inspecting the Project and the specified Work required by the Contract Documents.
- c) If the Work includes underground sewer conduit installations, the inspection will include televising in accordance with 306-1.4.8, "Televising Sewer Mains and Storm Drains."
- d) The City will facilitate a walk-through.

- e) The Contractor shall make available at the Site for walk-through attendees the plans and specifications and the technical data such as submittals and equipment manuals.
- f) The City will generate the Punchlist within 15 Working Days from the date of the walk-through and submit it to the Contractor. The City will not provide a preliminary Punchlist.
- g) If the City begins to generate a Punchlist and finds the Project is not substantially complete as defined herein, the City will terminate the walk-through and notify the Contractor in writing.
- h) If, at any time during the City's evaluation of the corrective Work required by the Punchlist, the City discovers that additional corrective Work is required, the City may include that corrective Work in the Punchlist. The Contractor shall be solely responsible for the Site until the Project is completely operational, all Punchlist items have been corrected, and all operation and maintenance manuals have been accepted by the City.
- i) The City will meet with the Contractor until all Punchlist items are corrected. If the Contractor takes longer than 30 Working Days to complete the corrective Work, the Project shall be subject to re-evaluation.
- j) During the 35 day stop notice/lien period which commences on the date the NOC is recorded, the Contractor shall submit to the City the retention billing with a "Release of Claims" form.
- k) Upon Final Completion, the Contractor shall assemble and deliver to the City all records, documents, warranties, bonds, guarantees, maintenance and service agreements, and maintenance and operating manuals. Written warranties, except manufacturer's standard printed warranties, shall be on the Contractor's and the Contractor's agents, material suppliers, installers, or manufacturer's letterhead, addressed to the Contractor. Warranties shall be submitted in the format described in this section, modified as approved by the City to suit the conditions pertaining to the warranty.

ADD: 6-8.8 Correction of Work During Warranty. If within one year (or a longer applicable warranty period) after the date for commencement of warranties under the Contract Documents, any item of the Work is found to be Defective Work, the Contractor shall correct it promptly after receipt of written notice from the City to do so unless the City has previously given the Contractor a specific written acceptance of such condition after the City has been specifically informed in writing by the Contractor that the condition is not in accordance with the Contract Documents. This period of one year (or a longer applicable warranty period) shall be extended with respect to portions of the Work corrected as part of the warranty requirements.

6-9 LIQUIDATED DAMAGES. DELETE in its entirety and SUBSTITUTE the following:

6-9.1 General Liquidated damages, if any, accrue starting on the 1st day after the expiration of the working days through the day of Contract acceptance except as specified in Sections 6-9.2 and 6-9.3.

The City shall withhold liquidated damages before the accrual date if the anticipated liquidated damages may exceed the value of the remaining work. Liquidated damages for all work except plant establishment are as shown in the following table:

Liquidated Damages

Total bid		Liquidated damages per day
From over	To	
\$0	\$50,000	\$1,200
\$50,000	\$120,000	\$1,500
\$120,000	\$1,000,000	\$1,900
\$1,000,000	\$5,000,000	\$3,000
\$5,000,000	\$10,000,000	\$5,400

If all work except plant establishment is complete and the total number of working days have expired, liquidated damages are \$950 per day.

6-9.2 Failure to Complete Work Parts within Specified Times. The Engineer may deduct specified damages from payments for each day in completing a work part beyond the time specified for completing the work part.

Damages for untimely completion of work parts may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Engineer does not simultaneously assess damages for untimely completion of work parts and for the whole work.

Damages accrue starting the 1st day after a work part exceeds the specified time through the day the specified work part is complete.

6-9.3 Failure to Complete Work Parts by Specified Dates

The Engineer may deduct specified damages from payments for each day in completing a work part beyond the specified completion date for the work part.

Damages for untimely work part completion may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Engineer does not simultaneously assess damages for untimely work part completion and the whole work.

Damages accrue starting the 1st day after an unmet completion date through the day the work part is complete.

6-9.4 Contractor's acknowledgement of Liquidated Damages. Execution of the Contract shall constitute agreement by the City and Contractor that the sum specified herein this Section 6-9.1 is the minimum value of the costs and actual damage caused by the failure of the Contractor to complete the Work within the allotted time. Such sum is liquidated damages and shall not be construed as a penalty, and may be deducted from payments due the Contractor if such delay occurs.

6-10 USE OF IMPROVEMENT DURING CONSTRUCTION. ADD the following:

For equipment or parts of Work possessed and partially utilized by the City, the warranty period shall commence on the date agreed to by the City in writing.

ADD: 6-11 RIGHT TO AUDIT.

6-11.1 The City's Right. The City retains the right to review and audit, and the reasonable right of access to the Contractor's and all Subcontractor's premises to review and audit the Contractor's compliance with the provisions of this contract (City's Right). The City's Right includes the right to inspect and photocopy same, and to retain copies, outside of the Contractor's premises, of any and all records with appropriate safeguards, if such retention is deemed necessary by the City in its sole discretion. This information shall be kept by the City in strictest confidence.

6-11.2 Audit. The City's Right includes the right to examine any and all books, records, documents and any other evidence of procedures and practices that the City determines is necessary to discover and verify that the Contractor is in compliance with all requirements under this contract.

6-11.2.1 Cost Audit. If there is a claim for additional compensation or for changes in Work, the City's Right to Audit includes the right to examine books, records, documents, and any and all other evidence and accounting procedures and practices that the City determines is necessary to discover and verify all direct and indirect costs, of whatever nature, which are claimed to have been incurred, anticipated to be incurred, or for which a claim for additional compensation or for changes in the Work have been submitted.

6-11.2.1.1 Accounting Records. The Contractor shall maintain complete and accurate records in accordance with generally accepted accounting practices in the construction industry. The Contractor shall make available to the City for review and audit all Project related accounting records and documents, and any other financial data. Upon the City's request, the Contractor shall submit exact duplicates of originals of all requested records to the City.

6-11.3 The City's Right -Binding on Subcontractors. The Contractor shall include the City's Right in accordance with 6-11, "RIGHT TO AUDIT" in any and all of their

subcontracts, and shall ensure that 6-11, "RIGHT TO AUDIT" is binding upon all Subcontractors.

6-11.4 Compliance Required Before Mediation and Litigation. A condition precedent to proceeding with mandatory mediation and further litigation provided for in 3-6, "DISPUTE RESOLUTION PROCESS" is the Contractor's full compliance with 6-11, "RIGHT TO AUDIT" within 60 days of the date on which the City mails a written request to review and audit compliance.

6-11.5 Access to Records on Federally Funded Projects. The Contractor shall retain all records, books, papers, and documents directly pertinent to the Contract for a period of not less than 5 years after grantees or subgrantees make Final Payments and all other pending matters are closed; and allow access to said records by the grantee, subgrantee, the Federal Grantor Agency, the Comptroller General of the United States, or any duly authorized representatives.

- END OF SECTION -

SECTION 7 – RESPONSIBILITIES OF THE CONTRACTOR

7-2.2 Prevailing Wages. ADD the following sentence to the last paragraph:

For contracts subject to payment of prevailing wages, the Contractor shall submit certified payrolls weekly to the City reflecting the wages of all the Contractor and Subcontractor employees engaged in the Work.

7-3 INSURANCE. DELETE in its entirety and SUBSTITUTE the following:

The insurance provisions herein shall not be construed to limit the Contractor's indemnity obligations contained in this contract.

ADD: 7-3.1 Policies and Procedures. The Contractor shall procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by the Contractor, the Contractor's agents, representatives, officers, employees or subcontractors.

At a minimum, on all contracts, Commercial General Liability, Commercial Automobile Liability, and Worker's Compensation insurance shall be provided. Depending upon the type of construction, nature and location of the Work, the Engineer reserves the right to require the additional policies of insurance related to:

Contractors Pollution Liability Insurance
Contractors Hazardous Transporters Pollution Liability Insurance
Builders Risk
Architects and Engineers Professional Insurance (Errors and Omissions Insurance)

If the Contractor determines these insurance policies are not applicable to the Work, the Contractor shall request the Engineer's waiver of a requirement to submit these insurance policies within 5 working days receipt of City's Notice of Award. All required insurance policies must be returned with the Contractor's executed Agreement.

The Contractor shall maintain this insurance for the duration of this contract and at all times thereafter when the Contractor is correcting, removing, or replacing Work in accordance with this contract. The Contractor's liabilities under this contract, e.g., the Contractor's indemnity obligations, shall not be deemed limited to the insurance coverage required by this contract.

Payment for insurance shall be included in the various items of Work as bid by the Contractor, and except as specifically agreed to by the City in writing, the Contractor shall not be entitled to any additional payment. The Contractor shall not begin any work under this contract until it has provided and the City has approved all required insurance. Policies of insurance shall provide that the City is entitled to 30 days (ten days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of this contract

and the Contractor's failure to maintain or renew coverage or to provide evidence of renewal during the term of this contract may be treated by the City as a material breach of contract.

ADD: 7-3.2 Types of Insurance.

7-3.2.1 Commercial General Liability Insurance. Commercial General Liability Insurance written on the current version of the ISO Occurrence form CG 0001 or an equivalent form providing coverage at least as broad. The policy shall cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract). There shall be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. All costs of defense shall be outside the policy limits. Policy coverage shall be in liability limits of not less than the following:

- (a) \$1,000,000 for each occurrence (combined single limit for bodily injury and property damage)
- (b) \$2,000,000 aggregate for products-completed operations.
- (c) \$1,000,000 umbrella or excess liability.
- (d) Umbrella or excess policy shall follow form over the Contractor's General Liability coverage and shall provide a separate aggregate limit for products and completed operations coverage. The umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

7-3.2.2 Commercial Automobile Liability Insurance. The Contractor shall provide a policy or policies of Commercial Automobile Liability Insurance written on the current version of the ISO form CA 00 01 12 90 or later version or equivalent form providing coverage providing coverage at least as broad in the amount of \$1,000,000 combined single limit per accident, covering bodily injury and property damage for owned, non-owned and hired automobiles ("Any Auto"). All costs of defense shall be outside the limits of the policy.

7-3.2.3 Commercial Pollution Liability Insurance. The Contractor shall procure and maintain at its expense require its subcontractor, as described below to procure and maintain, the Contractors Pollution Liability Insurance including contractual liability coverage to cover liability arising out of cleanup, removal, storage, or handling of hazardous or toxic chemicals, materials, substances, or any other pollutants by the Contractor or any Subcontractor in an amount not less than \$2,000,000 limit for bodily injury and property damage. All costs of defense shall be outside the limits of the policy. Any such insurance provided by a subcontractor instead of the Contractor shall be approved separately in writing by the City. Approval of a substitution of a subcontractor's insurance shall require a certification by the Contractor that all activities for which the Contractors Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance. The deductible shall not exceed \$25,000 per claim.

Contractual liability shall include coverage of tort liability of another party to pay for bodily injury or property damage to a third person or organization. There shall be no endorsement or modification of the coverage limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. Occurrence based policies shall be procured before the Work commences and shall be maintained for the duration of this contract. Claims Made policies shall be procured before the Work commences, shall be maintained for the duration of this contract, and shall include a 12 month extended Claims Discovery Period applicable to this contract or the existing policy or policies shall continue to be maintained for 12 months after the completion of the Work under the Contract without advancing the retroactive date. Except as provided for under California law, the policy or policies shall provide that the City is entitled to 30 days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

7-3.2.4 Contractors Hazardous Transporters Pollution Liability Insurance. The Contractor shall provide at its expense or require its subcontractor to provide, as described below Contractors Hazardous Transporters Pollution Liability Insurance including contractual liability coverage to cover liability arising out of transportation of hazardous or toxic, materials, substances, or any other pollutants by the Contractor or any subcontractor in an amount not less than \$2,000,000 limit per occurrence/aggregate for bodily injury and property damage. All costs of defense shall be outside the limits of the policy. The deductible shall not exceed \$25,000 per claim. Any such insurance provided by a subcontractor instead of the Contractor shall be approved separately in writing by the City. Approval of the substitution of a subcontractor's insurance shall require a certification by the Contractor that all activities for which Contractors Hazardous Transporters Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance.

Contractual liability shall include coverage of tort liability of another party to pay for bodily injury or property damage to a third person or organization. There shall be no endorsement or modification of the coverage limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. Occurrence based policies shall be procured before the Work commences and shall be maintained for the duration of this contract. Claims Made policies shall be procured before the Work commences, shall be maintained for the duration of this contract, and shall include a 12 month extended Claims Discovery Period applicable to this contract or the existing policy or policies shall continue to be maintained for 12 months after the completion of the Work under this contract without advancing the retroactive date. Except as provided for under California law, the policy or policies shall provide that the City is entitled to 30 days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

7-3.2.5 Contractors Builders Risk Property Insurance. The Contractor shall provide at its expense, and maintain until Final Completion and Acceptance of the Work, a Special Form Builders Risk Policy or Policies. This insurance shall be in an amount equal to the replacement cost of the completed Work (without deduction for depreciation) including the cost of excavations, grading, and filling. The policy or policies limits shall be 100% of this contract value of the Work plus 15% to cover administrative costs, design costs, and the costs of inspections and construction management.

Insured property shall include material or portions of the Work located away from the Site but intended for use at the Site, and shall cover material or portions of the Work in transit.

The policy or policies shall include as insured property scaffolding, falsework, and temporary buildings located at the Site. The policy or policies shall cover the cost of removing debris, including demolition.

The policy or policies shall provide that all proceeds thereunder shall be payable to the City as Trustee for the insureds, and shall name the City, the Contractor, Subcontractors, and suppliers of all tiers as named insureds. The City as Trustee shall collect, adjust, and receive all monies which may become due and payable under the policy or policies, may compromise any and all claims thereunder, and shall apply the proceeds of such insurance to the repair, reconstruction, or replacement of the Work.

Any deductible applicable to the insurance shall be identified in the policy or policies documents and responsibility for paying the part of any loss not covered because of the application of such deductibles shall be apportioned among the parties except for the City as follows: if there is more than one claimant for a single occurrence, then each claimant shall pay a pro-rata share of the per occurrence deductible based upon the percentage of their paid claim to the total paid for all insureds. The City shall be entitled to 100% of its loss. Any portion of that loss not covered because of a deductible shall be paid to the City by the Contractor at the same time the proceeds of the insurance are paid to the City as trustee.

Any insured, other than the City, making claim to which a deductible applies shall be responsible for 100% of the loss not insured because of the deductible. Except as provided for under California law, the policy or policies shall provide that the City is entitled to 30 days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies.

7-3.2.6 Railroad Protective Liability Insurance. Railroad protective liability insurance shall be required for any work located on or within 200 feet of an existing railroad right-of-way, unless otherwise specifically waived by the Engineer. Exclusions relating to performance of operations within the vicinity of any railroad, bridge, trestle, roadbed, tunnel, underpass, or cross shall be deleted from all policies to which they may apply. Alternatively, the Contractor may provide separate Railroad Protective Liability insurance providing coverage, including endorsements, equivalent to that required for the CGL described herein.

ADD: 7-3.3 Rating Requirements. Except for the State Compensation Insurance Fund, all insurance required by this contract as described herein shall be carried only by responsible insurance companies with a rating of, or equivalent to, at least "B+, VII" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

7-3.3.1 Non-Admitted Carriers. The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Eligible Surplus Lines Insurers (LESLI list).

All policies of insurance carried by non-admitted carriers shall be subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

ADD: 7-3.4 Evidence of Insurance. The Contractor shall furnish to the City documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and shall furnish renewal documentation prior to expiration of this insurance. Each required document shall be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. The City reserves the right to require complete, certified copies of all insurance policies required herein.

ADD: 7-3.5 Policy Endorsements.

7-3.5.1 Commercial General Liability Insurance

7-3.5.1.1 Additional Insured. To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insureds. The additional insured coverage for Projects for which the Engineer's Estimate is \$1,000,000 or more shall include liability arising out of: (a) Ongoing operations performed by the Contractor or on the Contractor's behalf, (b) Your products, (c) Your work, e.g., the Contractor's completed operations performed by the Contractor or on the Contractor's behalf, or (d) premises owned, leased, controlled, or used by the Contractor; the coverage for Projects for which the Engineer's Estimate is less than \$1,000,000 shall include liability arising out of: (a) Ongoing operations performed by the Contractor or on the Contractor's behalf, (b) Your products, or (c) premises owned, leased, controlled, or used by the Contractor.

7-3.5.1.2 Primary and Non-Contributory Coverage. The policy shall be endorsed to provide that the coverage with respect to operations, including the completed operations, if appropriate, of the Named Insured is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives. Further, it shall provide that any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of the Contractor's insurance and shall not contribute to it.

7-3.5.1.3 Project General Aggregate Limit. The policy or policies shall be endorsed to provide a Designated Construction Project General Aggregate Limit that will apply only to

the Work. Only claims payments which arise from the Work shall reduce the Designated Construction Project General Aggregate Limit. The Designated Construction Project General Aggregate Limit shall be in addition to the aggregate limit provided for the products-completed operations hazard.

7-3.5.2 Commercial Automobile Liability Insurance.

7-3.5.2.1 Additional Insured. Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insureds, with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the Contractor. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

7-3.5.3 Contractors Pollution Liability Insurance Endorsements.

7-3.5.3.1 Additional Insured. The policy or policies shall be endorsed to include as an Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to liability arising out of: (a) Ongoing operations performed by the Contractor or on the Contractor's behalf, (b) the Contractor's products, (c) the Contractor's work, e.g., the Contractor's completed operations performed by the Contractor or on the Contractor's behalf, or (d) premises owned, leased, controlled, or used by the Contractor; Except that in connection with, collateral to, or affecting any construction contract to which the provisions of subdivision (b) of Section 2782 of the California Civil Code apply, this endorsement shall not provide any duty of indemnity coverage for the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives in any case where an agreement to indemnify the City and its respective elected officials, officers, employees, agents, and representatives would be invalid under subdivision (b) of §2782 of the California Civil Code.

In any case where a claim or loss encompasses the negligence of the Insured and the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives that is not covered because of California Insurance Code §11580.04, the insurer's obligation to the City and its respective elected officials, officers, employees, agents, and representatives shall be limited to obligations permitted by California Insurance Code §11580.04.

7-3.5.3.2 Primary and Non-Contributory Coverage. The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. Any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of the Contractor's insurance and shall not contribute to it.

7-3.5.3.3 Severability of Interest. For Contractors Pollution Liability Insurance, the policy or policies shall provide that the Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

7-3.5.4 Contractors Hazardous Transporters Pollution Liability Insurance Endorsements.

7-3.5.4.1 Additional Insured. The policy or policies shall be endorsed to include as an Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to liability arising out of: (a) Ongoing operations performed by the Contractor or on the Contractor's behalf, (b) the Contractor's products, (c) the Contractor's work, e.g., the Contractor's completed operations performed by the Contractor or on the Contractor's behalf, or (d) premises owned, leased, controlled, or used by the Contractor; Except that in connection with, collateral to, or affecting any construction contract to which the provisions of subdivision (b) of §2782 of the California Civil Code apply, this endorsement shall not provide any duty of indemnity coverage for the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives in any case where an agreement to indemnify the City and its respective elected officials, officers, employees, agents, and representatives would be invalid under subdivision (b) of §2782 of the California Civil Code.

In any case where a claim or loss encompasses the negligence of the Insured and the active negligence of the City and its respective elected officials, officers, employees, agents, and representatives that is not covered because of California Insurance Code §11580.04, the insurer's obligation to the City and its respective elected officials, officers, employees, agents, and representatives shall be limited to obligations permitted by California Insurance Code §11580.04.

7-3.5.4.2 Primary and Non-Contributory Coverage. The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. Any insurance maintained by the City and its elected officials, officers, employees, agents and representatives shall be in excess of the Contractor's insurance and shall not contribute to it.

7-3.5.4.3 Severability of Interest. For Contractors Hazardous Transporters Pollution Liability Insurance, the policy or policies shall provide that the Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

7-3.5.5 Builders Risk Endorsements.

7-3.5.5.1 Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City, and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the Named Insured for the City.

7-3.5.5.2 Builders Risk – Partial Utilization. If the City desires to occupy or use a portion or portions of the Work prior to Final Completion in accordance with this contract, the City shall notify the Contractor and the Contractor shall immediately notify its Builder's Risk insurer and obtain an endorsement that the policy or policies shall not be cancelled or lapse on account of any such partial use or occupancy. The Contractor shall obtain the endorsement prior to the City's occupation and use.

ADD: 7-3.6 Deductibles/Self-Insured Retentions. The Contractor shall be responsible for the payment of all deductibles and self-insured retentions. Deductibles and self-insured retentions shall be disclosed to the City at the time the evidence of insurance is provided.

ADD: 7-3.7 Reservation of Rights. The City reserves the right, from time to time, to review Contractor's insurance coverage, limits, deductibles and self-insured retentions to determine if they are acceptable to the City. The City will reimburse Contractor, without overhead, profit, or any other markup, for the cost of additional premium for any coverage requested by the City but not required by this contract.

ADD: 7-3.8 Notice of Changes to Insurance. The Contractor shall notify the City 30 days prior to any material change to the policies of insurance provided under this contract.

ADD: 7-3.9 Excess Insurance. Policies providing excess coverage shall follow the form of the primary policy or policies e.g., all endorsements.

ADD: 7-3.10 Architects and Engineers Professional Insurance (Errors and Omissions Insurance) – For contracts with required engineering services (e.g., preparation of engineered Traffic Control Plans (TCP) by the Contractor) for all of the Contractor's employees or Subcontractors who provide professional engineering services under this contract, the Contractor shall keep or shall require its Subcontractor in full force and effect, Professional Liability coverage with a limit of \$1,000,000 per claim and \$2,000,000 annual aggregate.

The Contractor shall ensure both that: (a) the policy retroactive date is on or before the date of commencement of the Project; and (b) the policy will be maintained in force for a period of three years after completion of the Project or termination of this contract whichever occurs last. The Contractor agrees that for the time period defined above, there will be no changes or endorsements to the policy that affect the coverage provided herein.

If professional engineering services are to be provided solely by a subcontractor, the Contractor shall (a) certify this to the City in writing and (b) agree in writing to require the

Subcontractor to procure Professional Liability coverage in accordance with the requirements set forth above.

7-4 WORKERS' COMPENSATION INSURANCE. DELETE in its entirety and SUBSTITUTE the following:

7-4.1 Workers' Compensation Insurance and Employers Liability Insurance. In accordance with the provisions of §3700 of the California Labor Code, the Contractor shall provide at its expense Workers' Compensation Insurance and Employers Liability Insurance to protect the Contractor against all claims under applicable state workers compensation laws. The City, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by the failure of the Contractor to comply with the requirements of this section. Limits for this insurance shall be not less than the following:

<u>Workers' Compensation</u>	<u>Statutory Employers Liability</u>
Bodily Injury by Accident	\$1,000,000 each accident
Bodily Injury by Disease	\$1,000,000 each employee
Bodily Injury by Disease	\$1,000,000 policy limit

By signing and returning this contract the Contractor certifies that the Contractor is aware of the provisions of §3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code and the Contractor will comply with such provisions before commencing the performance of the work of this contract as required by Section 1861 of the California Labor Code.

7-4.1.1 Workers' Compensation Insurance for Work In, Over, or Alongside Navigable Waters. In addition to the Workers' Compensation Insurance required under the General Conditions of this contract, the Contractor shall provide additional insurance coverage for claims brought under the Longshore and Harbor Workers' Compensation Act, the Jones Act, general maritime law, and any other federal or state laws, resulting from the Contractor's work in, over, or alongside navigable waters.

7-4.2.1 Waiver of Subrogation. The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City, and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from work performed by the Named Insured for the City.

ADD: 7-5.1 Business License. The Contractor and all of its subcontractors shall obtain and pay the applicable fees for a current City Business License, issued by the City, prior to commencement of the work, in accordance with Title 5 of the City's Municipal Code. The Business License can be obtained from the City of Rialto, Business License Office, 150 S. Palm Avenue, Rialto, CA 92376; Phone: (909) 820-2525. Information about the City Business License can also be obtained by visiting the City's website. A City Business License Tax (which is a separate fee from the Business License fee previously noted) will be assessed to the project. Payment for the City Business License Tax is not the responsibility of the contractor or his subcontractors. The tax will be determined after the project is awarded, and will be paid via a City inter-departmental transfer.

ADD: 7-5.2 Permits. The Contractor shall obtain the required permits for the project, including but not limited to those required by: the City of Rialto, City of San Bernardino, County of San Bernardino, and Railroad, as required to perform work within the respective owners' rights of way.

The Contractor's right to enter right-of-way owned, operated, occupied, and/or controlled by Railroad shall be subject to the absolute right of Railroad to cause the Contractor's work to cease if, in the opinion of Railroad, Contractor's activities create a hazard to Railroad's patrons, employees, and operations.

The Contractor shall obtain a Temporary Right of Entry Permit from Railroad prior to entering or constructing on property owned, operated, occupied, and/or controlled by the Railroad. The Contractor shall abide by the terms of the Temporary Right of Entry Agreement. The terms of the Temporary Right of Entry Permit shall govern if there are any conflicts with the Plans and Specifications.

For work requiring coordination with the Railroad, payment for railroad liability insurance, permits, plan review, inspection, flagging, and fees shall be included in the various Bid items and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all work involved to establish, implement, monitor and maintain railroad insurance and comply with the terms of a Railroad Right of Entry Permit, and no additional compensation shall be allowed therefore.

The payment for applying for and obtaining the required permits shall be included in the various Bid items.

ADD: 7-5.3 Caltrans Permit. When applicable and available, a copy of the draft Caltrans permit is included in the Appendix. The City has applied for the permit and the Contractor shall be responsible for pulling the permit prior to construction and supplying any construction method information to do so to Caltrans. The Contractor shall be responsible for paying permit fees prior to construction, complying with all terms of the permit, and arranging and paying for inspection as required by Caltrans.

The Allowance Bid item for Caltrans Encroachment Permit includes all Caltrans permit fees, Caltrans hourly inspection costs, and all costs to obtain the subject permit. If Bid Item is not provided payment shall be included in the various items of Work.

ADD: 7-5.4 Construction Activity Permit, California Division of Occupational Safety and Health (DOSH) – For projects that require excavations greater than 5 feet in depth, the Contractor shall be required to obtain a Construction Activity Permit from the California Department of Industrial Relations, Division of Occupational Safety and Health, for excavation of trenches required for the project. A copy of the Permit shall be provided to the Engineer at the Pre-Construction Conference.

7-6 THE CONTRACTOR'S REPRESENTATIVE. ADD the following:

The designated Contractor's representative shall not be replaced without written notice to the City. During periods when the Work is suspended, the Contractor shall make appropriate arrangements for any emergency work which may be required to be performed under the supervision of the Contractor's representative.

The Contractor shall provide the Engineer with a local phone number at which they or their representative may be contacted 24 hours a day.

ADD: 7-6.1 Project Meetings. The Contractor's field supervisor e.g., superintendent and Project Manager, shall attend all scheduled construction progress meetings and other Project meetings as required by the Engineer. The City's design staff will attend Project meetings on an as-needed basis to address design issues. Construction progress meetings may be weekly, bi-weekly, or monthly as required by the Engineer. Other Project meetings will be scheduled at the sole discretion of the Engineer.

The Engineer will determine the date(s), time(s), and location(s) for all meetings. The Engineer will be responsible for the meeting agendas and meeting minutes. If any of the Contractor's staff cannot attend, the Contractor shall notify the Engineer a minimum of 24 hours in advance, prior to the start of the scheduled meeting. If the Contractor does not provide the required notification the Contractor shall be financially responsible for the costs of the City staff, consultants, or both that attend. The Contractor will be charged a minimum of two hours of the Engineer's time plus the time of other the City employees or representatives that attend the meeting. Lack of participation from the Contractor will be documented and reported in the Contractor's performance evaluation.

The objective of the meetings is to discuss: (1) the status of submittals, (2) requests for information, (3) progress of schedule, (4) disputed items, (5) non-conformance notices, and (6) new business of importance from any member of the meeting.

7-6.1.1 Payment. The payment for the Contractor's attendance of Project meetings shall be included in the various Bid items. All costs assessed to the Contractor for not attending the meetings will be deducted from the monthly invoice.

7-8.4.2 Storage in Public Streets. DELETE the first two sentences and REPLACE with the following:

Equipment, material, or debris shall not be stored or remain in the public right-of-way without prior approval by the Engineer.

7-8.6.1 General. ADD the following:

This project is subject to the requirements of General Permit No. CAS000002 issued by the State Water Resources Control Board through Order NO. 2009-0009-DWQ. This General Permit regulates discharges of pollutants in storm water associated with construction activity (storm water discharges) to waters of the United States from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. Contractor is not responsible for filing a Notice of Intent (NOI) for Permit coverage or a Notice of Termination (NOT) at project end. City staff will file a NOI for permit coverage and file a (NOT) at the end of the project. The Contractor shall refer to and comply with all of the terms of the General Construction Permit for Storm Water Dischargers, available for review online at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo2009_0009_dwq.pdf

7-8.6.3 Storm Water Pollution Prevention Plan (SWPPP). DELETE in its entirety and SUBSTITUTE the following:

Unless specifically prepared for the project and included in the Appendix, the Contractor shall be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) for this project, which shall be submitted to the Engineer for review and approval at the Pre-Construction Conference. The Contractor's attention is directed to the California Department of Transportation (Caltrans) website at:

www.dot.ca.gov/hq/construc/stormwater/manuals.htm

The Caltrans website contains SWPPP templates and other important information that may be useful in the preparation of a SWPPP for public works projects. The Contractor shall ensure that the SWPPP prepared for this project complies with the requirements of General Permit No. CAS000002 and Regional Board Order No. R8-2010-0036, NPDES No. CAS 618036.

Additionally the Contractor shall guarantee that the SWPPP complies with the following measures from the Regulatory Permits and Environmental Commitment Measures:

- Projects shall not discharge substances in concentrations toxic to human, plant, animal, or aquatic life or that produce detrimental physiological responses.
- Projects shall not discharge waste classified as "hazardous" as defined in Title 22 CCR section 66261 and the California Water Code section 19179;
- No oil, petroleum products, or rubbish shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the United States.

- No equipment maintenance will be done within or near any stream channel where petroleum products or other pollutants from the equipment may enter waters of the United States.
- Equipment refueling shall not occur within waters of the United States.
- Any oil or grease leaks shall be immediately cleaned up.

Upon approval of the SWPPP by the Engineer, the City shall submit a Notice of Intent (NOI) to the Regional Water Quality Control Board (RWQCB). Although this project is subject to Board Order 2009-0009-DWQ General Permit No. CAS000002, the Contractor does not need to file a Notice of Intent for coverage under the State Water Resources Control Board's General National Discharge Elimination System (NPDES) Permit for Discharges of Storm Water Runoff Associated with Construction Activity (Statewide General Permit) provided the Notice of Intent is filed with the RWQCB, in accordance with Board Order No. R8-2010-0036, NPDES No. CAS 618036. The Contractor shall refer to and comply with all requirements of the NPDES Permit, available for review online at:

www.waterboards.ca.gov/rwqcb8/board_decisions/adopted_orders/orders/2010/10_036_SBC_MS4_Permit_01_29_10.pdf

The Contractor shall ensure that the SWPPP is developed and amended or revised by a Qualified SWPPP Developer (QSD). The Contractor shall ensure that Best Management Practices (BMPs) within the SWPPP are implemented by a Qualified SWPPP Practitioner (QSP). To demonstrate compliance with requirements of this General Permit, the QSD shall include information in the SWPPP that supports the conclusions, selections, use, and maintenance of BMPs.

The Contractor shall designate the QSD and QSP, as the case may be, as the individuals directly responsible for and implementing the SWPPP requirements, and maintenance of the documentation contained therein, during the course of construction until the project has been accepted as complete by the City. The Contractor shall keep the SWPPP at the project site and make it available for review upon request of a representative of the RWQCB or the Engineer.

The Construction Superintendent shall prepare a Construction Schedule and BMP Sequencing Schedule for the project and include it into the SWPPP at the designated location.

Special Note: The Contractor shall ensure it has prepared, *in advance*, the required SWPPP for submittal at the Pre-Construction Conference. Failure to have prepared an adequate SWPPP for submittal at the Pre-Construction Conference will delay Contractor's start of work, however, the Notice to Proceed shall be issued and working days shall commence, regardless of construction work occurring due to the Contractor's delay in preparing and submitting an adequate SWPPP for the Engineer's approval.

The Construction Superintendent shall prepare a Notice of Termination (NOT), included in the SWPPP, and submit it to the RWQCB following acceptance of the work by the City, but prior to final payment.

Throughout the duration of the work, the Construction Superintendent shall ensure the following construction storm water monitoring actions are performed:

- Conduct site inspections before and after storm events.
- Conduct inspections of construction sites prior to anticipated storm events and after actual storm events to identify areas contributing to a discharge of storm water associated with construction activity, and evaluate whether control practices to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented or whether additional control practices are needed. A record of the inspections must include the date of the inspection, the individual(s) who performed the inspection, and the observations.
- Any noncompliance or anticipated noncompliance shall be reported to the Engineer immediately, for reporting to the Regional Water Quality Control Board (RWQCB). The notifications shall identify the type(s) of noncompliance, describe the actions necessary to achieve compliance, and include a time schedule, subject to the modifications by the RWQCB, indicating when compliance will be achieved.

The Contractor shall maintain a copy of the General Stormwater Permit and the SWPPP at the construction site and shall make the General Stormwater Permit available to operating personnel and local, State, and Federal agencies' representatives during construction activities. Should the Contractor elect not to have a construction field office, the Engineer will, on request, reserve filing space within the facilities for City Inspection Personnel to assist in complying with this requirement.

The Contractor shall allow authorized agents of the California Regional Water Quality Control Board (Regional Board), State Water Resources Control Board, U.S. Environmental Protection Agency, and local storm water management agencies, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter, at reasonable times, upon the construction site and the Contractor's facilities pertinent to the work.
2. Have access to and copy, at reasonable times, any records that must be kept as specified in the General Stormwater Permit.
3. Inspect, at reasonable times, the construction site and related erosion and sediment control measures.
4. Sample or monitor, at reasonable times, for the purpose of ensuring compliance with the General Stormwater Permit.

5. The Contractor shall grant Regional Water Board staff, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to enter the project site at reasonable times, to ensure compliance with the terms and conditions of the WQC and/or to determine the impacts the project may have on waters of the United States.

Prior to commencing work, the Contractor shall make such amendments to the SWPPP as are required to make it coincide with the Contractor's planned operations and submit the amendments to the Engineer for approval and file. The amendments shall include an Erosion Control Plan (ECP), described in Section "Construction Project Diversion and Control of Water", along with any plan for water pollution control measures. The amended and approved SWPPP shall be kept at the project field office.

The Contractor is notified that the SWPPP must be amended from time to time during construction to reflect actual construction practices and such amendments shall be submitted to the Engineer within five (5) working days of the Engineer's written request. If the Contractor plans to amend the SWPPP, due to field conditions or any other reason, he shall propose the necessary amendments to the Engineer for approval at least five (5) working days prior to implementation.

The SWPPP and amendments shall not be construed to be a waiver of the Contractor's obligation to review and understand the General Stormwater Permit before submitting a Bid. By submitting a Bid, the Contractor acknowledges satisfaction as to the requirements of the General Stormwater Permit.

Payment – Full compensation for compliance with the provisions of Section 7-8.6 "Water Pollution Control," of the Standard Specifications, and as amended by these Special Provisions, shall be considered as included in the lump sum bid item price for "**Mobilization**," or will be paid for at the bid item price for "**Water Pollution Control**," (if indicated), which price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all work involved to establish, implement, monitor and maintain the BMP's required by the SWPPP, and no additional compensation shall be allowed therefore. The Contractor shall be responsible for payment of any administrative fines that may be imposed on the City due to the Contractor's failure to comply with the terms of the applicable permits regulating Water Pollution Control. Administrative fines, if imposed, will be withheld from the Contractor's payments.

ADD: 7-8.7 Graffiti Control. The Contractor shall maintain all Site improvements, including any temporary facilities, equipment or other materials in a graffiti free condition throughout the construction period, until acceptance of the Project by the City. Graffiti encountered on the Site shall be removed by the Contractor within 24 hours.

The payment for graffiti removal shall be included in other items of Work.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. ADD the following:

1. The City reserves the right to repair damages to the City's facilities caused by your operations at your expense.
2. You are responsible for coordinating with property owners for access to be provided to work on the private property.
3. Loop detectors must be replaced within 3 Working Days of completion of work that originally affected the original loop detectors.
4. In any emergency affecting the safety of persons or property, you must act, at your discretion, to prevent threatened damage, injury or loss. Any change in Contract Price or Contract Time resulting from emergency work will be determined as provided in SECTION 3, "CHANGES IN WORK."

ADD: 7-9.1 Video Recording Of Pre-existing Conditions. The Contractor shall make its own arrangements for video recording all pre-existing conditions of the Site prior to any construction.

Video recording of important aspects of a construction Site shall include, but is not limited to the following:

- a) Property lines
- b) Right-of-way and easement conditions
- c) Utility markings
- d) Survey conditions.
- e) Pavement conditions.
- f) Adjacent property conditions.
- g) Sidewalk, median, curb, and gutter conditions.
- h) Safety conditions.
- i) Unusual conditions or equipment.
- j) Existing canyon conditions (including vegetation) along the pipe corridor;
- k) Striping

The Contractor shall turn over video discs to the City immediately after recording is done in the presence of the Engineer. Disc(s) shall be submitted no later than 30 days from NTP. The Contractor shall not be entitled to any additional Working Days due to delay securing videotaping services.

Unless proven otherwise via the pre-existing video records, the Contractor shall be responsible for the repair of any damage for which a Claim has been submitted.

7-9.1.1 Payment. Payment for video recording services shall be included in the various Bid items.

ADD: 7-9.2 Placement and Removal of Markout. Markout shall not be placed in the public right-of-way more than 10 days prior to the commencement of excavation work.

Markout shall be removed from all surfaces in the public right-of-way, including decorative surfaces, within 10 days of completion of the related construction work item.

ADD: 7-9.3 Existing Pavement Markers and Striping. The Contractor shall record the location and conditions of the existing pavement markers and striping prior to construction and submit to the Engineer in accordance with 2-5.3, "Submittals." Permanent pavement markers and striping removed or damaged during construction shall be replaced in kind or as noted on the Drawings at the Contractor's expense.

7-10.4 Safety. ADD the following:

The Contractor shall be solely responsible for initiating, maintaining and providing supervision of Safety precautions and programs in connection with the Work, and shall comply with all Applicable Law and regulations and any and all insurance carrier-mandated Safety requirements and programs.

Notwithstanding the Contractor's primary responsibility for safety at the site of the Work when the Contractor is not present, the Engineer, at his option, after attempting to contact the Contractor, may direct City forces to perform any functions he may deem necessary to ensure public safety at or in the vicinity of the site of the Work. If such procedures are implemented, the Contractor shall be responsible for all expenses incurred by the City.

7-10.4.1 Work Site Safety. ADD the following:

If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety, the plan shall be prepared by a registered civil or structural engineer employed by the Contractor, and all costs therefore shall be included in the price named in the Contract for completion of the Work as set forth in the Contract Documents. Nothing in this section shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this section shall be construed to impose tort liability on the City, or any of their officers, agents, representatives, or employees.

In non-emergency situations, the Contractor shall back fill trenches and restore roadway for safe night-time traffic usage. No open trenches shall be allowed overnight or during nonworking hours unless prior written approval is received from the Engineer.

ADD: 7-10.4.6 Emergency Markout. The Contractor shall place, by spray paint or other method approved by the Engineer, their name and emergency phone number on the trench saw cut for the following day. Payment shall be included in the price Bid for pipeline work.

ADD: 7-10.4.7 Health and Safety Plan. The Contractor bears the ultimate responsibility for the health and safety of its employees. These specifications shall not be construed to limit the Contractor's liability nor to assume that the City, its employees or designate, will assume any of the Contractor's liability associated with Site safety considerations. The Contractor shall have a health and safety plan in effect prior to commencement of Work. The plan shall meet all OSHA and other applicable requirements. The plan shall specifically address procedures and protocols that will be followed to monitor for the presence of hazardous atmosphere, possibility for engulfment, gasses due to organic soils or proximity to landfills, exposure to hazardous products such as may be released when grinding, cutting, or torching galvanized or painted surfaces, contaminated soil, and groundwater, and identify response actions that will be taken when these conditions are encountered. This plan shall be provided to the Engineer at least one week before any construction activities begin. The City will not assume any role in determining the adequacy of the plan on behalf of the Contractor.

ADD: 7-10.4.8 Designation of Safety Coordinator. The Contractor shall designate a responsible member of its organization, located at the Site, whose duty shall include the prevention of accidents at the Site.

ADD: 7-10.4.9 Reasonable Precautions. The Contractor shall take reasonable precautions for the Safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- a) Workers and other persons who may be affected thereby;
- b) The Work and materials and equipment to be incorporated therein, whether in storage on or off the Site under care, custody or control of the Contractor; and
- c) other property at the Site or adjacent thereto, e.g., trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the Construction Work.

ADD: 7-10.4.10 Safeguards. The Contractor shall erect and maintain, as required by existing conditions and performance of the Work, reasonable safeguards for Safety and protection, including posting danger signs and other warnings against hazards, promulgating Safety regulations and notifying owners and users of adjacent sites and utilities, and shall comply fully with the requirements of State and/or Federal OSHA.

ADD: 7-10.4.11 Security. The Contractor shall furnish and install all necessary facilities to provide safe means of access to all points where Work is being performed. The Contractor shall take all precautions and measures as may be reasonably necessary to secure the Site, the Project, and the Work at all hours, including evenings, Holidays and

non-work hours. Such precautions may include provision of security guards. The payment for security shall be included in the various Bid items.

ADD: 7-10.4.12 Emergencies. If an emergency arises or appears imminent which may affect the Safety of persons or property, the Contractor shall act immediately to prevent and mitigate actual or threatened damage, injury or loss. Additional costs or extensions of time claimed by the Contractor on account of an emergency not caused by the fault or neglect of the Contractor shall be determined as Extra Work.

ADD: 7-10.4.13 Concrete Forms, Falsework, and Shoring. The Contractor shall comply fully with the requirements of §1717 of the Construction Safety Orders, State Department of Industrial Relations, regarding the design of concrete forms, falsework and shoring, and the inspection of same before the placement of concrete. Where the said §1717 requires the services of a civil engineer registered in the State to approve design calculations and working drawings of the falsework or shoring system, or to inspect such system prior to placement of concrete, the Contractor shall employ a registered civil engineer for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the Work as set forth in the Contract Documents.

ADD: 7-10.4.14 OSHA/Cal OSHA Citations. The Contractor shall indemnify the City against fines, reasonable attorneys' fees, and defense costs resulting from citations issued to the City by either the federal, state, or local safety enforcement agencies due to the Contractor's failure to abide by applicable Safety and health standards.

ADD: 7-10.4.15 Emergency Drills. The Contractor shall make itself familiar with the emergency evacuation routes and procedures in the event of an emergency. Drills are conducted annually and are scheduled a year in advance. Further information prior to bidding is available upon request from the City's Safety and Security Officer or the Facility Manager(s) for the facility(ies) included in the Project. The information includes a listing of dates for upcoming Emergency Evacuation Drills. Activities shall be reflected in the Schedule. Approved delay times caused by unscheduled drills may be added to the Schedule and treated as Extra Work.

The payment shall be included in the various Bid items unless a Bid item has been provided for Emergency Drills.

ADD: 7-10.6 Temporary Project Signs.

Reserved

ADD: 7-10.7 Traffic Plate Bridging. The Contractor shall secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use.

Transverse or longitudinal cuts in the right-of-way that cannot be properly completed within a workday shall be protected by structural steel plate bridging in such a way as to preserve unobstructed traffic flow. Structural steel plates placed over surface voids, such as

trenches and other areas to be protected in the public right-of-way shall conform to the following:

- a. Un-restored voids, trenches, holes, excavations, etc., that are in the pedestrian or traveled way shall be protected through the use of adequately designed barricades and structural steel plates that will support legal vehicle loads.
- b. Structural steel plate bridging shall be designed for HS 20-44 truck loading in accordance with Caltrans Bridge Design Specifications Manual. See Table 1 - Trench Width / Minimum Plate Thickness.
- c. Steel plates used for bridging shall extend a minimum of 12" (300mm) beyond the edges of the trench.
- d. Plates shall provide complete coverage to prevent any person, bicycle, motorcycle or motor vehicle from being endangered due to plate movement causing separations or gaps. Plates shall be installed with the plate laid in reasonably flat plane and all vertical edges transitioned with asphaltic cold-mix or other acceptable ramping device(s) acceptable to the City.
- e. Fine graded asphalt concrete shall be compacted to form ramps with a maximum slope of 8.5% and a minimum of 12" (300mm) taper to cover all edges of the steel plates.
- f. Structural steel plates shall have a skid-resistant surface.
- g. When steel plates are removed, any damage to the pavement shall be repaired with either graded fines of asphalt concrete mix, asphaltic cold mix, concrete slurry or equivalent slurry satisfactory to the Engineer.
- h. The Contractor shall be responsible for maintenance of the structural steel bridging plates, shoring and asphalt concrete ramps.
- i. The trench shall be adequately shored to support the bridging and traffic loads.
- j. Steel Plate Bridging shall be secured against movement or displacement by using adjustable cleats, shims, welding, or other devices, and shall be installed to in a manner that will minimize noise.

When steel plates are placed within the public right of way:

- a) The Contractor's name and 24-hr phone number shall be visible, legible and permanently affixed on each plate or,
- b) The Contractor shall erect sign(s) in the immediate area of the trench plate(s) identifying the Contractors name with a 24-hr phone number. The minimum height of letters and numbers shall be two inches.

The Contractor shall immediately mobilize necessary personnel and equipment after being notified by the Engineer or the City's emergency service section of a repair needed. This includes, but is not limited to, plate anchors, cold-mix, asphalt concrete to transition/ramp from the existing roadway or sidewalk to the plate surface and back down.

Failure to respond to the emergency request within two hours will be grounds for the City repairs that will be invoiced at actual cost including overhead or \$500 per incident, whichever is greater. All Traffic Control Plans currently require prompt repairs of steel plating by the Contractor. Lack of Contractor conformance may be automatic grounds for suspension of their permit, Contract, or both.

The following table shows the required minimal thickness of steel plate bridging required for a given trench width:

Table 1 - Trench Width / Minimum Plate Thickness

Trench Width	Minimum Plate Thickness
10" (0.25 m)	1/2" (13 mm)
1'-11" (0.58 m)	3/4" (19 mm)
2'-7" (0.80 m)	7/8" (22 mm)
3'-5" (1.04 m)	1" (25 mm)
5'-3" (1.6 m)	1 1/4" (32 mm)

Note: For spans greater than 5'-3" (1.6 m), a structural design shall be prepared by a California Registered Civil Engineer and approved by the City.

A Rough Road sign (W33) with black lettering on an orange background may be used in advance of structural steel plate bridging.

Payment for steel plate bridging shall be included in the various Bid items unless a Bid Item has been provided for steel plate bridging.

ADD: 7-10.8 Site Maintenance.

7-10.8.1 Sanitation. The Contractor shall provide and maintain enclosed toilets for the use of the Contractor and City's officers, employees or agents. The Contractor shall keep these accommodations in a neat and sanitary condition, and shall ensure they comply with all applicable laws, ordinances, and regulations pertaining to public health and sanitation of dwellings and camps.

7-10.8.2 Use of Site. The Contractor shall, prior to on-site testing and inspection activities and prior to on-site mobilization for demolition and construction, prepare a Mobilization Plan for the City's review and approval based upon information provided to the Contractor by the City from time to time concerning the anticipated availability of the Site or portions thereof for tests and inspections to be performed in connection with the preparation of the Order of Magnitude Documents, for remedial work relating to Hazardous Materials and Waste as set forth in the Contract Documents, and for demolition, excavation and construction activities.

The foregoing Mobilization Plan shall be revised from time to time as necessary to incorporate additional information on Site availability provided by the City. The Contractor shall confine operations at the Site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the Site with materials or equipment. The Contractor shall at all times confine its access and use of the Site to the areas designated by the City from time to time as being delivered and available to the Contractor.

7-10.8.3 Storage and Staging Areas. If the Plans designate a staging location within the Project or in close proximity, the Contractor shall utilize such area for their use. Otherwise, storage and staging areas shall be the responsibility of the Contractor. The storage and staging areas shall be as close as possible to the Site. The Contractor shall be responsible for obtaining any permits, leases, or any other items necessary to obtain staging areas.

Trash, oil dumping, storage of hazardous wastes, or construction equipment material and parking, fueling of equipment shall be allowed in the MHPA or other biologically sensitive areas. The Contractor shall ensure the fueling of vehicles occurs only within designated staging areas Using appropriate catch basins and devices.

The Contractor shall meet with the Engineer at the proposed staging area prior to any use of the area to ascertain the existing condition. The Contractor shall be responsible to return the storage and staging area and the adjacent area to an equal or better condition as deemed necessary by the Engineer, at no additional cost to the City.

7-10.8.4 Water for Construction Purposes. The Contractor shall purchase all water for construction including water used for initial filling and final flushing of new pipeline.

The Contractor shall make application and pay all costs for temporary water meter and water, as required to:

West Valley Water District
8555 West Baseline Road
Rialto, CA 92376
(909) 875-1804

7-10.8.5 Payment. The payment for Site maintenance shall be included in the Bid item for Mobilization. If a pay item has not been established for Mobilization, the payment shall be included in the various Bid items.

7-12 ADVERTISING. ADD the following:

Any advertisement referring to the City as a user of a product, material, or service by the Contractor or any Subcontractor and Supplier is expressly prohibited without prior written approval of the City.

Any advertisement referring to the City as a user of a product, material or service by the Contractor or any Subcontractor and Supplier is expressly prohibited without prior written approval of the Mayor or designee.

7-13 LAWS TO BE OBSERVED. ADD the following:

The Contractor shall give the notices required by law and comply with all laws, ordinances, rules and regulations pertaining to the conduct of the Work. The Contractor shall be liable for violations of the law in connection with Work provided by the Contractor.

If the Contractor observes that the Plans, Specifications, or other portions of the Contract Documents are at variance with any laws, ordinances, rules or regulations, he shall promptly notify the Engineer in writing of such variance. The City will promptly review the matter and, if necessary, shall issue a Change Order or take any other action necessary to bring about compliance with the law, ordinance, rule or regulation in questions. The Contractor agrees not to perform work known to be contrary to any laws, ordinances, rules or regulations.

ADD: 7-13.1 Environmental & Safety Laws. Following is not an exhaustive list of the laws to be complied with by the Contractor. It is a partial list of some specific laws that the Contractor shall be aware of and comply with. They are added here for convenience as follows:

- a) Environmental Protection Agency regulations (40 CFR, Part 15).
- b) Clean Air Act of 1970, e.g., §306 (42 U.S.C. 7606), Executive Order 11738, prohibiting contracting with Clean Air Act violators; and §§608 and 609 (42 U.S.C. 7671g, 7671h) as amended November 15, 1990, prohibiting the intentional release of chlorofluorocarbons into the environment when performing Work.
- c) Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified under §[01560], "Temporary Environmental Controls" of the General Requirements.
- d) CAL OSHA 5189 "Process Safety Management," CAL OSHA 3220 "Emergency Action Plan," Federal OSHA 29, CFR 1910, facilities Process Safety Management (PSM) manual, and the City's Risk Management Plan.

- e) Flood Disaster Protection Act of 1973 (42 USC 4001 et seq, as amended).
- f) Senate Bill 198 and specifically shall have a written Injury Prevention Program on file with the City in accordance with all applicable standards, orders, or requirements of California Labor Code, §6401.7. This Program shall be submitted to the Engineer at the preconstruction meeting.
- g) State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163) as set forth in Division 15 of the Public Resources Code of the State.

ADD: 7-13.2 Nondiscrimination. The Contractor shall comply with all applicable federal, state and local laws; ordinances, rules, statutes, orders, regulations, or other legal requirements of California; the California Fair Employment and Housing Act; those Laws prohibiting discrimination, on account of race, color, national origin, religion, age, sex or handicaps, e.g.,: zoning, environmental, building, fire and safety codes and coverage, density and density ratios and lien laws existing as of the date of the execution of this contract.

The Contractor shall not discriminate in its employment with regard to age/handicap, race, color, religion, sex, or national origin, and shall comply with all federal, state, and local directives and executive orders regarding non-discrimination in employment; and shall agree to demonstrate positively and aggressively the principle of equal employment opportunity in employment.

The Contractor shall:

1. Establish or observe employment policies, which affirmatively promote opportunities for minority persons at all job levels.
2. Communicate this policy to all persons concerned, including all company employees, outside recruiting services, especially those serving minority communities, and to the minority communities at large.
3. Take affirmative steps to hire minority employees within the company.

ADD: 7-15 INDEMNIFICATION AND HOLD HARMLESS AGREEMENT. Contractor agrees to defend, indemnify, protect and hold City, its agents, officers and employees, harmless from and against all claims asserted, or liability established for damages or injuries to any person or property including to Contractor's employees, agents or officers, or judgments arising directly or indirectly out of obligations, work or services herein undertaken, which arise from, are connected with, are caused or claimed to be caused by the acts or omissions of the Contractor, its agents, officers and employees. The obligation to indemnify shall be effective even if the City, its agents, officers or employees established passive negligence contributes to the loss or claim. The Contractor agrees that the City may elect to conduct its own defense or participate in its own defense of any claim related

to this project. The Contractor's duty to indemnify and hold harmless shall not include any claims or liability arising from the established active or sole negligence, or sole willful misconduct of the City, its agents, officers or employees.

ADD: 7-16 CONFLICT OF INTEREST. The Contractor shall establish and make known to its employees appropriate safeguards to prohibit employees from using their positions for a purpose that is, or gives the appearance of being, motivated by desire for private gain for themselves or others, particularly those with whom they have family, business, or other relationships. Project personnel shall not accept gratuities or any other favors from Subcontractors or potential Subcontractors.

The Contractor shall be subject to all federal, state and local conflict of interest laws, regulations, and policies applicable to public contracts and procurement practices, e.g., California Government Code §§1090, et. seq., and 81000, et. seq. If, in performing the Services and/or Work set forth in this contract, the Contractor makes, or participates in, a "governmental decision" in accordance with title 2, §18701(a)(2) of the California Code of Regulations, the Contractor shall be subject to a conflict of interest code requiring the completion of one or more statements of economic interests disclosing the Contractor's relevant financial interests.

Statements of economic interests shall be made on Fair Political Practices Commission Form 700 and filed with the City Clerk. The Contractor shall file a Form 700 (Assuming Office Statement) within 30 days of the City's written determination that the Contractor shall be subject to a conflict of interest code. The Contractor shall file a Form 700 (Annual Statement) on or before April 1, disclosing any financial interests held during the previous calendar year for which the Contractor was subject to a conflict of interest code.

The Contractor's personnel employed on the Project shall not accept gratuities or any other favors from any Subcontractors or potential Subcontractors. The Contractor shall not recommend or specify any product, supplier, or contractor with whom the Contractor has a direct or indirect financial or organizational interest or relationship that would violate conflict of interest laws, regulations, or policies. If the Contractor violates any conflict of interest laws or any of these conflict of interest provisions, the violation shall be grounds for immediate termination of this Contract. Further, the violation subjects the Contractor to liability to the City for all damages sustained as a result of the violation.

ADD: 7-17 COMMUNITY LIAISON. If required by the Engineer, the Contractor shall retain a community liaison representative throughout the Contract Time. The representative shall closely coordinate Work with the businesses, institutions and residents impacted by the Project. Duties shall include, but not be limited to, notification to the businesses, institutions and residents of the commencement of construction activities not less than 5 Working Days in advance, coordination of access for vehicular and pedestrian traffic to businesses, institutions and residences impacted by the Project, response to community questions and complaints related to the Contractor's activities, reporting of liaison activities at all Project progress meetings scheduled by the Engineer, attendance to the Project pre-construction meeting, and attendance at 2 community meetings.

The Contractor shall present their community liaison representative to the City, in writing, within 15 days of the award of the Contract.

7-17.1 Payment. The payment for the community liaison shall be included in the various Bid items.

ADD: 7-18 NEWSLETTER. When required in the Special Provisions one week before the end of every month, the Contractor shall submit to the City a written update on the progress of work, a 1 month look-ahead schedule, contact names and phone numbers, and any other information which may be of interest to the public. The City will utilize this information to create and distribute a newsletter the first of every month. Payment for the Newsletter shall be included in the various Bid items.

ADD: 7-19 PATENTS, TRADEMARKS, AND COPYRIGHTS. The Contractor shall pay, at no additional cost to the City, all applicable royalties and license fees on any and all matters arising in connection with the Work. The Contractor shall defend all suits or claims for infringement of patent, trademark, and copyrights against the City and any other Indemnified Parties, and shall save the City and any other Indemnified Parties harmless from loss on account thereof for any and all matters arising in connection with the Work on the Project, such costs to be paid at no additional cost to the City, except with respect to any particular design process or the product of a particular manufacturer or manufacturers specified and required by the City, other than pursuant to the recommendation or suggestion of the Contractor; provided however, if the Contractor has reason to believe that the design, process or product so specified is an infringement of a patent, the Contractor shall be responsible for any loss resulting unless the Contractor has provided the City with prompt written notice of the Contractor's belief, and the City has nevertheless elected to go forward with such design, process or product so specified.

- END OF SECTION -

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

For this contract, the provision of Section 8 of the Standard Specifications shall not apply.

- END OF SECTION -

SECTION 9 – MEASUREMENT AND PAYMENT

9-3.1 General. DELETE the tenth paragraph in its entirety and SUBSTITUTE the following:

At the expiration of 35 days from the date of filing NOC with the County Recorder and upon receipt by the Engineer of a fully executed Release of Claims, the amount deducted from the final estimate, and retained by the City, will be paid to the Contractor except such amounts as are required by law to be withheld by properly executed and filed notices to stop payment.

Acceptance by the Contractor of Final Payments shall be and shall operate as a release to the City of all claims in stated amounts that may be specifically excepted by the Contractor for things done or furnished in connection with this Work and for every act and neglect of the City and others related to or arising out of this Work. Payment by the City shall not release the Contractor or its Surety from any obligation under Contract or under the performance bond and payment bonds.

9-3.2 Partial and Final Payment. DELETE the second and third paragraphs and SUBSTITUTE with the following:

From each progress estimate, an amount (Retention) not less than 5% of the completed Work will be deducted and retained by the City. The City will withhold not less than 5% of the Contract Price until Final Acceptance of the Project. After 50% of the Work has been completed and if progress on the Work is satisfactory, the total retention held may be limited to 5% of the first half of Contract Price.

ADD the following:

Partial payments made after the Contract completion date will reflect the amount withheld for liquidated damages as required by 6-9, "LIQUIDATED DAMAGES." Any such partial payments made to the Contractor, or its Sureties, will not constitute a waiver of the City's liquidated damages.

Pursuant to California Public Contract Code §22300, the Contractor has the option, at its expense, to substitute for any money withheld by the City, securities equivalent to the amount being withheld. Securities eligible for such substitution are bank or savings and loans certificates of deposit or such securities which are eligible for investment pursuant to Government Code §16430. As to any such security or securities so substituted for monies withheld, the Contractor shall be the beneficial owner of same and shall receive any interest thereon.

Such security shall, at the request and expense of the Contractor, be deposited with the City or with a State or Federally Chartered bank as the escrow agent who shall pay such monies to the Contractor upon notification by the City that payment can be made. Such notification will be given at the expiration of 35 days from the date of acceptance of the work, or as prescribed by law, provided however, that there will be a continued retention

of the necessary securities to cover such amounts as are required by law to be withheld by properly executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.

Neither Final Payment nor any final release of Retention shall become due until the Contractor submits to the City:

- a) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the City or the City's property might be responsible or encumbered, less amounts withheld by the City, have been paid or otherwise satisfied;
- b) a certificate evidencing that insurance required by the Contract Documents to remain in force after Final Payment is currently in effect and will not be canceled or allowed to expire until at least 30-day prior written notice has been given to the City;
- c) consent of Surety to Final Payment; and
- d) if required by the City, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract Documents. If a Subconsultant or Subcontractor refuses to furnish a release or waiver required by the City, the Contractor may furnish a bond satisfactory to the City to indemnify the City against such lien, and
- e) if required in the Contract Documents, the successful completion and submittal of the required reports such as construction demolition waste recycling and hydrostatic discharge reports.

The Contractor has completed all Work, e.g., providing required, as-built drawings, operations manuals, test reports, UL labels, and other similar documentation as determined by the City.

ADD: 9-3.2.1 Application for Progress Payment. By the tenth day of each month, the Contractor shall submit to the Engineer a partial payment estimate, filled out and signed by the Contractor, that identifies acceptable Work performed during the previous month, or since the last partial payment estimate was submitted. If requested by the Engineer, the Contractor shall provide such additional data as may be required to support the payment estimate. Such data may include satisfactory evidence of payment for equipment, materials, and labor, including payments to Subcontractors and suppliers.

For application for progress payment, the Contractor shall use the format required by the City. An electronic copy of the invoice form is available from the Engineer upon request. Progress or partial payments shall not be made until the Contractor submits to the City an updated Schedule that meets the City's requirements. It is solely the responsibility of the Contractor to prepare and submit the Schedule updates.

30 days after presentation of undisputed and properly submitted Application for Payment, the amount will become due and when due will be paid by the City to the Contractor. Any payment request that is disputed or determined to be improper will be returned to the Contractor not later than 7 days after receipt accompanied by documentation describing the reason(s) why the payment request is not proper.

ADD: 9-3.2.2 Amount of Progress Payments. Provided an undisputed and properly submitted Application for Payment is received by the City, payment shall be made by the City not later than thirtieth day after the City receives the application for Payment. The City will pay the Contractor for Work performed, including payment for off-site stored materials, through the period covered by the application for Payment, less Retention as set forth in the Contract Documents, provided that the payment amount before Retention will not exceed the percentage of completion of the Work, all as set forth in the SOV.

ADD: 9-3.2.3 Waiver of Claims at Final Payment. Acceptance of Final Payment by the Contractor shall constitute a waiver of affirmative Claims by the Contractor, except those previously made in writing and identified as unsettled at the time of Final Payment, which are expressly reserved by the Contractor from operation of its Release of Claims pursuant to PCC7100 or other Applicable Law.

ADD: 9-3.2.4 Early Release of Subcontractor Retention. If a Subcontractor has completed its portion of the Work, including all Punch List items, pursuant to any given Subcontract, the Contractor may request the City to disburse the Retention allocable to such Subcontractor, after delivering to the City acceptable releases from the Subcontractor and consent to such disbursement from such Contractor's Surety, in a form reasonably satisfactory to the City. The City, at its sole discretion, may determine that the Subcontractor's Work has been completed in accordance with the Contract Documents, and may disburse the Subcontractor's share of Retention to the Contractor for distribution to the Subcontractor. Regardless of whether the City has disbursed Retention for the benefit of any Subcontractor, the 1 year warranty period with respect to such Work shall commence at completion of the Work.

ADD: 9-3.2.5 Withholding of Payment. The City may withhold payment on account of an Application for Payment to the extent necessary to protect the City from loss because of:

- a) Defective or incomplete Work not remedied;
- b) A deductive Change Order; c) Third Party Claims filed or reasonable evidence indicating probable filing of such Claims;
- d) Failure of the Contractor to make payments of undisputed amounts to Subconsultants or Subcontractors for labor, materials or equipment;
- e) Damage to the City or a Separate Contractor caused by the fault or neglect of the Contractor to the extent not covered by insurance;

- f) Reasonable evidence that the Work will not be completed within the Contract Time due to Inexcusable Delay, and that the unpaid balance of the Contract Price would not be adequate to cover Liquidated Damages for the anticipated or actual Unexcused Delay;
- g) Persistent failure of the Contractor to perform the Work in accordance with the Contract Documents, including failure to maintain the progress of the Work in accordance with the Construction Schedule. Persistent failure to maintain the progress of the Work shall mean that for a period of two consecutive months following a written notice from the Construction Manager, the Contractor fails to correct a behind-schedule condition at a rate that would reasonably indicate that he will finish the Project on schedule;
- h) Disregard of authority of the Construction Manager or the laws of any public body having jurisdiction; or
- i) Stop notices, wage orders, or other withholdings required by Applicable Law.

When all the above reasons for withholding payment are removed, payment shall be made for amounts previously withheld. Prior to any withholding pursuant to this section, the City will meet with the Contractor to discuss potential withholding, and attempt in good faith to resolve such issue without the need for withholding.

9-3.3 Delivered Materials. DELETE and SUBSTITUTE with the following:

The City will not pay the Contractor for the cost of materials and equipment delivered but not incorporated into the Work.

9-3.4 Mobilization: ADD the following:

Mobilization shall consist of labor and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to and from the Site; for establishment of all offices, buildings, storage yards, and other facilities necessary for Work, and for all other work and operations which shall be performed prior to beginning Work and after completion of Work on the various Contract items on the Site.

The Contractor shall properly design the Project parameters to incorporate construction mobility for moving on and off the Site in a manner that limits disturbance to the surrounding residences, businesses, and any other citizens. Specifically, this includes, but is not limited to, the designated staging areas, loading areas, and assemblage areas. The Contractor shall consider and address access rights of the public at all times. The Contractor shall be required to prepare a "Mobilization Plan" that will describe and govern the Contractor's mobilization activities.

The complete dismantling and removal by the Contractor of all of the Contractor's temporary facilities, equipment, materials, construction wastes, and personnel at the Site referred to as demobilization shall be included in mobilization.

9-3.4.2 Payment. When no such Bid item is provided, payment for Mobilization shall be included in the various Bid items. Otherwise, payment for Mobilization will be the lesser amount from columns B and C of Table 9-3.4.2 (A) as follows:

Table 9-3.4.2 (A)

IF A ¹ IS	B AMOUNT IS	C AMOUNT IS
05	0.2 x Mobilization Bid Item	0.02 x CONTRACT PRICE
10	0.4 x Mobilization Bid Item	0.04 x CONTRACT PRICE
20	0.5 x Mobilization Bid Item	0.05 x CONTRACT PRICE
50	0.7 x Mobilization Bid Item	0.07 x CONTRACT PRICE
70	0.8 x Mobilization Bid Item	0.08 x CONTRACT PRICE
90	0.9 x Mobilization Bid Item	0.09 x CONTRACT PRICE
100 ² OR MORE	1.0 x Mobilization Bid Item	0.10 x CONTRACT PRICE

Notes:

- 1 A is the monthly pay estimate as a % of the original Contract Price not including amount earned for mobilization, bonds, and permits.
- 2 One hundred percent or more of the original Contract Price and final cleanup operations have been satisfactorily completed.

The amount, if any, of the Bid item for mobilization in excess of 10% of the original Contract Price may be included for payment in any partial payment estimate after filing of the NOC in accordance with 6-8, "COMPLETION, ACCEPTANCE, AND WARRANTY."

The adjustment provisions of the Contract in accordance with 3-2.2, "Contract Unit Prices" shall not apply to the lump sum Bid item for mobilization. When other Contract items are adjusted in accordance with 3-2.2, "Contract Unit Prices" if the costs applicable to such item of work include mobilization costs, such costs will be deemed to have been recovered by the Contractor by payments made for mobilization, and will be excluded for consideration in determining compensation in accordance with 3-2.2, "Contract Unit Prices."

ADD: 9-3.6 Field Orders. A Field Order is a written order by the Engineer to compensate the Contractor for items of work in accordance with 3-3, "EXTRA WORK," or 3-4, "CHANGED CONDITIONS." A Field Order does not involve change in the Contract Price or Contract Time or the intent of the Contract.

Field Order items of work may be paid for in accordance with this section provided that the cumulative total of Field Orders does not exceed the Field Order Bid Item.

Construction Contract Price	Max. Amount for Each Field Order
Less than \$100,001	\$2,500
\$100,001 to \$1,000,000	\$5,000
\$1,000,001 to \$5,000,000	\$10,000
Greater than \$5,000,000	\$20,000

ADD: 9-4 WAIVER OF CLAIMS. The acceptance by the Contractor of the Final Payment of undisputed Contract amounts shall release the City, the Engineer, and the Design Consultant as agent of the City, from all claims and all liability to the Contractor for all things done or furnished in connection with the Work, and every act of the City and others relating to or arising out of the Work and related to those undisputed amounts. No payment, however, final or otherwise, shall operate to release the Contractor and the Surety from obligations under this contract and the Performance Bond, Payment Bond, and other bonds and warranties as herein provided.

- END OF SECTION -

PART III – TECHNICAL SPECIFICATIONS

FRISBIE PARK SEWER LIFT STATION

SPECIAL PROVISIONS

100% SUBMITTAL

Special Provisions Prepared by:

Kimley-Horn and Associates, Inc.
401 B Street, Suite 600
San Diego, CA 92101



Samuel Lake McWhorter

05/20/19

Samuel Lake McWhorter, P.E.

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall submit to the Engineer, shop drawings, project data and samples required by specification sections.

1.2 SCHEDULES

- A. The Contractor shall prepare and submit a Construction Schedule prior to beginning work.
- B. The Contractor shall prepare and submit a separate schedule listing dates for submission of shop drawings, projected return dates and relationship to the Construction Schedule.

PART 2 – PRODUCTS

2.1 SHOP DRAWINGS

- A. Original drawings, prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate portions of the Work; showing fabrication, layout, setting or erection details including, but not limited to the following:
 - 1. Mechanical equipment
 - 2. Valves and operators (w/specific locations)
 - 3. Piping and fittings (w/specific locations)
 - 4. Electrical wiring diagrams
 - 5. Concrete mix designs (with specific locations indicating where each mix design is to be used), grouts, etc.

6. Paintings, coatings, liners, etc.
 7. Fencing details
 8. Asphalt and base material
- B. Shop drawing submittals shall be prepared by a qualified detailer.
- C. Identify details by reference to sheet numbers and detail shown on Contract Drawings.

2.2 PROJECT DATA

- A. Manufacturer's standard schematic drawings:
1. Modify drawings to delete information which is not applicable to project.
 2. Supplement standard information to provide additional information applicable to project.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
1. Clearly mark each copy to identify pertinent materials, products or models.
 2. Show dimensions and clearances required.
 3. Show performance characteristics and capacities.
 4. Show wiring diagrams and controls.

2.3 SAMPLES

- A. Physical examples to illustrate materials, equipment, workmanship and finishes, and to establish standards by which completed work is to be judged for compliance with Contract provisions.
- B. Office samples of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of product or material, with integrally related parts and attachment devices.
2. Full range of color samples.

PART 3 – EXECUTION

3.1 SUBMISSION REQUIREMENTS

- A. Allow a minimum of 14 days for Owner's review.
- B. Electronic submissions in pdf format are acceptable.
- C. Hard copy submissions – The Contractor shall submit the number of Shop Drawings, Project Datum, and Samples that Contractor requires for distribution plus 2 copies to be retained by Engineer.
- D. Accompany submittals with transmittal letter, in duplicate, containing:
 1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Notification of proposed deviations from Contract Documents.
 5. Other pertinent data.
- E. Submittals must include:
 1. Date of submittal and revision dates.
 2. Project title and number.
 3. The names of:
 - a. Contractor's or Supplier's Engineer.
 - b. Contractor.

- c. Subcontractor.
 - d. Supplier.
 - e. Manufacturer.
 - f. Separate detailer when pertinent.
- 4. Identification of product or material.
- 5. Relation to adjacent structure or materials.
- 6. Field dimensions, clearly identified as such.
- 7. Identification of deviations from Contract Documents.
- 8. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

3.2 RESUBMISSION REQUIREMENTS

A. Shop Drawings:

- 1. Revise initial drawings as required and resubmit as specified for initial submittal.
- 2. Indicate on drawings any changes which have been made other than those specifically requested by Engineer.

B. Project Data and Samples:

- 1. Submit new datum and samples as required for initial submittal.

3.3 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. Distribute copies of Shop Drawings and Project Datum which carry Engineer's approval stamp, to:

- 1. Contractor's file.
- 2. Job site file.
- 3. Record Documents file.
- 4. Other prime contractors.

5. Subcontractors.
6. Supplier.
7. Fabricator.

B. Distribute samples as directed.

END OF SECTION 01 33 00

SECTION 01 55 26

TRAFFIC CONTROL

PART 1 GENERAL

1.1 SUMMARY

- A. Work Included:
This section shall consist of providing traffic control in and around project work areas shown on the Plans and in accordance with this Special Provision.
- B. Reference Standards:
This Special Provision makes references to the California Manual on Uniform Traffic Control Devices (MUTCD) and the State of California Department of Transportation Standard Specifications, referred to hereinafter as Caltrans Specifications.

1.2 PROJECT CONDITIONS

- A. Coordinate with the City to determine actual phase limit, physical construction limits, and staging and laydown area locations.
- B. The lift station project and associated gravity and force main piping is located within an active street and park. Phasing limits and staging areas shall be set to minimize impacts to the street and park circulation, public safety, and uses to the maximum extent practicable.
- C. Phasing limits and staging areas shall be set to allow vehicle and pedestrian circulation around the park buildings at all times and avoid blockages to doorways.
- D. It is the Contractor's responsibility to provide for the safety of traffic and the public during construction, including non-working hours and periods.

1.3 SUBMITTALS

- A. Shop Drawings: Prepare and submit a traffic control plan for each phase of work prior to the start of construction for that phase. The traffic control plans shall show phase limit, physical construction, limits, barricade types

and locations, lane closure traffic control layout, construction vehicle access, public vehicle, bicycle, and pedestrian access routes around the construction work, staging and laydown area sizes and locations, access drive and roadway lane closure durations, and flagging procedures necessary to maintain public access. The traffic control plans for each phase of work must be approved by the City before the Contractor will be allowed to begin work on that phase.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All traffic control devices and materials shall conform to the requirements of California MUTCD and Caltrans Standard Specifications, Section 12, *"Construction Area Traffic Control Devices."*

PART 3 EXECUTION

3.1 GENERAL

- A. Traffic control shall be set up and maintained continuously throughout the duration of construction and until each work area has been accepted for use by the City. Damaged, displaced, or non-functional traffic control features shall be replaced immediately upon identification by the Contractor or City or when directed by the City.
- B. Whenever the Contractor's operations create a condition hazardous to traffic or to the public that is not covered by the approved traffic control plan, the Contractor shall, at the Contractor's expense and without cost to the City, furnish, erect and maintain those fences, temporary railing (Type K), barricades, lights, signs and other devices, and take such other protective measures necessary to prevent accidents or damage or injury to the public and to promote public health and safety.
- C. Flaggers shall be furnished, as necessary, to safely direct vehicles and the public around work areas and to give adequate warning of any dangerous conditions.

- D. All movements of workmen and construction equipment on or across areas open to public traffic shall be performed in a manner that will not endanger public traffic or public health and safety.
- E. When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic. Flaggers are to be provided when required by the approved traffic control plans or applicable traffic safety manuals and bulletins.
- F. No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, including bicyclists and pedestrians. At the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the project area open for use by public traffic, including bicyclists and pedestrians.
- G. Temporary facilities which the Contractor uses to perform the work shall not be installed or placed where they will interfere with the free and safe passage of public traffic, including bicyclists and pedestrians.
- H. Should the Contractor appear to be neglectful or negligent in furnishing warning devices and taking protective measures as above provided, the City may direct attention to the existence of a hazard and the necessary warning devices shall be furnished and installed and protective measures taken by the Contractor at the Contractor's expense. Should the City point out the inadequacy of warning devices and protective measures, that action on the part of the City shall not relieve the Contractor from responsibility for public safety or abrogate the obligation to furnish and pay for these devices and measures. Should the Contractor fail to correct, the City may, at its sole discretion, cause the condition to be corrected by others and deduct the costs of such corrective measures, including City staff and administrative costs, from amounts due to the Contractor under the contract.
- I. A minimum of one 12-foot lane shall be maintained operational at all times on each road affected during construction. Work requiring roadway closures shall only be performed during off peak times at night or at other off-peak times as designated by the City. The City will provide the

contractor with specific timeframes within which travel lanes may be closed. Open trenches in areas that must be opened to public traffic during non-working hours shall be plated (HS-20 loading).

- J. Alternative pedestrian paths shall be provided if the Contractor's work interferes with pedestrian access.
- K. Access into and out of the parking lots, parking spaces, along ingress and egress routes, and other public access roads and facilities shall be maintained at all times.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Traffic Control will not be measured for payment.

4.2 PAYMENT

- A. Traffic Control will be paid for at the Contract lump sum amount for Traffic Control, which amount shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Traffic Control (including flaggers, traffic control plans, and continuous maintenance and repair of traffic control features), complete in place, as shown on the Plans and as specified in these Special Provisions. Progress payments for Traffic Control shall be prorated, based upon the Contractor's Construction Schedule.

END OF SECTION 01 55 26

SECTION 01 71 13

MOBILIZATION

PART 1 GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of payment for mobilization, preparatory work (including schedules and Quality Control Program), and demobilization and is intended to compensate the Contractor for operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to/from the project site; for the establishment of offices, buildings, plants, and other facilities at the project site; and for transportation of buildings, Quality Control personnel, laboratory field testing equipment and tools, testing supplies, maintenance of haul roads and other facilities for payment of premium bonds and insurance for the project; for all necessary costs of acquisition of equipment, including purchase and mobilization expense; all permits and fees, maintaining the Contractor's staging area and for all other work and operations which must be performed and costs that must be incurred incident to the initiation of meaningful work at the site and for which payment is not otherwise provided under the contract.

1.2 PROJECT CONDITIONS

- A.** All facilities, plants, and equipment which are established at or brought to the worksite by the Contractor shall conform to the provisions of these Special Provisions unless the Engineer specifically directs otherwise, in writing, for a specific item or items. The Contractor shall be solely responsible for the adequacy of all facilities, plants, and all utilities, structures and facilities, and other site features that are to remain in place from damage caused by impact, settlement, lateral movement, undermining, washout, and other hazards created by excavation, construction of facilities, and compaction operations equipment.

- B. Demobilization costs will include, but not be limited to, removal of temporary utilities to the staging area and removal of temporary field offices, and materials laboratories, demobilization of equipment, and the clean-up and restoration of the construction staging area.
- C. This item shall also include noise control, dust control, and the provision of portable construction lighting and back up equipment.

1.3 SUBMITTALS

- A. Staging and Storage Area Layout Plan

PART 2 – PRODUCTS

2.1 Water

- A. The Contractor shall furnish and maintain an adequate supply of suitable quality water as required for construction and for domestic use. The Contractor shall investigate the availability of suitable water, make all arrangements for the purchase of the water and provide all facilities necessary to furnish water for use during construction. The Contractor shall not draw any water from a fire hydrant for use on the work without first obtaining a permit from the City of Rialto.

PART 3 - EXECUTION

3.1 CONTRACTOR'S STAGING AND STORAGE AREA.

- A. The Contractor's staging and storage area location shall be determined in coordination with the City. This area may be used for the Contractor's operations, staging, and storage. The staging and storage area shall be kept in a neat and orderly condition at all times. The City reserves the right to direct the Contractor to correct any deficiencies in the maintenance of the staging and storage area and the Contractor shall promptly comply with the directives of the City.
- B. The Contractor's field offices, if needed for this project, shall be located within the staging area.

- C. The Contractor shall be responsible for verifying the condition of any existing pavement near and adjacent to the staging and storage area for use to support their construction equipment, stockpiles and materials storage. Damaged pavement, as a result of the Contractor's use of this area, shall be restored to a new paved condition to the satisfaction of the City.

3.2 NOISE CONTROL

- A. The Contractor shall endeavor to keep the noise level resulting from its operations to a minimum at all times.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Mobilization will not be measured for payment.

4.2 PAYMENT

- A. The Contract lump sum paid for Mobilization shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Mobilization, complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.

END OF SECTION 01 71 13

SECTION 01 77 00

CONTRACT CLOSEOUT

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED:

- A. Administrative process for closing out the Work.

1.2 SUBSTANTIAL COMPLETION:

- A. Substantial completion shall be defined as “the time and date at which the Work has progressed to the point where, in the opinion of Engineer, the Work is sufficiently complete, in accordance with the Contract Documents, so that the Work can be occupied and/or utilized for the purposes for which it is intended. Substantial Completion cannot occur before the Project is issued a Certificate of Occupancy (or Completion, if applicable) by the governing building department that allows Owner to utilize the entire Project for the purposes for which it is intended.” (EJCDC Document C-700 s. 1.01.46).
- B. When Contractor considers the Work is substantially complete, he shall submit to the Engineer:
 - 1. A written notice that the Work, or designated portion thereof, is substantially complete.
 - 2. A list of items remaining to be completed or corrected.
- C. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.
- D. Should the Engineer determine that the Work is not substantially complete:
 - 1. The Engineer will promptly notify the Contractor, in writing, giving the reasons therefor.
 - 2. Contractor shall remedy the deficiencies in the Work, and send a

second written notice to substantial completion to the Engineer.

3. The Engineer will re-inspect the Work for substantial completion.
- E. When the Engineer finds that the Work is substantially complete, the Engineer will:
1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items remaining to be completed or corrected before final payment.
 2. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, the Engineer will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.3 FINAL INSPECTION:

- A. When Contractor considers the Work is complete, he shall submit written certification that:
1. Contract Documents have been reviewed.
 2. Work has been completed in accordance with Contract Documents.
 3. Work has been completed on the list of items to be corrected.
 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 5. Work is completed and ready for final inspection.
- B. The Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should the Engineer consider that the Work is incomplete or defective:
1. The Engineer will promptly notify the Contractor in writing, listing the

incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
 3. The Engineer will re-inspect the Work
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer shall request the Contractor to make closeout submittals.

1.4 RE-INSPECTION FEES:

- A. Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:
1. Owner will compensate the Engineer for such additional services.
 2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.5 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER:

- A. Evidence of compliance with requirements of governing authorities.
- B. Project Record Documents.
- C. Operating and Maintenance Data, Instructions to Owner's Personnel.
- D. Warranties and Bonds.
- E. Keys and Keying Schedule.
- F. Spare Parts and Maintenance Materials.
- G. Evidence of Payment and Release of Liens.
- H. Certificate of Insurance for Products and Completed Operations.

- I. Contractor's Final Affidavit.
- J. Lien Waivers from Subcontractors and Suppliers.

1.6 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Bid Item actual quantities at unit prices
 - c. Deductions for uncorrected Work
 - d. Penalties and Bonuses
 - e. Deductions for liquidated damages
 - f. Deductions for re-inspection payments
 - g. Other adjustments
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Adjustment in Contract Time.
 - 6. Sum remaining due.
- C. Engineer will prepare a final Change Order, reflecting approved adjustment to the Contract Sum, which were not previously made by Change Orders.

1.7 FINAL APPLICATION FOR PAYMENT:

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirement stated in the General Conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 77 00

SECTION 01 78 23

OPERATION AND MAINTENANCE MANUALS

PART 1 – GENERAL

1.1 RELATED INFORMATION

- A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
 - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
- B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.2 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual in hard-copy and electronic format for use by Owner's personnel.
- B. Hard-Copy Format:
 - 1. Size: 8-1/2 in. x 11 in.
 - 2. Text: Manufacturer's printed data, or neatly typewritten.
 - 2. Drawings:
 - a. Provide reinforced punch binder tab, bind in with text.
 - b. Fold larger drawings to the size of the text pages.
 - 3. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.

4. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
 - a. Title of Project.
 - b. Date Work completed and accepted by the City.
 - c. Identity of separate structures, as applicable.
 - d. Identity of general subject matter covered in the manual.
- C. Binders:
 1. Commercial quality expandable catalog binders with durable and cleanable plastic covers.
 2. When multiple binders are used, correlate the data into related consistent groupings.
- D. Electronic format shall be in .pdf file format. Copies of specific manuals shall either be scanned or converted to .pdf format and submitted on CD disc to Owner. Submit after approval of hard copies from Engineer.

1.3 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume arranged in a systematic order, and Contractor, name of responsible principal, address and telephone number.
 1. A list of each product required to be included, indexed to the content of the volume.
 2. List, with each product, the name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify the area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 3. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:

1. Include only those sheets which are pertinent to the specific product.
 2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete references to inapplicable information.
- C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems.
 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the specific installation:
1. Organize in a consistent format under separate headings for different procedures.
 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each Warranty issued.
1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties.

1.4 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit three (3) complete paper copies and one (1) electronic copy of manual in final form.
- B. Content, for each unit of equipment and system, as appropriate:
1. Description of unit and component parts.

- a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
- 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Alignment, adjusting and checking.
- 3. Servicing and lubrication schedule:
 - a. List of lubricants required for each piece of equipment.
 - b. Schedule for manufacturer recommended maintenance.
- 4. Manufacturer's printed operating and maintenance instructions.
- 5. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
- 6. Other data as required under pertinent sections of specifications.

1.5 SUBMITTAL SCHEDULE

- A. Submit one copy of completed data in final form at least fifteen days prior to final inspection or acceptance.
 - 1. Copy will be returned after final inspection or acceptance, with comments.
- B. Submit specified number of copies of approved data, incorporating all comments, in final form at least 10 days after final inspection or acceptance.

1.6 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
 - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 01 78 23

SECTION 01 78 39

PROJECT RECORD DRAWINGS

PART 1 – GENERAL

1.1 PROJECT RECORD DOCUMENTS

- A. Maintain at the site for the Owner one record copy of:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Engineer Field Orders or written instructions.
 - 6. Reviewed Shop Drawings.
 - 7. Field test records.

1.2 MAINTENANCE OF DOCUMENTS

- A. Store documents in approved location apart from documents used for construction.
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents available at all times for inspection by Engineer and Owner. Record drawing information shall be maintained concurrently with Pay Requests.

1.3 MARKING DEVICES

- A. Provide ink marking pens for recording information in a color code.

1.4 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information currently with construction progress.

1. Do not conceal any work until required information is recorded.
 2. Contractor shall mark clearly on the record drawing any changes, modifications, or deviations from the issued construction documents.
 3. For construction documents that are constructed per plan, the contractor shall acknowledge on each sheet that the as-built condition is per the plan.
- C. Drawings shall be drawn to record actual construction:
1. Horizontal location of pipes shall be provided at every fitting. Any deviations from the alignment shown on the drawings must be noted.
 2. Vertical location of piping shall be provided at fittings and tie-ins. Vertical location shall be pipe elevation as called for on the drawings.
 3. All fittings, including sleeves and valves shall be located vertically and horizontally by two measurements to permanent surface reference points.
 4. Field changes of dimension and detail.
 5. Changes made by Field Order or by Change Order.
 6. Details not on original Contract Drawings.
- D. Specifications and Addenda; legibly mark each Section to record:
1. Manufacturer, trade name, catalog number, and supplier of each item actually installed.
 2. Changes made by Field Order or by Change Order.

1.5 SUBMITTAL

- A. The contractor shall submit progress record drawings with each pay application for review by the engineer. Applications for payment submitted without progress record drawings may not be reviewed.

- B. The contractor shall submit progress record drawings with the notification of substantial completion.
- C. At contract close-out, Record Documents shall be submitted to Engineer in the following formats for Owner:
 - 1. Two CD's with electronic as-builts in AutoCAD format.
 - 2. Three 22" x 34" hard copy as-builts.
- D. Accompany submittal with transmittal letter in duplicate, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each record document.
 - 5. Signature of Contractor or his authorized representative.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 78 39

SECTION 02 41 13

SELECTIVE SITE DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of:

- Existing Utility Verification and Location
- Remove Existing Pavement
- Remove Existing Curb and Gutter
- Remove Existing Septic Tank Riser
- Remove Existing Sidewalk
- Remove Existing Landscaping and Irrigation
- Abandon Existing Septic Tank
- Landscaping Restoration

- B. Existing improvements, adjacent property, utilities, and other facilities that are not called for or otherwise required for removal to accommodate this project shall be protected in-place from injury or damage. Any cost related to protection of these facilities is considered included in the price bid for the various work items and no additional payment will be made therefor. Existing facilities damaged by the Contractor shall be restored to pre-damage condition by the Contractor without cost to the City.

C. Reference Standards:

This Special Provision makes references to the Standard Specifications for Public Works Construction (Greenbook), referred to collectively hereinafter as SSPWC.

1.2 RELATED SECTIONS

- A. Section 31 23 16 – Excavation and Backfill
B. Section 03 30 00 – Cast in Place Concrete

1.3 PROJECT CONDITIONS

- A. Protect all utilities, structures and facilities, and other site features that are to remain in place from damage caused by impact, settlement, lateral movement, undermining, washout, and other hazards created by excavation, construction of facilities, and compaction operations.
- B. The City and Engineer do not warrant the accuracy or completeness of the locations and type of existing utilities and substructures shown on the Plans.

1.3 SUBMITTALS

- A. Mix design for concrete used for abandonment of structures/facilities and utility plugs.
- B. Landscape Restoration Products.

PART 2 – PRODUCTS

2.1 CONCRETE

- A. Concrete used for plugging abandoned utilities shall conform to SSPWC Section 201-1 for Class 520-C-2500 as shown on the Plans.

2.2 LANDSCAPE RESTORATION

- A. Landscaping and irrigation restoration products shall match the existing landscaping at the park to maximum extent practicable.

PART 3 – EXECUTION

3.1 EXISTING UTILITY LOCATION AND VERIFICATION

The Contractor is responsible for accurately locating, by potholing or other suitable methods, all existing utilities such as service connections and substructures, to identify utility facilities within the work area and in potential conflict with the work and to prevent unwanted damage to such facilities and to identify any conflicts with the proposed work.

The Contractor shall perform, or cause or arrange to be performed, all utility mark-out, locating, status verification, and potholing work prior to the start of construction.

The Contractor shall fill all potholes on the same day of excavation, and, if no trenching is performed within 10 working days, fully restore all potholes and any damaged surrounding areas to their original condition unless otherwise allowed by the City.

The Contractor will coordinate with the City or other utility owners to obtain record information and to verify the operational status of utilities in conflict with the proposed construction.

The Contractor shall notify the City, in writing, of any conflicts between existing utilities and the proposed work a minimum of 5 working days, and 300 feet in advance of the work to provide adequate time, and space for any changes to the work needed to avoid unforeseen conflicts. The Contractor shall perform utility location and status verification far enough in advance of the Work to provide the written notification specified in this section.

The Written notification shall include; date of utility location, method of utility location, method of operational status verification, type, size, and material of utility, horizontal location, depth from existing pavement or ground surface to top and bottom of utility, suspected or presumed ownership of utility, and date on which any conflict with the utility will impact the critical path.

The Contractor shall not be entitled to an extension of Contract time or compensation for delay if direction to the Contractor is provided by the City within 5 working days from receipt of the Contractor's written notification of the utility conflict.

3.2 REMOVE EXISTING PAVEMENT

- A. Removal and disposal of existing bituminous and concrete pavements shall conform to SSPWC Section 300-1.3. Existing pavements shall be removed to neatly sawed edges. Horizontal limits for pavement removal shall be as needed to construct the sewer force main and gravity mains, vaults and manholes.

3.3 ABANDON EXISTING UTILITY

- A. When existing utilities have been or are to be abandoned and are found to interfere with construction, the interfering portion shall be removed and the remaining open portions securely sealed. The Contractor shall conduct this abandonment process at the location shown on the plans and as required to accommodate the construction. Interfering utilities shall be removed by saw cutting to a flat surface that is approximately perpendicular to the long axis of the utility.
- B. The status of existing utilities requiring removal shall be verified by the Contractor prior to removal. The Contractor shall immediately notify the City of any utility, requiring removal, found to be or believed to be live.
- C. Where the internal dimension of the conduit is greater than 12-inches, the seal shall consist of an 8-inch thick wall of solid masonry brick and mortar as shown on the Plans.
- D. Where the internal dimension of the conduit is less than or equal to 12-inches, the seal shall consist of a wall (plug) of concrete not less than 8-inches thick as shown on the Plans.
- E. Abandonment of Septic Tanks shall include pumping out and disposing of the contents of the septic tank and the removal of the top 2 feet of the tank lids and risers and filling of the septic tank with concrete.

3.4 LANDSCAPING RESTORATION

- A. Contractor shall notify the City prior to trench excavation within the Park boundaries (behind curb line in turf areas) to allow the City to mark out underground utilities such as: irrigation lines, storm drains, electrical and communications lines, gas lines.
- B. Contractor is responsible for minimizing turf and landscaping disturbance to minimum amount necessary to install the sewer laterals, water service and abandon the septic tanks.
- C. Contractor shall restore all disturbed landscaping and irrigation systems to match the existing conditions. Turf replacement shall be coordinated with the

City's Park maintenance staff to verify the type of turf to be installed to match existing conditions.

- D. Sidewalk and curb/gutter removal as necessary for sewer lateral installation and septic tank abandonment shall be replaced in kind.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Demolition shall not be measured for separate payment.
- B. Septic Tank Abandonment will be measured by the number of Septic Tank Abandonments as determined from field measurement.
- C. Landscaping Restoration shall not be measured for payment.

4.2 PAYMENT

- A. Full compensation for demolition shall be considered as included in the price paid for the various items of work requiring demolition and no additional compensation will be allowed therefor.
- B. The contract price paid for Septic Tank Abandonment shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Septic Tank Abandonment (including existing utility verification and location, removal and disposal of existing contents of tank, removal of risers/manhole covers, concrete, backfill and surface restoration) and for doing all the work for Septic Tank Abandonment complete in place, as shown on the Plans, and as specified in these Special Provisions and the SSPWC.
- C. The Contract lump sum paid for Landscaping Restoration shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Landscaping Restoration, complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.

END OF SECTION 02 41 13

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of:

- Formwork,
- Reinforcement,
- Accessories,
- Cast-in-place concrete, and
- Finishing and curing.

B. Reference Standards:

This Technical Specification makes references to the Standard Specifications for Public Works Construction ("Greenbook" or SSPWC), and to the City of San Diego Regional Standard Drawings.

1.2 RELATED SECTIONS

A. Section 31 23 16 – Excavation and Backfill

1.3 SUBMITTALS

A. Shop Drawings:

1. Reinforcing placing plan shall be submitted in accordance with the requirements of Section 303-1.7.1 of the SSPWC.

B. Concrete mix design shall be submitted in accordance with the requirements of Section 201-1.1 of the SSPWC.

C. Product Data.

1. Product data and source of material as applicable for chemical admixtures, aggregates, Portland cement and supplementary

cementitious materials shall be submitted in accordance with the requirements of Section 201-1.1 of the SSPWC.

2. Certifications for reinforcing materials shall be submitted in accordance with the requirements of Section 201-2.4 of the SSPWC.
3. Product data for waterstops including details for placement of waterstops and details for vertical and horizontal waterstop joint and corner construction and installation.

1.4 QUALITY CONTROL

- A. Testing of Portland Cement Concrete shall be in accordance with the requirements of Section 201-1.1.5 of the SSPWC.

PART 2 PRODUCTS

2.1 FORM MATERIALS AND ACCESSORIES

- A. Form materials shall conform to the requirements of Section 303-1.3 of the SSPWC.
- B. Provide ribbed type waterstops conforming to the requirements of COE CRD C 572 or equal, and manufactured from virgin polyvinyl chloride plastic compound.
 1. Construction Joints:
 - a. Provide flat ribbed 6-inch by 3/8-inch construction joints, such as Greenstreak Group Inc, Catalog Number 786 Or equal.
 2. Manufacturers:
 - a. Vinylex Corporation, catalog numbers as specified above, www.vinylex.com or equal.
 - b. The Euclid Chemical Company/Tamms Industries, Inc., www.euclidchemical.com or equal.
 - c. W. R. Meadows, Inc., www.wrmeadows.com. Greenstreak, www.greenstreak.com or Equal.
 - d. Approved equal.

2.2 PORTLAND CEMENT CONCRETE

- A. Portland Cement Concrete shall conform to the requirements of Section 201-1 of the SSPWC.
- B. Portland Cement Concrete used for construction of equipment pad slab on grades shall meet the mix design requirements of mix 658-CME-4500P per Table 201-1.1.3(A) of the SSPWC.
- C. Portland Cement Concrete used for construction of manholes and other miscellaneous drainage and sewer structures shall meet the mix design requirements of the *Sewer & Storm Drainage Facilities* section of Table 201-1.1.2(A) of the SSPWC for the various elements constructed unless noted otherwise.
- D. Portland Cement Concrete used for construction of all other miscellaneous structures shall meet the mix design requirements of the *Miscellaneous* section of Table 201-1.1.2(A) of the SSPWC for the various elements constructed unless noted otherwise.

2.3 REINFORCEMENT

- A. Reinforcement shall be Grade 60 billet steel conforming to ASTM A 615 and shall conform to the requirements of Section 201-2 of the SSPWC.

2.4 CONCRETE CURING MATERIALS

- A. Concrete Curing compound shall conform to the requirements of Section 201-4 of the SSPWC.

2.5 GROUT

- A. High strength non-shrink grout shall conform to the requirements of non-shrink grout according to Section 201-7 of the SSPWC.

2.6 CONTROLLED LOW STRENGTH MATERIAL

- A. CLSM shall conform to the requirements of Section 201-6 of the SSPWC and shall be 190-E-400.

PART 3 EXECUTION

3.1 GENERAL

- A. Concrete structures shall be constructed in conformity with the Plans and these Special Provisions. Concrete for use in work constructed under this section shall conform to the requirements contained herein and the requirements of Section 201-1 of the SSPWC as referenced herein.
- B. The compressive strength of the concrete referred to in this section will be based on the results of concrete test cylinders made and tested by the contractor in accordance with the requirements contained herein and the requirements of Section 201-1 of the SSPWC as referenced herein.
- C. Subgrade for concrete structures shall be prepared in accordance with the requirements of the Plans and these Special Provisions and Section 303-1.2 of the SSPWC.
- D. Contractor shall verify equipment foundation dimensions are appropriate for the selected/purchased equipment prior to forming and pouring foundations. Contractor may need to adjust length and width dimension of foundations to fully support the equipment if equipment dimensions vary from plan. Notify Engineer of any discrepancies in final equipment dimensions from those indicated for the foundation on the plans prior to forming and pouring foundations.

3.2 FORMWORK ERECTION

- A. Formwork erection, shoring and bracing shall conform to the requirements of Section 303-1.3 and 303-1.6 of the SSPWC.

3.3 INSERTS, EMBEDDED COMPONENTS, AND OPENINGS

- A. Provide formed openings where required for work to be embedded in and passing through concrete members.
- B. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.
- C. Install concrete accessories straight, level, and plumb.
- D. Install waterstops continuous without displacing reinforcement.

3.4 REINFORCEMENT PLACEMENT

- A. Placing Reinforcement shall conform to the requirements of Section 303-1.7 of the SSPWC.

3.5 PLACING CONCRETE

- A. Placing Concrete shall conform to the requirements of Section 303-1.8 of the SSPWC.

3.6 FORM REMOVAL

- A. Removal of forms shall conform to the requirements of Section 303-1.4 of the SSPWC.

3.7 FINISHING

- A. Surface finishes shall conform to the requirements of Section 303.1.9 of the SSPWC.
 - 1. Unless noted otherwise all exposed formed surfaces shall receive a Class 1 Surface Finish.
- B. Surfaces to receive waterproofing shall be finished to meet the requirements of the waterproofing system manufacturer.

3.8 CURING AND PROTECTION

- A. All concrete shall be cured in conformance with the requirements of Section 303-1.10 of the SSPWC.

3.9 FIELD QUALITY CONTROL

- A. Perform field inspection and testing in accordance with ACI 318 and the requirements for special inspections according to the 2010 California Building Code as required on the Plans.
- B. Reinforcement Inspection:
 - 1. Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

C. Strength Test Samples:

1. Sample concrete and make one set of three cylinders for every 150 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.

D. Field Testing:

1. Measure slump and temperature for each compressive strength concrete sample.
2. Measure air content in air entrained concrete for each compressive strength concrete sample.

E. Cylinder Compressive Strength Testing:

1. Test Method: ASTM C39/C39M.
2. Test Acceptance: In accordance with ACI 318.
3. Test two cylinders at 28 days.
4. Test one cylinder at 56 days.
5. Dispose remaining cylinders when testing is not required.

3.10 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required lines, details and elevations, as directed by the City.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Driveway shall be measured by the square footage of Driveway installed as determined from field measurement.
- B. Curb and Gutter shall be measured by the horizontal linear footage of Curb and Gutter installed as determined from field measurement. Field measurement will be made along the top of curb line.

- C. Sidewalk shall be measured by the square footage of Concrete Sidewalk installed as determined from field measurement.
- D. Equipment Foundations shall not be measured for payment.
- E. Pedestrian Ramp shall be measured by each Pedestrian Ramp installed as determined from field measurement which shall include tactile strip, concrete, retainer curb at rear of ramp and transition ramps from curb return to curb return.

4.2 PAYMENT

- A. The Contract unit price paid for Driveway shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Driveway, complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- B. The Contract unit price paid for Curb and Gutter shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Curb and Gutter, complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- C. The Contract unit price paid for Sidewalk shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Sidewalk, complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- D. Equipment Foundations shall be included in the unit price paid for the other various items of work and no additional compensation will be allowed therefor.
- E. The Contract unit price paid for Pedestrian Ramp shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Pedestrian Ramp, (including retainer curb, transitions ramps on both sides) complete in place as shown on the Plans and as specified in these Special Provisions and the SSPWC.

END OF SECTION 03 30 00

SECTION 22 14 23

PUMPING STATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Work Included:
This section shall consist of:
 - Sewer Pump Station Installation,
- B. Reference Standards:
This Special Provision makes references to the Standard Specifications for Public Works Construction (Greenbook-most current version), referred to hereinafter as SSPWC.

1.2 SUBMITTALS

- A. Wet Well
- B. Pumps
- C. Force Main Piping and couplings in wet well
- D. Valves in wet well
- E. Crushed rock for bedding
- F. Pump Controller

PART 2 PRODUCTS

2.1 WET WELL

- A. Precast Fiberglass Package Type.

2.2 PUMPS

- A. Furnish and install 2 submersible non-clog wastewater pumps. Each pump shall be equipped with an 11 HP submersible electric motor connected for operation on 460 volts, 3-phase, 60 hertz, wire service, with 50 feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and have P-MSHA Approval.

- B. The pump shall be supplied with a mating cast iron 3-inch discharge connection and be capable of delivering: 150 GPM at 100 FT. TDH. An additional point on the same curve shall be 250 GPM at 80 feet total head. Shut off head shall be 130 feet (minimum). The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor. Each pump shall be fitted with 30 feet of lifting chain or stainless-steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.
- C. Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle shall be of stainless steel. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces in contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
1. Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
 2. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.
- D. Motors are sufficiently cooled by the surrounding environment or pumped media. A water jacket is not required.
- E. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior

from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

- F. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.
1. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
 2. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
 3. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from

shut-off through run-out.

- G. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The power cable shall be of a shielded design in which an overall tinned copper shield is included, and each individual phase conductor is shielded with an aluminum coated foil wrap. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
- H. The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two-row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable. The minimum L₁₀ bearing life shall be 50,000 hours at any usable portion of the pump curve.
- I. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide seal ring.

Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and

inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. The motor shall be able to operate dry without damage while pumping under load.

Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

Seal lubricant shall be non-hazardous.

- J. Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T.

If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the oil housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

- K. The impeller shall be of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on a replaceable insert ring.

The impeller shall have vanes hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. The impeller shall be capable of momentarily moving axially upwards a distance of 15mm/0.6-in. to allow larger debris to pass through and immediately return to normal operating position.

- L. The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of Hard-

Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

- M. All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. **USE OF VOLTAGE SENSITIVE SOLID-STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.**

The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

2.3 PUMP STATION APPURTENANCES

- A. Stainless Steel Guide Bar Bracket and Cable Holder Hooks
- B. Check Valve and Shutoff Valves as indicated on the plans
- C. Vent Piping
- D. Influent connection – size/orientation per plans
- E. Pump Station Controller in NEMA 4X enclosure
- F. Pressure Transducer and Backup Level Floats
- G. Aluminum Access Hatch

2.4 PUMP CONTROLLER

- A. The pump controller shall provide user ready automatic control of pumps with an intuitive HMI interface. The pump controller shall contain pre-designed operational parameters that are selected and configured via the user interface (HMI). The minimum features available in the pump controller shall include:
 - 1. Pump control of up to 6 pumps; including pump grouping and pump alternation.
 - 2. Intelligent Hand-Off-Auto Control:
 - a. Hand mode (semi-automatic, non-maintained manual mode), the pump switches off at the deactivation set point and then resets to Auto mode for the next pump run cycle.

- b. Hand mode (fully manual, maintained mode). To pump beyond the off (deactivation) set point, the Hand-Off-Auto button must be held down by the user for failsafe control.
- 3. Level set point adjustment for pump activation, deactivation and station level alarms.
- 4. Level device input capability shall include: 4-20mA analog signal, conductive probe or floats.
- 5. Redundant level device input capability with automatic input fault control (input device switching).
- 6. Selectable charge (fill) or discharge (empty) modes.
- 7. Pre-configured station optimization features:
 - a. Maximum pump off time
 - b. Maximum pumps to run
 - c. Maximum starts per hour
 - d. Inter-pump start and stop time delays
 - e. Maximum pump run time
 - f. Blocked pump detection
 - g. Well washer control capability
 - h. Well clean out control capability
 - i. Pump operation control (profile programming) capability
- 8. "Locked level" alarm function to indicate a level device fault.
 - a. User-defined % change within a specified time period
 - b. Different set point values for low use or high use time periods (user defined)
- 9. Pump alternation modes:
 - a. Fixed lead pump assignment
 - b. Normal alternation
 - c. User defined alternation using N:1 ratio
 - d. Run most efficient pump using N:1 ratio
 - e. Alternation by the number of hours run or the number of starts within a specified time period
- 10. Pump decommissioning:
 - a. Decommissioned pump is automatically removed from the pump controller.
 - b. Internal remote monitoring data tag shall flag the decommissioned status of a pump
- 11. Up to (6) unique user defined profiles of set points shall be available to control pumps during specific site conditions or events. Features shall include:
 - a. Automatic profile change based on date and time

- b. Profile selection option from SCADA (remote control), digital input, logic tag or local display HMI
- 12. Datalogger for user-defined faults and events:
 - a. 50,000 events to internal flash memory
 - b. 10,000,000 events by writing directly to an SD card or USB
 - c. FTP data transfer or download data capability of event and fault logs in the form of a (csv) file for Microsoft Excel analysis
- 13. 3-phase supply voltage monitoring and supply fault management for the following conditions:
 - a. Under-voltage
 - b. Over-voltage
 - c. Phase fail
 - d. Phase rotation
- 14. Monitoring of dc power supply, battery voltage, and internal controller temperature
- 15. Energy, power and pump efficiency monitoring:
 - a. kW, kVA, power factor, kWhr, KVAH calculation for each pump
 - b. pump efficiency calculation (litres or gals per kWhr) for each pump
- 16. Motor protection features:
 - a. 3-phase current monitoring for each pump
 - b. Over- and under-current trip
 - c. Ground/earth fault
 - d. Current phase imbalance fault
 - e. I²T fault
 - f. Insulation resistance testing for motor windings
- 17. Flow measurement:
 - a. Calculated flow via liquid level draw down data
- 18. VFD speed control capability.
- 19. Fault module capability as follows:
 - a. Pump hold out function
 - b. Automatic restart function after fault condition is no longer present
 - c. Manual reset of fault required (if user intervention of fault reset is selected)
- 20. Remote control via remote telemetry monitoring to include the following:
 - a. Changing the mode of pumps (hand/off/auto)
 - b. Reset of pump faults and station faults

- c. Changing pump and alarm setpoints
- d. Changing operational profiles

21. Security

- a. User defined password management for access to programming areas in the controller
- b. Automatic data logging of personnel who have entered the programming areas
- c. Automatic logging of all unsuccessful login attempts with a date and time stamp
- d. Digital input option for controlled access to programming areas

22. SD/USB ports shall be available for the following operations:

- a. Firmware upgrades
- b. Save and load pump controller configuration
- c. Download data logs
- d. Export or import Modbus and DNP3 points list

- B. Advanced Programming Functions - The pump controller shall have the option of interfacing with IEC61131-3 and IEC61499 compliant PLC programming languages to enhance functionality or interact with the pump controller. The pump controller shall have the option of using a simple logic engine to enhance functionality or interact with the pump controller.
- C. Input /Output Characteristics - The pump controller inputs and outputs shall be modular and shall be expandable.

Available I/O types shall include:

- 1. Digital inputs (voltage free input), also configurable as counters
- 2. Digital outputs (240V, 5A resistive)
- 3. Analog inputs (10bit)
- 4. Analog outputs (10bit)

- D. User defined digital inputs - Digital Inputs shall be configurable based on specific pump sensor arrangements:
 - 1. Seal sensor (conductive)
 - 2. PTC Thermistor
 - 3. Conductive probe (for liquid level sensing)

- E. Dedicated pump monitoring inputs - The pump controller shall provide support for the following pump monitoring inputs:
 - 1. Insulation resistance test (IRT) with user selectable test voltage up to 1000VDC
 - 2. 3-phase current monitoring, derived from external current transformer devices with a 0.5% input resolution tolerance
 - 3. 3-phase supply voltage monitoring at 0.5% input resolution tolerance. Up to 630VAC maximum voltage (phase to phase).
- F. Duoprobe Support - The pump controller shall have an internal atmospheric pressure sensor to allow for atmospheric pressure sensing and signal correction when used in conjunction with the Multitrode Duoprobe pressure transducer level sensing device.
- G. User interface - The pump controller shall include a graphical user interface (HMI) display for configuration settings, control operations, and advanced programming. The following display characteristics shall be provided:
- H. Status indication - The following parameters shall be displayed on the main screen:
 - 1. Liquid level in percentage, meters, feet or other custom defined units
 - 2. Set points for pump control and alarms
 - 3. Pump status (running or stopped)
 - 4. Pump availability
 - 5. Pump fault indication
 - 6. 3-phase voltage supply values
 - 7. Date and time indication
 - 8. User configurable options to display pump information and station status
- I. Information screens - The following parameters shall be available via a user key press from the main screen:
 - 1. Hours Run accumulators for each pump and the pump station with the following information:
 - a. minutes run for last pump cycle
 - b. total minutes (hourly)

- c. total hours today, total hours yesterday
 - d. total hours this week, total hours last week
 - e. total accumulated hours
 - 2. Pump Start accumulators for each pump & the station with the following comparisons
 - a. pump starts this hour, pump starts last hour
 - b. pump starts today, pump starts yesterday
 - c. pump starts this week, pump starts last week
 - d. total accumulated pump starts
 - 3. Flow values
 - a. station inflow rate
 - b. pump flow rate
 - c. total station volume
 - d. overflow data (including overflow start time, duration, estimated volume)
 - 4. Power and Efficiency
 - a. pump efficiency in gallons or litres per KWHr - or KVAh
 - b. power in kW, KVA
 - c. power factor
 - d. energy accumulators per pump in KWHr and KVAH
 - 5. Insulation resistance value for each pump motor in (Ohms)
 - 6. I/O Status
 - a. Digital I/O status and accumulated values
 - b. Analog I/O status and values in (mA) or scaled values
 - c. 3-phase voltage, current, frequency, phase angle, power factor
 - 7. Database viewer to review all statistics, data information and available tags in real time
 - 8. Communications information and statistics
- J. Control Functions - The pump controller display interface shall be capable of performing the following control operations:
- 1. Pump control mode for each pump (Hand-Off-Auto)
 - 2. Pump fault reset
 - 3. Level alarm reset
- K. Fault screen - The main screen shall include a Fault button which takes the user to a Fault screen and allows them to check all current and unacknowledged alarms. The fault screen will provide fault details along with a date and time stamp for each fault occurrence. A fault reset option

shall be presented to the user when alarms can be acknowledged or reset.

- L. History screen - The main screen shall include a History button which takes the user to a History screen which allows them to view the following information:
 - 1. Viewing of all faults and events
 - 2. Information filtering capability

- M. Configuration screens - The user configuration screens shall provide capability to change pump control settings as follows:
 - 1. Setup Wizard function to configure the pump controller settings by user input to specific questions
 - 2. Set point programming of alarms and pump activation/deactivation.
 - 3. Enable or disable alarms
 - 4. Set alternation mode for pumps
 - 5. Configure I/O as follows:
 - a. Assign primary/backup level to any input, e.g. 4-20mA or conductive probe
 - b. Assign pre-defined or user-defined faults to any digital input
 - c. Zero and span analog inputs
 - d. Configure digital output source
 - e. Configure analog output source
 - 6. Configure faults as follows:
 - a. display the fault to the local screen only
 - b. manual reset (local) or remote reset operation before pump becomes available
 - c. auto-restart (after fault condition clears) with configurable restart time
 - d. auto-restart user-selectable number of times within time window before locking out
 - e. customized text for fault and event name
 - 7. Configure station optimization parameters
 - 8. Configure supply protection
 - a. Under and over voltage alarm points
 - b. Volts phase imbalance and volts phase rotation set points
 - c. DC supply alarm set point
 - 9. Configure motor protection
 - a. Under current set points
 - b. Over current set points

- c. Ground/earth fault set points
 - d. Phase failure set points
10. Configure communications ports, speeds and addresses

N. Configuration program backup, restore and firmware upgrades - The pump controller configuration interface shall allow the user to save and restore pump controller configurations onto a portable SD card or USB storage device. The pump controller shall allow for the import of DNP3 and Modbus point lists and custom logic scripts via the SD or USB ports. The pump controller configuration interface shall allow the user to backup system log files, alarm and event log files, and custom scripts via the SD or USB ports. Firmware upgrades shall be possible by using a firmware upgrade file on a portable SD card or USB storage device.

O. Communications:

1. Physical - The pump controller shall include the following data communication ports:
 - a. Two Ethernet ports (10Mbit/s)
 - b. Two RS232 ports (115kBit/s)
 - c. Two RS485 ports (115kBit/s)
 - d. USB device port
 - e. SD card port
2. Communication Types - The pump controller shall support the following communication types:
 - a. TCP/IP
 - b. UDP
 - c. RS232
 - d. RS485
 - e. Private radio over RS232
 - f. PSTN
 - g. Wireless LAN
 - h. Cellular data (via integral ppm module)
 - i. Cellular voice
3. Communication Protocols - DNP3 (master & slave, level 2 compliant), including:
 - a. Change of state reporting
 - b. Native date/time and quality stamps for each data point
 - c. Event buffering for different classes of data

- d. Support for multiple masters and slaves to be configured on the unit
 - e. DNP Security (for securing communications between master station and RTU)
 - Modbus (master & slave) including:
 - f. Modbus TCP
 - g. Modbus RTU
 - h. Modbus ASCII
 - i. Support for multiple masters and slaves
- P. Performance and Environmental Characteristics - The pump controller shall meet the following performance and environmental characteristics:
- 1. Central Processing Unit Speed: 566MHz
 - 2. Central Processing Unit RAM Size: 256MByte
 - 3. Central Processing Unit Flash Memory Size: 64MByte
 - 4. Real Time Clock
 - 5. Working temperature -10°C to +60°C
 - 6. Storage temperature -40°C to +90°C
 - 7. Humidity 5% to 95% (non-condensing)
 - 8. IP Rating

Controller Base Unit: IP20, Nema 1
Display Interface IP65, Nema 4
- Q. Warranty - The pump controller shall be provided with a 5-year manufacturer's warranty.

PART 3 EXECUTION

3.1 GENERAL

- A. Dewater excavations and trenches, as necessary, to allow for construction of the Work as called for on the Plans and in conformance with these Specifications.
- B. Shore excavations and trenches, as necessary, to comply with applicable laws.

3.2 PUMP STATION INSTALLATION

- A. Excavation and backfill for Pump Station installation shall conform to SSPWC Section 300-3. Upon completion of excavation and dewatering,

the subgrade at the bottom of the excavation shall be smoothed and adjusted for grade. The excavation bottom subgrade shall be compacted to a firm and unyielding condition to the extent practicable without soil amendment or other special preparation. Wet well base structures shall be installed on a prepared bedding as shown on the Plans and conforming to this Specification and the pump station manufacturer's recommendations. The bedding material shall be leveled and compacted to a firm and unyielding condition prior to installation of the structure.

- B. Pump station installation shall conform to the details shown on the plans and shall include the installation of the wet well, pumps, force main piping including fittings, couplings, valves, anchor brackets, pipe penetrations and sealing and foundation and valve vault.
- C. Ensure pump station is adequately ballasted and supported before pouring of concrete foundation.
- D. The electrical system shall conform to Special Provisions Sections 26 05 19, 26 05 26, 26 05 29, 26 05 33 and 26 09 43, and 26 05 55.
- E. Testing shall conform to the following requirements:
 - 1. Pumps: The pump and power cord shall be visually inspected for imperfections, cuts or nicks.
 - 2. Contractor to refer to manufacturer's specifications for testing procedures.
 - 3. The pump shall have a ground continuity check.
 - 4. The pump is run. Voltage and current are monitored visually, electronically, and the tester listens for any noise or malfunction.
 - 5. Contractor to fill wet well with potable water to allow each pump to cycle a minimum of five times. The lift station pumps shall also be operated to empty the force main at least once per pump with a visual inspection at the force main discharge manhole. The alarm system should be cycled a minimum of three times. Contractor is responsible for purchasing and obtaining water needed for testing of the pumps and force main. Contractor is responsible for coordinating discharge of test water to the downstream public sewer with approval from the City of Rialto.
 - 6. Contractor to coordinate with the City Maintenance Department for inspection of the pump operation. The City's lead plumber and lead electrician (or designates) shall be present during startup and testing.

7. Contractor shall be responsible for providing water for use in testing the operation of the pump station.
- F. The contractor shall assemble an operations and maintenance manual for the pump stations and provide 2 copies to the City.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Equipment: Duplex Submersible Package Lift Station Equipment (Q=150 gpm, 100' TDH) will be measured by each Equipment: Duplex Submersible Package Lift Station (Q=150 gpm, 100' TDH) purchased and delivered to the site.
- B. Duplex Submersible Package Lift Station Installation will not be measured for payment.
- C. Equipment: Valve Vault will be measured by each Equipment: Valve Vault purchased and delivered to the site.
- D. Valve Vault Installation will not be measured for payment.
- E. Equipment: Lift Station Control Panel will be measured by each Equipment: Lift Station Control Panel purchased and delivered to the site.
- F. Lift Station Control Panel Installation will not be measured for payment.

4.2 PAYMENT

- A. Equipment: Duplex Submersible Package Lift Station Equipment (Q=150 gpm, 100' TDH) will be paid for each Equipment: Duplex Submersible Package Lift Station Equipment (Q=150 gpm, 100' TDH) purchased and delivered to the site.
- B. Duplex Submersible Package Lift Station Installation will be paid for at the Contract lump sum amount for Duplex Submersible Package Lift Station Installation, which amount shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Duplex Submersible Package Lift Station (including guiderails, guiderail support brackets, level transducer, lifting cable, power and

control cable, shoring, dewatering, excavation for all soil conditions encountered, foundation preparation, testing and commissioning and test water), complete in place, as shown on the Plans and as specified in these Special Provisions.

- C. Equipment: Valve Vault will be paid for each Equipment: Valve Vault purchased and delivered to the site.
- D. Valve Vault Installation will be paid for at the Contract lump sum amount for Valve Vault Installation, which amount shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Valve Vault (including shoring, dewatering, excavation for all soil conditions encountered, foundation preparation, installation of vault and piping), complete in place, as shown on the Plans and as specified in these Special Provisions.
- E. Equipment: Lift Station Control Panel will be paid for each Equipment: Lift Station Control Panel purchased and delivered to the site.
- F. Lift Station Control Panel Installation will be paid for at the Contract lump sum amount for Lift Station Control Panel Installation, which amount shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Lift Station Control Panel Installation (including wiring, foundation, testing and commissioning), complete in place, as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 22 14 23

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or equal:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. Alpha Wire.
 - 3. Belden Inc.
 - 4. Encore Wire Corporation.
 - 5. General Cable Technologies Corporation.
 - 6. Southwire Incorporated.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN/THWN-2.

- D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for armored cable, Type AC, metal-clad cable, Type MC with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following or equal:
 - 1. AFC Cable Systems, Inc.
 - 2. Gardner Bender.
 - 3. Hubbell Power Systems, Inc.
 - 4. Ideal Industries, Inc.
 - 5. IlSCO; a branch of Bardes Corporation.
 - 6. NSI Industries LLC.
 - 7. O-Z/Gedney; a brand of the EGS Electrical Group.
 - 8. 3M; Electrical Markets Division.
 - 9. Tyco Electronics.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 3 EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- C. Feeders: Copper Solid for No. 8 AWG and smaller; stranded for No. 6 AWG and larger.
- D. Branch Circuits: Copper. Solid for No. 8 AWG and smaller; stranded for No. 6 AWG and larger.
- E. Control Circuits: Copper. 16 AWG stranded for wiring inside the control panel, 14 AWG solid when routed to field mounted digital instruments.

- F. Analog Circuits: Copper. 100% shielded, 18 stranded gauge, twisted pairs or otherwise noted.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. This article provides examples of application requirements for conductors and cables. Revise to retain wiring methods for various environments in Project. Add other methods if required. Revise conductor insulation and cable type designations to suit Project conditions, authorities having jurisdiction, and practice. See NFPA 70 and UL's "Electrical Construction Equipment Directory" for additional application information about conductor sizes, insulation temperature ratings in cables, and product-use classifications and restrictions.
- B. Service Entrance: Type THHN/THWN-2, single conductors in raceway.
- C. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway
- D. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 26 05 33 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

- F. Support cables according to Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 26 05 53 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2.

3 days after Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.

- a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
- b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

B. Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

C. Cables will be considered defective if they do not pass tests and inspections.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. All conductors will be measured by the number of linear feet per the size/type installed as determined from field measurement.
- B. Underground Street Light Electrical Service will not be measured for payment.

4.2 PAYMENT

- A. The contract per unit price paid for conductors shall include full compensation for furnishing all labor, materials, tools, equipment, and

incidentals, and for doing all the work, including terminations, complete in place, as shown on the Plans and as specified in these Special Provisions.

- B. The Contract lump sum paid for Underground Street Light Electrical Service shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Underground Street Light Electrical Service (including SCE Coordination) complete in place, as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 26 05 19

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings of the Contract, including but not limited to, the General and Special Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes: Grounding systems and equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY CONTROL

- A. Testing Agency Qualifications: Member company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3

2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Grounding Conductor: No. 4/0 or No. 2 AWG, stranded conductor.
5. Grounding Connectors: Cadweld or equivalent.

2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel 3/4 inch by 10 feet (19 mm by 3 m) in diameter.

PART 3 EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 1. Feeders and branch circuits.
 2. Lighting circuits.
 3. Receptacle circuits.
 4. Flexible raceway runs.
 5. Busbar Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on bus bar.
 6. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
- C. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts. Make connections to building steel.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

3.4 LABELING

- A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.

3.5 FIELD QUALITY CONTROL

- A. Tests and Inspections:
1. After installing grounding system, but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no earlier than two full days after last trace of precipitation and without soil being moistened by

any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

- b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify ~~Airport~~ Authority promptly and include recommendations to reduce ground resistance.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Grounding Systems shall not be measured for payment.

4.2 PAYMENT

- A. Grounding Systems shall be considered included in the unit prices paid for the other various items of work and no additional compensation will be allowed therefor.

END OF SECTION 26 05 26

SECTION 22 05 29

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe hangers and supports.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete
 - 2. Section 33 41 00 – Utility Piping

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- B. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
- C. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 - 3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate system layout with location including critical dimensions, sizes, and support locations.

- B. Product Data:
 - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.
- C. Design Data: Indicate load carrying capacity of, multiple pipe and riser support hangers. Indicate calculations used to determine load carrying capacity of multiple pipe and riser support hangers. Submit sizing methods and calculations sealed by a registered professional engineer.
- D. Manufacturer's Installation Instructions:
 - 1. Hangers and Supports: Submit special procedures and assembly of components.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY CONTROL

- A. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to structure.
- B. Maintain one copy of each document on site.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Manufacturers:
 - 1. Standon Model C92 Adjustable Pipe Saddle Clamp Support as basis of design.
 - 2. Standon Model S96 Flange Cradle Pipe Support
 - 3. Approved Equal

- B. Piping:
 - 1. Vertical Support: as shown on plans
 - 2. Floor Support: 304 Stainless Steel adjustable pipe saddle, clamp support, or flange cradle pipe support, as called out on plan, or approved equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify openings are ready to receive sleeves.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of material.
- B. Remove incompatible materials affecting bond.
- C. Obtain permission from Engineer before drilling or cutting structural members.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- C. Support horizontal ductile iron pipe adjacent to each hub, with 8 feet maximum spacing between supports.
- D. Support vertical piping at with 8 feet maximum spacing.
- E. Support riser piping independently of connected horizontal piping.
- F. Any pipe support configuration that differs from what is shown on the plans will require Engineer's approval and will require shop drawings and calculations signed and stamped by a registered Professional Engineer in the State of California.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Pipe supports will not be measured for payment.

4.2 PAYMENT

- A. Full compensation for pipe supports shall be considered as included in the price paid for the various other items of work requiring pipe supports and no additional compensation will be allowed therefor.

END OF SECTION 22 05 29

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings of the Contract, including but not limited to General and Special Conditions.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits, tubing, and fittings.
 - 2. Nonmetal conduits, tubing, and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Nonmetal wireways and auxiliary gutters.
 - 5. Surface raceways.
 - 6. Boxes, enclosures, and cabinets.
 - 7. Handholes and boxes for exterior underground cabling.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.
- C. PVC: Polyvinyl Chloride plastic conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 MATERIALS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following Or equal:

1. AFC Cable Systems, Inc.
 2. Allied Tube & Conduit; a Tyco International Ltd. Co.
 3. Anamet Electrical, Inc.
 4. Electri-Flex Company.
 5. O-Z/Gedney; a brand of EGS Electrical Group.
 6. Picoma Industries, a subsidiary of Mueller Water Products, Inc.
 7. Republic Conduit.
 8. Robroy Industries.
 9. Southwire Company.
 10. Thomas & Betts Corporation
 11. Western Tube and Conduit Corporation
 12. Wheatland Tube Company; a division of John Maneely Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. ARC: Comply with ANSI C80.5 and UL 6A.
- E. IMC: Comply with ANSI C80.6 and UL 1242.
- F. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit
Comply with NEMA RN 1.
Coating Thickness: 0.040 inch (1 mm), minimum.
- G. EMT: Comply with ANSI C80.3 and UL 797.
- H. FMC: Comply with UL 1; zinc-coated steel
- I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 2. Fittings for EMT:
 - a. Material: Steel
 - b. Type: Setscrew or compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- K. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following Or equal:
1. AFC Cable Systems, Inc
 2. Anamet Electrical, Inc.
 3. Arnco Corporation.
 4. CANTEX Inc.
 5. CertainTeed Corp.
 6. Condux International, Inc.
 7. Electri-Flex Company.
 8. Kraloy.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Niedax-Kleinhuis USA, Inc.
 11. RACO; a Hubbell company.
 12. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. ENT: Comply with NEMA TC 13 and UL 1653.
- D. RNC: Type EPC-40-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- E. LFNC: Comply with UL 1660.

- F. Rigid HDPE: Comply with UL 651A.
- G. RTRC: Comply with UL 1684A and NEMA TC 14.
- H. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- I. Fittings for LFNC: Comply with UL 514B.
- J. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- K. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following or equal:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman; Pentair company.
 - 3. Mono-Systems, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 4 unless otherwise indicated, and sized according to NFPA 70.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Flanged-and-gasketed type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following Or equal:
1. Adalet.
 2. Cooper Technologies Company; Cooper Crouse-Hinds.
 3. EGS/Appleton Electric.
 4. Erickson Electrical Equipment Company.
 5. FSR Inc.
 6. Hoffman; a Pentair company.
 7. Hubbell Incorporated; Killark Division.
 8. Kraloy.
 9. Milbank Manufacturing Co.
 10. Mono-Systems, Inc.
 11. O-Z/Gedney; a brand of EGS Electrical Group.
 12. RACO; a Hubbell Company.
 13. Robroy Industries.
 14. Spring City Electrical Manufacturing Company.
 15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
 16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

- H. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
- I. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- K. Cabinets:
 - 1. NEMA 250, Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 3. Boxes shall be as shown in details on the plans.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following Or equal:

- a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. CDR Systems Corporation; Hubbell Power Systems.
 - d. NewBasis.
 - e. Oldcastle Infrastructure; Christy Concrete Products.
 - f. Synertech Moulded Products; a division of Oldcastle Precast, Inc.
 - g. Jensen Precast
 - h. San Diego Precast
- 2. Standard: Comply with SCTE 77.
 - 3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 - 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 - 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - 6. Cover Legend: Molded lettering, "POWER" OR "COMM".
 - 7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 - 8. Handholes 12 Inches Wide by 24 Inches Long (300 mm Wide by 600 mm Long)] and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC
 - 2. Concealed Conduit, Aboveground: EMT
 - 3. Underground Conduit: Type SCH-40-PVC
 - 4. Retain first option in first subparagraph below if raceway may be exposed to physical damage.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC
 - 6. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R

- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT
 2. Exposed, Not Subject to Severe Physical Damage: EMT
 3. Exposed and Subject to Severe Physical Damage: GRC.
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250,
 8. Type 4 stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size above ground, 1-inch (25mm) below ground.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- G. Install surface raceways only where indicated on Drawings.

- H. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C)

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. First paragraph below is more restrictive than NFPA 70, which permits up to four quarter bends in a conduit run. Retain paragraph for more conservative design, with less stress being placed on conductors being pulled in.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- H. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- J. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot (3-m) intervals.

2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 3. Arrange raceways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 4. Do not embed threadless fittings in concrete unless specifically approved by Engineer for each specific location.
- K. Stub-ups to Above Recessed Ceilings:
1. Use EMT, IMC, or RMC for raceways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- L. Retain "Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions" Paragraph below to require application of protective joint compound to threads of rigid steel conduit or IMC and to their fittings where these raceways are installed outdoors or in wet, damp, or corrosive conditions. This optional requirement exceeds NFPA 70 rules. If retaining, coordinate with Drawings indicating wet, damp, or corrosive indoor locations.
- M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- O. Retain one of first two paragraphs below to exceed NFPA 70 requirements. NFPA 70 requires insulated bushings or other smooth, rounded entry provisions for conduit terminations at all locations where conductors are No. 4 AWG and larger, regardless of the environment. NFPA 70 requires bonding of all service conductors, but does not require bonding to be accomplished with grounding bushings. See Evaluations for further discussion.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-

inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

- R. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- S. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- T. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- U. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- V. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch (50-mm) radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- W. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- X. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where an underground service raceway enters a building or structure.
 3. Where otherwise required by NFPA 70.
- Y. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- Z. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- AA. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- BB. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- CC. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- DD. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- EE. Locate boxes so that cover or plate will not span different building finishes.
- FF. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- GG. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- HH. Set metal floor boxes level and flush with finished floor surface.
- II. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified on the plans.
 2. Install backfill.
 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide

maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
6. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
7. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
8. Underground Warning Tape: Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material

to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Electrical Conduit will be measured by the number of linear feet installed per type and size as determined from field measurement.

4.2 PAYMENT

- A. The accepted quantity for Electrical Conduit, will be paid for at the contract unit price per linear foot, which price shall be full compensation for the work, complete in place, including excavation, conduit, slurry, fittings, mule tape, tracer wire, backfill necessary to complete the work.
 - 1. No direct payment will be made for conduit bends or rigid non-metallic conduit bends at pull boxes, expansion fittings coupling fittings or innerducts, the cost being considered as included in the contract price for the conduit items.
 - 2. No separate measurement or direct payment shall be made for saw cutting, boring, trenching, pavement removal, disposal and pavement replacement done as part of conduit installation, the cost

being considered as included in the contract price for the conduit items.

END OF SECTION 26 05 33

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings of the Contract, including General and Special Conditions.

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.4 QUALITY CONTROL

- A. Comply with ANSI A13.1
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling is not permitted.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

1.6 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field
 - 2. Legend: Indicate voltage
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches

(50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

- F. Metal Tags: Brass or aluminum, 2" by 2" by 0.05" inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
- G. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

1.7 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Colors for Cables Carrying Circuits at 600 V and Less:
 - 1. Black letters on an orange field
 - 2. Legend: Indicate voltage
- C. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.
- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.
- E. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

1.8 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.

- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around cable it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.
- C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
- D. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.
- E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of cable it identifies and to stay in place by gripping action.
- F. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of cable it identifies and to stay in place by gripping action.

1.9 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of conductor it identifies and to stay in place by gripping action.
- C. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve with diameter sized to suit diameter of conductor it identifies and to stay in place by gripping action.
- D. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tube with machine-printed identification label. Sized to suit diameter of and shrinks to fit firmly around conductor it identifies. Full shrink recovery at a maximum of 200 deg F (93 deg C). Comply with UL 224.

1.10 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE, Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

1.11 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 7 by 10 inches (180 by 250 mm).

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 10 by 14 inches (250 by 360 mm).

- E. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES.Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

1.12 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.
- C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
- D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

1.13 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black except where used for color-coding.

- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - 5. Color: Black.

1.14 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 2 EXECUTION

2.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.

- D. Self-Adhesive Identification Products are not permitted.
- E. Attach signs and plastic labels with stainless steel machine screws or similar fasteners appropriate to the location and substrate.
- F. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.
- G. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- I. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- J. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
- K. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

2.2 IDENTIFICATION SCHEDULE

- A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
 2. Wall surfaces directly external to raceways concealed within wall.
 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30A, and 120V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot (3-m) maximum intervals.
- C. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
1. Emergency Power.
 2. Power.
 3. UPS.
- D. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded conductors.
 - a. Color shall be factory applied
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.

- d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- E. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive, self-laminating polyester labels with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations provide heat-shrink preprinted tubes with the conductor designation.
- H. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- J. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
 - 1. Limit use of underground-line warning tape to direct-buried cables.
 - 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- K. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70

and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

- L. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
 - 1. Comply with 29 CFR 1910.145.
 - 2. Identify system voltage with black letters on an orange background
 - 3. Apply to exterior of door, cover, or other access.
 - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- M. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- N. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.
- O. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high. Secure labels with stainless steel machine screws, not self-adhesive glue.

- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label. Secure labels with stainless steel machine screws, not self-adhesive glue.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
- d. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure. Self-adhesive backing is not permitted.

2. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Switchgear.
- e. Switchboards.
- f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- g. Emergency system boxes and enclosures.
- h. Motor-control centers.
- i. Enclosed switches.
- j. Enclosed circuit breakers.
- k. Enclosed controllers.
- l. Push-button stations.
- m. Power transfer equipment.
- n. Contactors.
- o. Remote-controlled switches, dimmer modules, and control devices.
- p. Power-generating units.
- q. Monitoring and control equipment.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Identification For Electrical Systems shall not be measured for separate payment.

4.2 PAYMENT

- A. Identification for Electrical Systems shall be included in the unit price paid for the other various items of work and no additional compensation will be allowed therefor.

END OF SECTION 26 05 53

SECTION 26 21 16

LOW VOLTAGE UNDERGROUND ELECTRICAL SERVICE ENTRANCE SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment and incidentals, including mounting hardware, as shown on the Drawings, and furnish and install Service Entrance Section.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with, or before, the service entrance sections.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall have a minimum of five years experience of producing substantially similar equipment, and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.

B. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown and specified.

1. ANSI C37.13, IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures.
2. ANSI C37.20, Switchgear Assemblies.
3. NEMA SG-3.
4. NEMA SG-5, Power Switchgear Assemblies.

5. NEMA SG-6, Power Switching Equipment.
 6. UL Standard No. 1558, Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear.
 7. National Fire Protection Association 79, Electrical Standards for Industrial Machinery.
- C. For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

1.3 SUBMITTALS

- A. Shop Drawings: Submit for approval the following:
1. Manufacturer's technical information for equipment proposed for use. Submittals shall include the following:
 - a. Dimensional information.
 - b. Three-line diagrams.
 - c. Technical specifications.
 - d. Catalog cuts.
 - e. Construction details of enclosure.
 - f. Schematic control diagrams for breaker control and all other controls.
- B. Certification of Ratings: Submit for approval copies of certifications as follows:
1. The integrated switchgear assembly shall have a BIL rating established by test on switchgear of the type to be furnished under this Specification. Certified test abstracts establishing such ratings shall be furnished.
- C. Operation and Maintenance Manuals:
1. Submit complete installation, operation and maintenance manuals, including, test reports, certificate of ratings, maintenance data and schedules, description of operation and spare parts information.
 2. Furnish Operation and Maintenance Manuals in conformance with

the requirements of Section 01781, Operation and Maintenance Data.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete in ample time to prevent delay of the Work.
- B. Equipment shall be handled and stored in accordance with manufacturer's instructions. One copy of these instructions shall be included with the equipment at the time of shipment.
- C. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the site. Notify ENGINEER of any loss or damage exists to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.
- D. Store materials to permit easy access for inspection and identification. Keep all materials off the ground, using pallets, platforms or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- E. Switchgear being stored prior to installation shall be stored so as to maintain the equipment in a clean and dry condition.
- F. Refer to and comply with the requirements of Section 01651, Transportation and Handling of Materials and Equipment and Section 01661, Storage of Materials and Equipment.

PART 2 - PRODUCTS

2.1 RATINGS

- A. The switchgear shall be rated for 600 volts service with a 3-phase, 4-wire bus rating as shown on the Drawings. Bus shall be braced for a symmetrical short circuit current of at least 100,000 amps.

2.2 MATERIALS

- A. General: The metal-enclosed switchgear assembly shall consist of multiple self-supporting bays. The sections shall contain drawout power air circuit

breakers.

B. Construction:

1. The switchgear shall consist of a stationary structure constructed from individual vertical sections as shown on the Drawings. The vertical sections shall be bolted together to form a rigid metal-clad switchgear assembly. Metal sheets shall provide grounded metal barriers between adjacent sections. Each vertical section shall contain one or more individual breaker or instrument compartments and a rear compartment for the bare busses and outgoing cable connections. Barriers shall be provided to isolate the cable compartment from the horizontal and vertical bus compartments. Where low voltage busway entry, is required into top of main breaker sections, provide necessary cutout and switchgear bus risers and auxiliary hardware. Connection to low voltage busway shall be tin-plated, copper bus. Cable connection is not acceptable.
2. Each breaker compartment shall be equipped with primary and secondary contacts, drawout extension rails, stationary levering mechanism parts and required instrument transformers. A formed steel door equipped with an emergency trip button and supported on concealed hinges with removable pins shall be provided for each circuit breaker compartment.
3. All busses and connections shall consist of tin-plated copper bar mounted on heavy duty supports and shall have bolted joints utilizing Belleville type spring washers. Ground bus shall be full length, copper.
4. Each circuit shall include the necessary three phase bus and connections between the bus and one set circuit breaker studs. Provide NEMA two-hole cable lugs attached to tin-plated copper extensions for the outgoing cables on the other set of circuit breaker studs.
5. Terminal blocks with integral type barriers shall be provided for secondary circuits. The terminal blocks shall be front accessible through a removable tray above each circuit breaker. All control wiring shall be securely fastened to the switchgear assembly without the use of adhesive wire anchors. A dedicated wiring path shall be provided for customer's control wiring.

6. The stationary part of the primary disconnecting devices for each circuit breaker shall consist of a set of contacts extending through a glass polyester insulating base. Busses and outgoing cable terminal shall be directly connected to them. The corresponding moving contacts shall consist of a set of contact fingers suitably spaced on the circuit breaker studs. In the "CONNECTED" position, these contacts shall form a current-carrying bridge. High uniform pressure on each finger shall be maintained by springs. Contact engagement shall be maintained only in the "CONNECTED" position.
7. The secondary disconnecting devices shall consist of floating fingers mounted on the removable unit and engaging contacts located at the rear of the compartment. The secondary disconnecting devices shall be silver-plated to ensure permanence of contact. Contact engagement shall be maintained in the "CONNECTED" and "TEST" positions.
8. Each removable breaker element shall consist of an air circuit breaker equipped with the necessary disconnecting contacts, wheels and interlocks for drawout application. The removable element shall have four-position features and shall permit closing the compartment door with the breaker in the "CONNECTED", "TEST", "DISCONNECTED" and "REMOVE" positions. Door shall be closed and stationary when breaker is racked between "CONNECTED", "TEST" and "DISCONNECTED" positions for added personnel safety.
9. All circuit breakers shall be drawout type, power air circuit breakers, manually operated and have a minimum of 65,000 amps symmetrical interrupting capacity at 480 volts. Breaker frame and trip ratings shall be as shown on the Drawings. All breakers shall be UL listed for application in their intended enclosures at 100 percent of continuous ampere rating. The circuit breakers shall include, where necessary, current-limiting fuses, integrally mounted, coordinated with the breaker trip device to avoid unnecessary blowing of the fuses. Breakers equipped with current-limiting fuses shall have an anti-single phase device that will trip the breaker in the event of a blown fuse, indicate on the front of the breaker which limiter is blown, and prevent the breaker from being reclosed on a single phase condition due to missing or blown limiters. Breakers shall have stored energy operating mechanisms. Only one stroke of the operating handle shall be required to charge the stored energy spring when operating

the breaker. The release of the energy to close the breaker shall be by means of a mechanical pushbutton to ensure positive control of the closing operation. Both main breakers and the tie breaker shall have key interlocking to prevent no more than two breakers from being closed simultaneously at any time.

- a. Each breaker shall be equipped with a microprocessor based tripping device. Current sensors shall provide operation and signal function. The trip unit shall use microprocessor-based technology to provide the basic adjustable time-current protection functions. True RMS sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time delay settings are reached. Interchangeable rating plugs shall establish the continuous trip ratings of each circuit breaker. The trip unit shall be General Electric, MicroVersaTrip Plus, or equal.

10. All control wire shall be No. 14 AWG minimum, Type SIS, bundled and secured with nylon ties. Insulated locking spade terminals shall be provided for all control connections, except where saddle type terminals shall be provided integral to a device. All groups of control wires leaving the switchgear shall be provided with terminal blocks with suitable numbering strips. Provide wire markers at each end of all control wiring. The color coding of the wires shall be in accordance with NFPA 79.
11. All current transformer secondary leads shall first be connected to conveniently accessible short circuit terminal blocks before connecting to any other device.
12. Each compartment labeled as "SPACE" on the Drawings, shall be equipped provisions for a future, manually operated breaker of frame rating as shown on the Drawings. All breaker locations designated as "FUTURE SPACE" on the Drawings, shall be furnished with all necessary provisions for a future, manually operated circuit breaker.

C. Metering:

1. Provide power quality monitoring as shown on the CONTRACT DRAWINGS.

D. Manufacturer's Nameplates:

1. Factory installed engraved manufacturer's nameplates, mounted on the face of the assembly, and shall be furnished for all main, tie and feeder breakers. These nameplates shall be laminated plastic with ½ inch minimum, standard black characters on a white background or match existing, secured with stainless steel screws. These nameplates shall also contain item designation, equipment served breaker frame size and breaker trip rating.
2. All control components within the assembly shall be identified in correspondence to appropriate designations on the manufacturer's wiring diagrams.

E. Accessories:

1. Portable, breaker lifting device for each lineup.
2. Portable test kit for testing and verification of trip units. Test kit shall operate on 120 VAC power from any outlet.
3. Any additional devices as required and as shown on the Drawings.

F. Product and Manufacturer: Provide one of the following:

1. Eaton
2. SQUARE D
3. Or Equal

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment so that sufficient access and working space is provided for ready and safe operation and maintenance. Seal bottom of equipment with RTV silicone.
- B. Install equipment on concrete pad, as shown on Drawings. Coordinate pad dimensions to fit equipment furnished.

- C. responsibility for all overcurrent protection settings as determined by Section 16215, Power System Study belongs to CONTRACTOR. The trip settings shown on the Drawings represent the desired long time pickup setting.
- D. Install in accordance with Phoenix Electrical Code.

3.2 FACTORY TESTS

- A. The manufacturer shall perform standard factory tests on each circuit breaker. The factory tests shall be witnessed by the ENGINEER. Include the cost of the witness testing in the price. The cost shall include all transportation, lodging and meals.

3.3 FIELD INSPECTION AND TESTS

- A. Provide the services of an authorized service representative of the equipment manufacturer to make site visits to supervise the field testing to be performed by CONTRACTOR. The service representative shall be an employee of the manufacturer of the low voltage drawout switchgear. The manufacturer's representative shall provide certification to the OWNER that the equipment has been correctly installed and shall submit the factory and field test results to the OWNER. The manufacturer's representative shall certify, in writing, that the equipment has been installed, adjusted and tested in accordance with the manufacturer's recommendations.
- B. Perform the following minimum tests and checks before energizing equipment.
 - 1. Perform insulation resistance tests on each bus section, phase-to-phase and each phase-to-ground for a period of one minute at 2200 volts DC.
 - 2. After successful completion of insulation resistance test, perform an over-potential test on each bus section, each phase-to-ground for a period of one minute at manufacturer's recommended voltage.
 - 3. Inspect all mechanical and electrical interlocks for proper operation.
 - 4. Perform insulation resistance test on all control wiring at 1500 volts DC after disconnecting devices.

- C. The manufacturer shall supply, upon request, test results to confirm that the switchgear assembly design has been tested to substantiate conformance with the applicable ANSI and NEMA Standards. The tests shall verify not only the performance of the switch or integrated switch and fuse, but also the suitability of the enclosure venting, rigidity and bus bracing. In addition, the switchgear assembly shall be factory tested in accordance with ANSI Standard C37.20.3. and the Contract Documents.
- D. Perform any other tests recommended by the equipment manufacturer.
- E. The testing specified in paragraph above shall be performed by a certified lab under the direction of the manufacturer's representative.

3.4 MANUFACTURER'S SERVICES

- A. A factory trained representative shall be provided for installation supervision, start-up and test services and operation and maintenance personnel training services. The representative shall make a minimum of 1 visit, minimum 2 hours on-site for each visit, to the site. The first visit shall be for assistance in the installation of equipment. The second visit shall be for checking the completed installation and start-up of the system. The third visit shall be as described under Section 01821, Instruction of Operations and Maintenance Personnel. Manufacturer's representative shall test operate the system in the presence of the ENGINEER and verify that the low voltage drawout switchgear conforms to requirements. Representative shall revisit the job site as often as necessary until all trouble is corrected and the installation is entirely satisfactory.
- B. All costs, including travel, lodging, meals and incidentals, shall be considered as included in CONTRACTOR'S bid price.

3.5 FIELD ADJUSTMENTS

- A. Relay settings on the microprocessor protective device shall be performed by CONTRACTOR in the field in accordance with the recommended settings designated in the coordination study in Section 16215, Power System Study.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Electrical Service Entrance Section shall not be measured for payment.
- B. SCE Electrical Service shall not be measured for payment.

4.2 PAYMENT

- A. The Contract lump sum paid for Electrical Service Entrance Section shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Electrical Service Entrance Section (including SES Cabinet), complete in place as shown on the Plans and as specified in these Special Provisions.
- B. The Contract lump sum paid for SCE Electrical Service shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of SCE Electrical Service (including SCE coordination), complete in place as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 26 21 16

SECTION 26 22 00

LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

Requirements for the following types of dry-type transformers rated 600 Volts and less, with capacities up to 1000 kVA:

1. Distribution transformers.

B. Related Requirements:

1. Section 03 30 00 - Cast-In-Place Concrete: Housekeeping pads.
2. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
3. Section 26 05 33 - Raceway and Boxes for Electrical Systems.
4. Section 26 05 53 - Identification for Electrical Systems.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:

1. NEMA ST 1 - Specialty Transformers (Except General Purpose Type).
2. NEMA ST 20 - Dry Type Transformers for General Applications.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: See Below.

- B. Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

- C. Test and Evaluation Reports: Indicate loss data, efficiency at 25, 50, 75 and 100 percent rated load, and sound level.
- D. Source Quality Control Submittals: Indicate results of factory tests and inspections.
- E. Field Quality Control Submittals: Indicate results of Contractor furnished tests and inspections.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 77 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Record Documentation: Record actual locations of transformers.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years of experience.

1.6 CERTIFICATIONS

- A. Electrical Listing and Labeling:
 - 1. Provide products that are listed and labeled as defined in Article 100 of NFPA 70 by a testing agency acceptable to the Authorities Having Jurisdiction (AHJ) for the location the product is installed in, and the application intended, unless products meeting the requirements of these nationally recognized testing laboratories are not available or unless standards do not exist for the products.
 - a. Provide products marked with their intended use or classification.
 - b. Submit evidence with the Product Data that the products represented meet testing agency quality verification requirements, including agency listing and labeling requirements.
 - a) Such evidence may consist of either a printed mark on the data or a separate listing card.

2. Submit a written statement from those product manufacturers that do not provide evidence of the quality of their products that indicates why an item does not have quality assurance verification.
 - a. Such statements provided in lieu of quality assurance verification are subject to the acceptance of the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Product storage and handling requirements.
- B. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 LOW-VOLTAGE TRANSFORMER EQUIPMENT

- A. Manufacturers:
Manufacturer List:
 1. Subject to compliance with the requirements specified herein, provide products manufactured by one of the manufacturers listed.

Substitution Limitations:

2. Subject to compliance with the requirements specified, products approved by the Owner from manufacturers other than those listed herein may be provided.
3. Source Limitations:
 - a. Obtain each transformer type from a single source from a single manufacturer.

B. Description:

Regulatory Requirements:

1. Florida Building Code:

2. National Electrical Code (NEC):
 - a. Provide products and installation complying with requirements specified for transformers in NFPA 70.

C. Design Criteria:

Transformers:

1. Provide factory-assembled and factory-tested, air-cooled transformer units designed for 60 Hertz service, and having a 3-phase, 4-wire primary, and a 3-phase, 4-wire secondary.
 - a. Cores:
 - a) Provide grain-oriented, non-aging silicon steel transformer cores.
 - b. Coils:
 - a) Provide continuous copper coil windings without splices except for taps.
 - b) Provide brazed or pressure type internal coil connections.
2. Provide transformer units complying with the requirements specified in IEEE C57.12.91.

Product Data:

3. Submit Product Data for each type and size of transformer to be provided under this Section to the Owner for approval.
 - a. Include the rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer.

Shop Drawings:

4. Submit Shop Drawings that detail the transformer equipment assemblies, and indicate the dimensions, weights, loads, required clearances, method of field assembly, components, and the location and size of each field connection to the Owner for approval.
 - a. Wiring Diagrams:

- a) Include power, signal, and control wiring diagrams.

D. Materials:

Distribution Transformers:

1. Provide distribution transformers complying with the requirements specified in NEMA ST 20, and listed and labeled in accordance with the requirements specified in UL 1561.
2. Cores:
 - a. Provide transformer cores having 1 leg per phase.
3. Low-Sound-Level Requirements:
 - a. Provide a minimum low-sound-level of 3 dBA less than the standard sound levels specified in NEMA ST 20 when factory-tested in accordance with the methods specified in IEEE C57.12.91.
4. Enclosure:
 - a. Provide totally enclosed non-ventilated transformer enclosures complying with the requirements for NEMA Type 2 enclosures specified in NEMA 250.
 - b. Provide cores and coils encapsulated within a resin compound that, seals out both moisture and air.
5. Transformer Enclosure Finish:
 - a. Provide a gray transformer enclosure finish complying with the requirements specified in NEMA 250.
6. Taps:
 - a. For transformers rated 25 kVA and larger, provide two 2.5 percent taps above and two 2.5 percent taps below the normal full capacity.
7. Insulation Class:
 - a. Provide a UL-component-recognized insulation system rated for 220 degrees Celsius, with a maximum of 80 degrees Celsius rise above a 40 degrees Celsius ambient temperature.
8. Energy Efficiency:

- a. For transformers rated 15 kVA and larger, provide units complying with the requirements for Class 1 efficiency levels specified in NEMA TP 1 when tested in accordance with the methods specified in NEMA TP 2.
- 9. Wall Brackets:
 - a. For transformers indicated to be wall-mounted on the Contract Drawings, provide the manufacturer's standard wall brackets.
- 10. Manufacturers:
 - a. ACME Electric Corporation, Power Distribution Products Division, www.acmepowerdist.com.
 - b. Controlled Power Company, www.controlledpwr.com.
 - c. Cutler-Hammer, Eaton Electrical Inc., www.eaton.com/EatonCom/Markets/Electrical/.
 - d. Federal Pacific Transformer Company, Division of Electro-Mechanical Corp., www.federalpacific.com
 - e. Hammond Manufacturing Ltd., www.hammondmfg.com.
 - f. Magnetek, www.magnetek.com.
 - g. Micron Industries Corp., www.micrnttransformers.com.
 - h. Myers Power Products, Inc., <http://www.myerspwrproducts.com>.
 - i. Sola/Hevi-Duty, www.solahevduty.com.
 - j. Square D; a brand of Schneider Electric, www.schneider-electric.us.
 - k. Approved equal.

2.2 ACCESSORIES

A. Identification Devices:

Transformer Nameplates:

- 1. For each transformer, provide laminated-plastic or metal engraved nameplates as specified in Section 16075, Electrical Identification, and mounted with corrosion-resistant screws.

2.3 SOURCE QUALITY CONTROL

A. Tests and Inspections:

Materials specified in this Section require advance examination or laboratory testing according to the methods referenced herein, or as required by the Owner.

Sound-Level Test:

1. Test Procedure:
 - a. Have the Testing Agency factory-test the sound-level of the equipment provided for this Contract under this Section in accordance with the methods specified in IEEE C57.12.91.
 - b. Have the Testing Agency prepare source quality-control Sound-Level Test Reports documenting the results of the testing, and submit them to the Owner for information.
2. Acceptance Criteria:
 - a. Equipment having a minimum low-sound-level of 3 dBA less than the standard sound levels specified in NEMA ST 20 passes the Sound-Level Test.

IEEE Standard Tests:

3. Test Procedure:
 - a. Have the Testing Agency factory-test the transformers in accordance with the requirements specified in IEEE C57.12.91.
 - b. Have the Testing Agency prepare source quality-control IEEE Standard Test Reports documenting the results of the testing, and submit them to the Owner for information.
4. Acceptance Criteria:
 - a. Equipment complying with the requirements specified in IEEE C57.12.91 passes the IEEE Standard Tests

Inspections:

5. Have the Testing Agency inspect the transformers in accordance with the requirements specified in IEEE C57.12.91.

B. Non-Conforming Work:

Do not allow defective equipment to be shipped to the Site.

C. Coordination of Other Tests and Inspections:

Notify the code-required Approved Agency responsible for performing special inspections when transformers for this Contract are being fabricated and/or tested.

Cooperate with the code-required Approved Agency when they are performing required material verifications and other special inspections.

1. Provide full access to the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

Examine conditions where the transformers will be installed for compliance with the enclosure- temperature and ambient-temperature requirements for each transformer.

Verify by field measurements that the dimensions are as needed to maintain the working clearances required by NFPA 70 and manufacturer's written instructions.

Examine walls, floors, roofs, and concrete bases where the transformers will be installed for suitable mounting conditions.

Verify that the ground connections are in place, and that the requirements specified in Section 16061, Electrical Grounding and Bonding, have been met.

1. The maximum allowable ground resistance at the location of a transformer is 5 ohms.

B. Evaluation and Assessment:

Proceed to install the transformers only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Section 01 70 00 - Execution and Closeout Requirements {01700 - Execution Requirements}: Requirements for installation preparation.
- B. Provide concrete pads under provisions of Section 03 30 00.

3.3 DEMOLITION

- A. Disconnect and remove abandoned transformers.
- B. Maintain access and adequate ventilation to existing transformers and other installations remaining active and requiring access and ventilation. Modify installation or provide access panel or ventilation grilles.

3.4 INSTALLATION

- A. Install wall-mounted transformers level and plumb with wall brackets fabricated by the transformer manufacturer.
- B. Install and anchor floor-mounted transformers level and plumb on concrete bases.
- C. Systems Integration:

Ground the transformer equipment in accordance with the requirements specified in Section 260526, Electrical Grounding and Bonding.

Connect the transformer wiring in accordance with the requirements specified in Section 260519, Low Voltage Electrical Power Conductors and Cables.

3.5 SITE QUALITY CONTROL

- A. Site Tests and Inspections:

During the period when the transformers are being installed, the Testing and Inspection Agency and the code-required Approved Agency must perform routine and other testing of materials.

1. Advise the Testing and Inspection Agency and code-required Approved Agency sufficiently in advance of operations to allow testing personnel to be assigned and to provide sufficient time for quality tests to be performed and completed.
2. The Testing and Inspection Agency and the code-required Approved Agency will perform additional materials testing due to changes in materials or proportions requested by the Contractor or testing required due to failure of material to meet specified requirements.
3. Failure of the Testing and Inspection Agency or the code-required Approved Agency to detect defective work will not prevent its rejection later when the defect is discovered, neither does it obligate the Owner to grant final acceptance of the Work.

Testing Agency Responsibilities:

- a. Have the Testing Agency employed by the Contractor perform the tests and inspections specified herein, and prepare a written Field Quality-Control Report for each test and inspection conducted to record the following information pertaining to the test or inspection:
 - a) The transformers included in the testing.
 - b) Test procedures used to perform the testing.
 - c) Test results that comply with the requirements specified.
 - d) Test results that do not comply with the specified requirements, and corrective action taken to achieve compliance with the requirements.
- (1) Note deficiencies detected, remedial action taken, and observations after remedial action.

NETA Acceptance Testing:

4. Test Procedure:
 - a. Have the Testing Agency perform each electrical test specified for transformers in ANSI/NETA ATS.
 - b. Have the Testing Agency prepare a certified NETA Acceptance Testing Field Quality-Control Report that identifies the transformers included and documents the NETA

acceptance testing, and submit the Report to the Owner for information.

5. Acceptance Criteria:
 - a. Have the Testing Agency submit certification of compliance with the test parameters specified in ANSI/NETA ATS to the Owner for approval.
 - b. Test Labeling:
 - a) On satisfactory completion of the testing of each unit, have the Testing Agency attach a dated and signed "Satisfactory Test" label to the tested unit.

Infrared Scanning:

6. Test Procedure:
 - a. Instruments and Equipment:
 - a) Have the Testing Agency furnish and use a portable infrared scanning device designed to measure temperature or to detect significant deviations from normal values.
 - b) Have the Testing Agency submit a calibration record for the infrared scanning device to the Owner for information.
 - b. Initial Infrared Scanning:
 - a) Two months after Substantial Completion, have the Testing Agency perform an infrared scan of the transformer connections.
 - c. Follow-up Infrared Scanning:
 - a) Have the Testing Agency perform 2 additional follow-up infrared scans of each transformer, the first follow-up scan 4 months after the date of Substantial Completion, and the second follow-up scan 7 months after the first follow-up scan.
 - d. Have the Testing Agency prepare a certified Infrared Scanning Field Quality-Control Report that identifies the transformers included and describes the infrared scanning results, and submit the report to the Owner for information.

7. Acceptance Criteria:
 - a. Significant deviations from normal temperature values are cause for the transformer under test to fail the infrared scanning testing.
 - b. Test Labeling:
 - a) On satisfactory completion of the testing of each unit, have the Testing Agency attach a dated and signed "Satisfactory Test" label to the tested unit.

Inspections:

8. Have the Testing Agency perform each visual and mechanical inspection and electrical test specified in ANSI/NETA ATS.

B. Non-Conforming Work

Remove and replace units that do not pass the tests or inspections, and retest the replacements as specified above.

C. Manufacturer Services:

Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

1. Have the factory-authorized service representative perform tests and inspections, and prepare and submit certified test reports to the Owner for information.

3.6 ADJUSTING

- C. Record the transformer secondary voltage at each low-voltage transformer unit for at least 48 hours of a typical occupancy period.
 1. Adjust the transformer taps to provide the optimum voltage conditions at the secondary terminals.
 - a. Optimum is defined as not exceeding the nameplate voltage plus 10 percent, and not being lower than the nameplate voltage minus 3 percent, at maximum load conditions.
 2. Submit the recorded transformer secondary voltages and tap settings as test results to the Owner for information.

- D. Output Settings Report:
 - 1. Prepare a written Output Settings Report recording the output voltages and tap settings, and submit the Report to the Owner for information.

3.7 CLEANING

- A. Clean the area around the transformers by vacuuming dirt and debris; do not use compressed air to assist in the cleaning.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Mini-Power Zone Transformer shall be measured per each installed as determined from field measurement.

4.2 PAYMENT

- A. Contract unit price paid for each Mini-Power Zone Transformer shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work (including dry type transformer) complete in place, as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 26 22 00

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for the following types of panelboards:
 - a. Distribution panelboards.
 - b. Lighting and appliance branch-circuit panelboards.
 - c. Electronic-grade panelboards.

B. Related Requirements:

1. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
2. Section 26 05 53 - Identification for Electrical Systems.
3. Section 01 33 00- Submittal Procedures.
4. Section 03 30 00- Cast-in-Place Concrete.

1.2 REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers:

1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:

1. NEMA FU 1 - Low Voltage Cartridge Fuses.
2. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts
3. AC or 750 Volts DC.
4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
5. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
6. NEMA PB 1 - Panelboards.

NEMA PB 1.1 - General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.

C. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. National Fire Protection Association:

1. NFPA 70 - National Electrical Code.

E. Underwriters Laboratories Inc.:

1. UL 50 - Cabinets and Boxes
2. UL 67 - Safety for Panelboards.
3. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures.
4. UL 1283 - Electromagnetic Interference Filters.
5. UL 1449 - Transient Voltage Surge Suppressors.
6. UL 1699 - Arc-Fault Circuit Interrupters.

F. Abbreviations and Acronyms:

1. AC: Alternating electric current.
2. AFCI: Arc-Fault Circuit-Interrupter.
3. GFCI: Ground Fault Circuit Interrupter.
4. GFEP: Ground Fault Equipment Protection.
5. HVAC: Heating Ventilating and Air Conditioning.
6. LED: Light emitting diodes.
7. MCCB: Molded-case circuit breakers.
8. NRTL: Nationally Recognized Testing Laboratory.

- 9. RMS: Root-mean-square.
- 10. SVR: Suppressed voltage rating.
- 11. TVSS: Transient voltage surge suppressor.

1.3 SUBMITTALS

A. Action Submittals:

- 1. Submit the following to the Owner for approval in accordance with the requirements of Section 01 33 00, Submittal Procedures:
 - a. Product Data:
 - 1) Distribution panelboards.
 - 2) Lighting and appliance branch-circuit panelboards.
 - 3) Load centers.
 - 4) Electronic-grade panelboards.
 - 5) Molded-case circuit breakers (MCCB).
 - 6) Fused switches.
 - 7) Surge protection devices.
 - 8) Accessory set.
 - 9) Portable test set.
 - b. Shop Drawings:
 - 1) Panelboards and related equipment.
 - 2) Setting drawings, templates, diagrams, instructions, and directions for placing and securing anchorage devices.
 - 3) Panelboard schedules.
 - c. Certificates:
 - 1) Electrical Listing and Labeling.
 - 2) Seismic Qualification Certificates.
 - 3) Certification of compliance with the inspection parameters specified in ANSI/NETA ATS.
 - d. Qualification Statements:
 - 1) Testing Agency's qualifications.

B. Informational Submittals:

- 1. Submit the following to the Owner for information in accordance with the requirements of Section 01 33 00, Submittal Procedures:
 - a. Manufacturer's Instructions:
 - 1) Manufacturer's installation, operation, and starting instructions for the panelboard equipment and systems.
 - b. Site Quality Control Submittals:
 - 1) Calibration record for the infrared scanning device.

- 2) Insulation Resistance Tests Field Quality-Control Report.
- 3) Electrical Continuity Tests Field Quality-Control Report.
- 4) NETA Acceptance Testing Field Quality-Control Report.
- 5) Infrared Scanning Field Quality-Control Report.

C. Closeout Submittals:

1. Submit the following to the Owner in accordance with the requirements of Section 01 70 00, Closeout Submittals:
 - a. Operation and Maintenance Data:
 - 1) Operation and maintenance data for the panelboards and components.
 - b. Warranty Documentation:
 - 1) Panelboards Warranty.

D. Maintenance Material Submittals:

1. Submit the following to the Owner in accordance with the requirements of Section 01 70 00, Closeout Submittals:
 - a. Spare Parts:
 - 1) Furnish spare parts that match the products installed in the following quantities, and package the spare parts with a protective covering for storage identified with labels describing the contents of the packages:
 - a) Keys:
 - (1) Furnish 2 spare keys for each type of panelboard cabinet lock.
 - b) Circuit Breakers:
 - (1) Furnish 2 spare circuit breakers, including GFCI and Ground Fault Equipment Protection (GFEP) types, for each panelboard.
 - c) Fuses for Fused Switches:
 - (1) Furnish a number of fuses for fused switches equal to 10 percent of quantity installed for each size and type, but no fewer than 3 of each size and type.
 - d) Fuses for Fused Power-Circuit Devices:
 - (1) Furnish a number of fuses for fused power-circuit devices equal to 10 percent of quantity installed for each size and type, but no fewer than 3 of each size and type.
 - b. Tools:

- 1) Accessory set.
- 2) Portable test set.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate with the Owner to insure notification is received sufficiently early to allow them ample time to schedule and perform the required testing performed by the Testing and Inspection Agency, the Approved Agency, and the Owner, prior to incorporating items requiring testing by them into the Work.
2. Coordinate the layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces.
 - a. Maintain required workspace clearances and required clearances for equipment access doors and panels.
3. Coordinate the sizes and locations of concrete bases for freestanding panelboards with the actual equipment provided.

B. Sequencing:

1. For floor mounted panelboards, provide concrete bases and anchorage devices prior to installing the panelboards.

1.5 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:

1. Special Inspections:
 - a. Code-Required Approved Agency for Performing Special Inspections:
 - 1) To perform the special inspections required by the California Building Code, the Owner acting as the Owner's agent will employ an independent Approved Agency.
2. Testing and Inspection Agencies:
 - a. To perform testing and inspections not considered special inspections by the California Building Code, the Owner will employ both an independent Testing and Inspection Agency.

B. Qualifications:

1. Testing Agency's Qualifications:
 - a. Employ an independent Testing Agency that is a member company of the InterNational Electrical Testing Association, or a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, that is acceptable to the Authorities Having Jurisdiction (AHJ), and that has the experience and capability to conduct the testing specified herein.
 - 1) Testing Agency's Field Supervisor:
 - a) The Testing Agency's field supervisor to supervise onsite field quality control testing must be currently certified by the InterNational Electrical Testing Association (NETA) in accordance with ANSI/NETA ETT, or by the National Institute for Certification in Engineering Technologies (NICET).
 - 2) Submit the qualifications of the Testing Agency, including the Testing Agency field supervisor's qualifications, to the Owner for approval.

C. Certifications:

1. Electrical Listing and Labeling:
 - a. Provide products that are listed and labeled as defined in Article 100 of NFPA 70 by a testing agency acceptable to the Authorities Having Jurisdiction (AHJ) for the location the product is installed in, and the application intended, unless products meeting the requirements of these nationally recognized testing laboratories are not available or unless standards do not exist for the products.
 - 1) Provide products marked with their intended use or classification.
 - 2) Submit evidence with the Product Data that the products represented meet testing agency quality verification requirements, including agency listing and labeling requirements.
 - a) Such evidence may consist of either a printed mark on the data or a separate listing card.
 - b. Submit a written statement from those product manufacturers that do not provide evidence of the quality of their products that indicates why an item does not have quality assurance verification.
 - 1) Such statements provided in lieu of quality assurance verification are subject to the acceptance of the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:

1. Receive, inspect, handle, and store panelboards in accordance with the requirements specified in NECA 407 or NEMA PB 1.1.

B. Storage and Handling Requirements:

1. Remove loose packing and flammable materials from the inside of the panelboards.
2. Handle and prepare panelboards for installation in accordance with the requirements specified in NECA 407 or NEMA PB 1.1.

1.7 SITE CONDITIONS

A. Ambient Conditions:

1. Do not deliver or install panelboards in spaces until the spaces are enclosed and weathertight, all wet work in the spaces is complete and dry, work above the panelboards is complete, and a temporary heating ventilating and air conditioning (HVAC) system is operating and maintaining the ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Existing Conditions:

1. Interruption of Existing Electric Service:
 - a. Do not interrupt electric service to facilities occupied by the Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electric service according to the requirements indicated:
 - 1) Notify the Owner no fewer than 2 days in advance of the proposed interruption of electric service.
 - 2) Do not interrupt electric service without the Owner's written permission.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: Flush- and surface-mounted cabinets.

1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
 - d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:
 - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Same finish as panels and trim.
 - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.
7. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.

C. Incoming Mains Location: Top and bottom.

D. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
 3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
 4. Split Bus: Vertical buses divided into individual vertical sections.
- E. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
 2. Main and Neutral Lugs: Mechanical.
 3. Ground Lugs and Bus-Configured Terminators: Mechanical.
 4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device, or Mechanical.
 6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.
- G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: Circuit breaker.
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
- G. Branch Overcurrent Protective Devices: Fused switches.
- H. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
 2. External Control-Power Source: 120-V branch circuit.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
 - C. Mains: Circuit breaker.
 - D. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.
 - E. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
 1. Internal Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.
 2. External Control-Power Source: 120-V branch circuit.
 - F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
 - G. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for

low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replaceable electronic trip; and the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time time adjustments.
 - d. Ground-fault pickup level, time delay, and I²t response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
6. Ground-Fault Equipment Protection (GFE) Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
 - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
 - d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 - e. Communication Capability: Circuit-breaker-mounted communication module with functions and features

compatible with power monitoring and control system specified in Section 26 09 13 "Electrical Power Monitoring and Control."

- f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.
- h. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
- i. Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.
- j. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.

2.6 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NECA 407.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install panelboards and accessories according to NECA 407.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.
- C. Comply with mounting and anchoring requirements specified in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."
- D. Mount top of trim maximum of 90 inches above finished floor unless otherwise indicated.
- E. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
- G. Install filler plates in unused spaces.
- H. Stub four 1-inch empty conduits from recessed panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade. Additional conduits will be as shown in plans.
- I. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- J. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 26 05 53 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer to create directory; handwritten directories are not acceptable.

- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.4 ADJUSTING

- A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study."
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as on-line data processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Distribution Panelboard shall be measured by each panelboard installed as determined from field measurement.

4.2 PAYMENT

- A. The Contract unit price paid for each Distribution Panelboard shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work (including materials, hardware) complete in place, as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 26 24 16

SECTION 26 32 13

ENGINE GENERATORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings of the Contract, including but not limited to General and Special Conditions.

1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for standby power supply with the following features:
 - 1. Diesel engine.
 - 2. Unit-mounted cooling system.
 - 3. Unit-mounted control and monitoring.
 - 4. Performance requirements for sensitive loads.
 - 5. Load banks.
 - 6. Outdoor enclosure.

1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
 - 1. Thermal damage curve for generator.
 - 2. Time-current characteristic curves for generator protective device.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic IV forces. Include the following:
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. Retain one of first two subparagraphs below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Second definition is used for essential facilities where equipment must operate immediately after an earthquake.
 - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Qualification Data: For manufacturer.
- C. Source quality-control test reports.
 1. Certified summary of prototype-unit test report.
 2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
 3. Retain first subparagraph below for generator sets specified to meet performance requirements and for generator sets serving sensitive loads.
 4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
 5. Report of sound generation.
 6. Report of exhaust emissions showing compliance with applicable regulations.

- 7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- D. Field quality-control test reports.
- E. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. Include the following:
 - 1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
 - 2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
 - 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

1.8 QUALITY CONTROL

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
 - 2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles (161 km) miles (kilometers) of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

- C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with ASME B15.1.
- F. Comply with NFPA 37.
- G. Comply with NFPA 70.
- H. Comply with NFPA 99.
- I. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- J. Comply with UL 2200.
- K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
- L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.9 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to any existing facilities unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Construction Manager's written permission.
- B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 - 1. Ambient Temperature: -7 to 40 deg C.
 - 2. Relative Humidity: 0 to 95 percent.
 - 3. Altitude: Sea level to 2000 feet (610 m)

- C. Unusual Service Conditions: Engine-generator equipment and installation are required to operate under the following conditions:

- 1. High ambient temperature and blowing sand/dust in the air.

1.10 COORDINATION

- A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
- B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 5 years from date of Substantial Completion.

1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following or equal:
 - 1. Caterpillar; Engine Div.
 - 2. Generac Power Systems, Inc.
 - 3. Kohler Co.; Generator Division.
 - 4. Magnetek, Inc.
 - 5. Onan/Cummins Power Generation; Industrial Business Group.
 - 6. Spectrum Detroit Diesel.

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and-tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
 - 1. Retain subparagraph below if rigging is required.
 - 2. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.
- C. Capacities and Characteristics:
 - 1. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.
 - 2. Output Connections: Three-phase, three wire.
 - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D. Generator-Set Performance:
 - 1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
 - 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
 - 3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
 - 4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
 - 5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
 - 6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
 - 7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and

then clear the fault automatically, without damage to generator system components.

8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.
 - a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.
2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.
 - a. Provide permanent magnet excitation for power source to voltage regulator.
10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

- A. Fuel: DIESEL
- B. Rated Engine Speed: 1800 rpm.

- C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).
- D. Lubrication System: The following items are mounted on engine or skid:
 - 1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 - 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 - 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- E. Engine Fuel System:
 - 1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
 - 2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
- F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.
- G. Governor: Adjustable isochronous, with speed sensing.
- H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
 - 1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 - 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 - 3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 - 4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 - 5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

- a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
 - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- I. Cooling System: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump.
 - 1. Configuration: Vertical air discharge.
 - 2. Radiator Core Tubes: Aluminum
 - 3. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 - 4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 - 5. Fan: Driven by multiple belts from engine shaft.
 - 6. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 - 7. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- J. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
 - 1. Minimum sound attenuation of 25 dB at 500 Hz.
 - 2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85 dBA or less.
- K. Air-Intake Filter: Standard duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- L. Starting System: 12-V electric, with negative ground.
 - 1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
 - 2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
 - 3. Cranking Cycle: As required by NFPA 110 for system level specified.
 - 4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.
 - 5. Coordinate subparagraph below with Drawings.

6. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
7. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
8. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
9. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:
 - a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
 - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
 - f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

- A. Comply with NFPA 30.
- B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:
 1. Tank level indicator.

2. Capacity: Fuel for 24 hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.5 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.
- D. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
 1. AC voltmeter.
 2. AC ammeter.
 3. AC frequency meter.
 4. DC voltmeter (alternator battery charging).
 5. Engine-coolant temperature gage.
 6. Engine lubricating-oil pressure gage.
 7. Running-time meter.
 8. Ammeter-voltmeter, phase-selector switch(es).
 9. Generator-voltage adjusting rheostat.
 10. Start-stop switch.
 11. Overspeed shutdown device.

12. Coolant high-temperature shutdown device.
 13. Coolant low-level shutdown device.
 14. Oil low-pressure shutdown device.
 15. Fuel tank derangement alarm.
 16. Fuel tank high-level shutdown of fuel supply alarm.
 17. Generator overload.
- E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- F. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

- A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.
1. Tripping Characteristic: Designed specifically for generator protection.
 2. Trip Rating: Matched to generator rating.
 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.

- 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.
- C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H or Class F.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Enclosure: Drip-proof.
- G. Instrument Transformers: Mounted within generator enclosure.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
 - 1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.
- I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- K. Sub-transient Reactance: 12 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 130 mph (209 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

- B. Description: Prefabricated or pre-engineered walk-in enclosure with the following features:
1. Construction: Galvanized-steel, metal-clad, integral structural-steel-framed building erected on concrete foundation.
 2. Structural Design and Anchorage: Comply with ASCE 7 for wind loads.
 3. Space Heater: Thermostatically controlled and sized to prevent condensation.
 4. Louvers: Equipped with bird screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust, birds, and rodents.
 5. Hinged Doors: With padlocking provisions.
 6. Ventilation: Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.
 7. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
 8. Muffler Location: Within enclosure.
- C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
 2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
- D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.
1. AC lighting system and connection point for operation when remote source is available.
 2. DC lighting system for operation when remote source and generator are both unavailable.

2.9 MOTORS

- A. Motor characteristics such as NEMA designation, temperature rating, service factor, enclosure type, and efficiency are specified in

Section 230513 "Common Motor Requirements for HVAC Equipment." If different characteristics are required, insert additional requirements below.

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in electrical Sections.

2.10 VIBRATION ISOLATION DEVICES

- A. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.
 1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
 2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
 3. Minimum Additional Travel: 50 percent of required deflection at rated load.
 4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.11 FINISHES

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.12 SOURCE QUALITY CONTROL

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
 - 1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.
- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
 - 1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
 - 2. Full load run.
 - 3. Maximum power.
 - 4. Voltage regulation.
 - 5. Transient and steady-state governing.
 - 6. Single-step load pickup.
 - 7. Safety shutdown.
 - 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Airport Authority's representative.
 - 9. Report factory test results within 10 days of completion of test.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.
- B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

- B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- C. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."
- D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.
- E.
 - 1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.
- B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.
- C. Coordinate first paragraph below with Section 232113 "Hydronic Piping."
- D. Connect engine exhaust pipe to engine with flexible connector.
- E. Connect fuel piping to engines with a gate valve and union and flexible connector.
- F. Ground equipment according to plans and Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- G. Connect wiring according to plans and Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

- A. Identify system components according to Section 26 05 53 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
 - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
 - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
 - c. Verify acceptance of charge for each element of the battery after discharge.
 - d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Exhaust Emissions Test: Comply with applicable government test criteria.
8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.

10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations on the property line and compare measured levels with required values.
- C. Coordinate tests with tests for transfer switches and run them concurrently.
- D. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- E. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- H. Remove and replace malfunctioning units and retest as specified above.
- I. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- K. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.
 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train maintenance personnel to adjust, operate, and maintain packaged engine generators.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Generator shall be measured for payment.
- B. ATS Cabinet shall be measured for payment.

4.2 PAYMENT

- A. The Contract lump sum paid for Generator shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Generator (including concrete foundation, misc. rebar and doweling, and concrete curb), complete in place as shown on the plans.
- B. The Contract lump sum paid for ATS Cabinet shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of ATS Cabinet (including concrete foundation and misc. rebar), complete in place as shown on the plans.

END OF SECTION 26 32 13

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes exterior luminaires, poles, and accessories.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Exterior Luminaire:
 - 1. Basis of Measurement: Each.
 - 2. Basis of Payment: Includes concrete base, luminaire pole, and luminaire with lamps and accessories.

1.3 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI C82.16-2015 – Light Emitting Diode Drivers
 - 2. ANSI O5.1 - Wood Poles, Specifications and Dimensions.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate dimensions and components for each luminaire not standard Product of manufacturer.
- B. Product Data: Submit dimensions, ratings, and performance data.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Product Requirements: Product storage and handling requirements.
- B. Store and handle solid wood poles in accordance with ANSI O5.1.

1.7 COORDINATION

- A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.8 MAINTENANCE MATERIALS

- A. Section 01 77 00 - Execution and Closeout: Spare parts and maintenance products.
- B. Furnish two of each lamp installed.
- C. Furnish two ballasts of each lamp type installed.

PART 2 PRODUCTS

2.1 LUMINAIRES

- A. Product Description: Complete exterior luminaire assemblies, with features, options, and accessories as scheduled.

2.2 LED FIXTURES

- A. Manufacturers:
 - 1. Cooper Industries Inc.
 - 2. General Electric Co.
 - 3. Substitutions: Permitted.
- B. Minimum Efficacy: 100 lumens/W, except where otherwise indicated or permitted by applicable code.

2.3 METAL POLES

- A. Manufacturers:
 - 1. HAPCO
 - 2. LightMart
 - 3. Ameron Poles
 - 4. Substitutions: Permitted.
- B. Material and Finish: Steel with prime finish for field painting.

- C. Section Shape and Dimensions: Round, Tapered round, or Square.
- D. Height As indicated on Drawings.
- E. Base: Non-breakaway
- F. Accessories:
 - 1. Handhole.
 - 2. Anchor bolts.
- G. Loading Capacity Ratings:
 - 1. Luminaire Weight: 25 pound
 - 2. Luminaire and Bracket Effective Projected Area: 6 square feet.
 - 3. Steady Wind: 50 miles per hour, minimum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify foundations are ready to receive fixtures.

3.2 EXISTING WORK

- A. Disconnect and remove abandoned exterior luminaries.
- B. Extend existing exterior luminaire installations using materials and methods compatible with existing installations.
- C. Clean and repair existing exterior luminaries to remain or to be reinstalled.

3.3 INSTALLATION

- A. Install concrete bases for lighting poles at locations as indicated on Drawings, in accordance with Section 03 30 00.
- B. Install poles plumb. Install shims or double nuts to adjust plumb. Grout around each base.
- C. Install lamps in each luminaire.

- D. Bond and ground luminaries, metal accessories and metal poles in accordance with Section 26 05 26. Install supplementary grounding electrode at each pole per drawings.

3.4 FIELD QUALITY CONTROL

- A. Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.5 ADJUSTING

- A. Section 01 77 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Aim and adjust luminaries to provide illumination levels and distribution as indicated on Drawings.

3.6 CLEANING

- A. Section 01 77 00 - Execution and Closeout Requirements: Final cleaning.
- B. Clean photometric control surfaces as recommended by manufacturer.
- C. Clean finishes and touch up damage.

3.7 PROTECTION OF FINISHED WORK

- A. Section 01 77 00 - Execution and Closeout: Protecting finished work.
- B. Replace luminaries having failed LEDs at Substantial Completion.

3.8 SCHEDULES

- A. See drawings for fixture schedules and placement.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Site Light, will be measured by each light pole assembly installed as determined from field measurement.

4.2 PAYMENT

- A. The Contract unit price paid for each Site Light shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Site Light complete in place, (including foundation, pole, fixture, mast arm, switch, installation and testing), as shown on the Plans and as specified in these Special Provisions

END OF SECTION 26 56 00

SECTION 31 23 16

EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of:

- Unclassified Excavation and Fill,
- Structure Excavation and Backfill
- Unsuitable Excavation,
- Trench excavation,
- Excavation for miscellaneous site structures,
- Excavation for slab on grades,
- Imported Backfill,
- Unclassified Fill,
- Temporary Shoring,
- Export Excess Material,
- Subgrade Stabilization,
- Crushed Rock,
- Filter Fabric
- Riprap

B. Reference Standards:

This Special Provision makes references to the Standard Specifications for Public Works Construction ("Greenbook" or SSPWC).

1.2 RELATED SECTIONS

- A. Section 02 41 13 – Selective Site Demolition,
B. Section 03 30 00 – Cast-In-Place Concrete,

1.3 PROJECT CONDITIONS

- A. Geotechnical data provided in the project geotechnical investigation indicates that groundwater was not encountered. The groundwater

elevation is believed to fluctuate seasonally. Therefore, it is not known what the groundwater surface elevation will be at the time of construction.

1.4 SUBMITTALS

- A. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- B. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- C. Materials Source: Submit name of imported fill materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
- E. Imported Backfill: Submit gradation and soil testing data.
- F. Riprap: Submit gradation from rock supplier.
- G. Lift Station Yard $\frac{3}{4}$ -Inch Crushed Rock Samples: Provide Sample of the $\frac{3}{4}$ -Inch Crushed Rock (1 Cubic Foot). Submit sample to Engineer (Kimley-Horn) for review at the following address: 401 B Street, Suite 600, San Diego, CA 92101.

1.5 QUALIFICATIONS

- A. Prepare excavation protection plan under direct supervision of a Professional Engineer experienced in design of this Work and licensed in the State of California.
 - 1. Assume sole responsibility for excavation protection plan and for loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by excavation protection plan.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Native Fill:

1. Excavated and re-used clean material.
2. Free of plastic/clay soils and vegetable or organic matter, such as; muck, peat, organic silt, or sod. Material containing these properties shall be considered unsuitable.
3. Free of lumps larger than 3 inches, rocks larger than 3 inches, and debris.
4. Compaction requirements and moisture conditioning as indicated on the plans and these Special Provisions.

B. Imported Backfill

1. If native materials are not suitable as determined by the City, import materials must be clean granular material that has less than 30 percent passing the #200 sieve, a minimum R-value of 30, and a very low expansion index (Expansion Index of 20 or less) as evaluated by ASTM D 4829 (Expansion Index Test). Import material should exhibit a low corrosivity potential. Low corrosivity material is defined as having a minimum resistivity of more than 2,000 ohm-cm, a chloride content less than 200 parts per million (PPM), and a sulfate content less than 0.05 percent when tested in accordance with California Tests 643, 422, and 417, respectively unless defined otherwise by the corrosion consultant.

C. Structural Fill:

1. Structural Fill (to be backfilled against manholes, clean outs, or storm drain inlets) shall be per Section 300-3.1 and 300-3.5 of the SSPWC. Material used as structural backfill shall have a sand equivalent of not less than 20 and shall have a gradation as shown in SSPWC Table 300-3.5.1.

D. Granular Fill: Sand, gravel, or crushed aggregate with a sand equivalent (SE) of not less than 30.

E. $\frac{3}{4}$ " crushed rock shall be per SSPWC 200-1.2

F. Riprap rock shall be per SSPWC 200-1.6.

2.2 GEOTEXTILE FABRIC

- A. Non-biodegradable, non-woven, permeable, not act as a wicking agent, inert to commonly encountered chemicals, rot-proof, resistant to ultraviolet light and conform to the following physical properties:

Property	Measurement	Test Method
Weight	5.4 oz./yd. ² (min.)	ASTM D5261
Grab tensile strength	250 lb. (min.)	ASTM D4632
Elongation at break	50% (max.)	ASTM D4632
Puncture strength	155 lb. (min.)	ASTM D4833
Burst strength	500 psi (min.)	ASTM D3786
Apparent opening size	#100 (max.)	ASTM D4751
Permittivity	1.0 sec. ⁻¹ (min.)	ASTM D4491
UV resistance	70% (min.)	ASTM D4355

2.3 ROCK PRODUCTS

- A. Rock Products including: Crushed Rock and Rock Dust, Gravel, and Sand shall conform to the requirements of Section 200-1 of the SSPWC.
- B. Lift Station Yard ¾-inch Crushed Rock shall consist of a decorative mix of landscaping crushed rock containing the following colors: browns, tans, grays.

2.4 UNTREATED BASE MATERIALS

- A. Untreated Base Materials including Crushed Aggregate Base, Crushed Miscellaneous Base, Processed Miscellaneous Base, Select Subbase, Disintegrated Granite and Pulverized Miscellaneous Base shall conform to the requirements of Section 200-2 of the SSPWC.

PART 3 EXECUTION

3.1 UNCLASSIFIED EXCAVATION

- A. Unclassified excavation shall conform to the requirements of Section 300-2 of the SSPWC.

3.2 UNCLASSIFIED FILL

- A. Unclassified fill shall conform to the requirements of Section 300-4 of the SSPWC.

3.3 STRUCTURE EXCAVATION

- A. Structure excavation shall conform to the requirements of Section 300-3.1 through 300-3.3 of the SSPWC.
- B. Any material encountered beyond the limits of structure excavation shown on the Plans that are determined to be unsuitable material by the engineer shall be removed and be disposed of and backfilled as required by these Special Provisions. The limits of unsuitable material shall be as identified by the City.
- C. Temporary shoring and bracing of excavations shall conform to the requirements, rules, orders and regulations of the Division of Industrial Safety of the State of California, Cal/OSHA, and/or other governing regulations pertaining to excavation safety.

3.4 STRUCTURE BACKFILL

- A. Structure backfill shall conform to the requirements of Section 300-3.1 and 300-3.5 of the SSPWC.

3.5 TRENCH EXCAVATION AND BACKFILL

- A. Trench excavation shall conform to the requirements of Section 306-1.1 of the SSPWC, and these special provisions.
- B. Temporary shoring and bracing of excavations shall conform to the requirements, rules, orders and regulations of the Division of Industrial Safety of the State of California, Cal/OSHA, and/or other governing regulations pertaining to excavation safety.

- C. Existing facilities adjacent to the trench shall be protected in place. Contractor is responsible for whatever means and methods are necessary to protect all existing facilities in place.
- D. Restore curb, gutter, sidewalk, pavements, traffic striping and marking, and other site surface features including landscaping over trenching and excavations and to match existing. Contractor is responsible for determining trench width necessary for construction. Contractor is responsible for restoring all surface features disturbed during construction.
- E. Any material, encountered during trenching, containing plastic/clay soils, vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use and be disposed of as required by these Special Provisions. The limits of unsuitable material shall be as identified by the City. All work associated with the excavation, segregation, and disposal of this material shall be done at no additional cost to the City.
- F. Contractor shall use imported backfill in accordance with SSPWC Section 306-1.3.7 and these Special Provisions for the trench backfill and pipe embedment material in areas where the excavated soil contains clay or other material and has been determined to be unsuitable for reuse by the City. This material shall not be considered unsuitable material if it can be dried and used as backfill in accordance with the Special Provisions. Imported backfill shall be placed in accordance with the plans and these Special Provisions.
- G. Place fill material in continuous layers and compact in accordance with the Plans. Trench Backfill (Trench Zone), Pipe Embedment Zone (Pipe Zone), and Foundation Material (Pipe Bedding) shall be as indicated in this Special Provisions.
 - 1. Trench Backfill Material (Trench Zone – 12 inches above the pipe to the subgrade): As specified on the drawings.
 - 2. Pipe Embedment Material (Pipe Zone – Invert of Pipe to 12 inches above pipe): As specified on the drawings.
- H. Backfilling within the Trench (Trench Zone) shall be in accordance with SSPWC 306-1.3 except that jetted backfill will not be allowed and compaction, loose lift thickness, depths of trench zone, pipe zone, and pavement shall be as indicated on the drawings.

3.6 EXPORT EXCESS MATERIAL

- A. Remove and export excess excavated materials not intended for reuse.

3.7 SUBGRADE PREPARATION

- A. For subgrade preparation as identified on the plans, the top 12-inches of the subgrade shall be removed and temporarily stockpiled and the bottom 6-inches of material shall be scarified in place, moisture conditioned and then recompactd.

The stockpiled material, assuming it is suitable material, shall then be placed over the 6-inches of compacted material. This 12-inches of subgrade of suitable granular (non-plastic) material shall be moisture conditioned to within +/-2 percent of optimum moisture content before rolling to obtain the prescribed compaction. Rolling operations shall be continued until the subgrade is compacted to not less than 95 percent of maximum density as determined by ASTM D 1557. The subgrade material shall be placed and compacted in lifts not exceeding 8-inches in loose thickness.

If this material is unsuitable then stabilize the subgrade. Lime Treatment can be considered by the contractor as an alternate for either drying or strengthening the subgrade soils and shall conform to the requirements in SSPWC 301-5.

- B. Proof rolling shall be done on the exposed subgrade surface free of surface water. Proof-roll the subgrade in the presence of the City. Operate the vehicle used in a systematic manner to ensure uniform coverage over all areas and at a speed of 3 miles per hour. Notify the City a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the City. If the subgrade surface does exhibit signs of significant flexing, rutting, or pumping under proof rolling this area must be over excavated and stabilized.

Proof Rolling shall be considered included in the price bid for Subgrade Preparation and no separate payment will be made therefor.

3.8 UNSUITABLE EXCAVATION

- A. There may be areas where over excavation and subgrade stabilization will be required. Unsuitable Excavation shall be performed in locations where plastic/clay material is encountered and proof rolling has demonstrated that

significant flexing, rutting, or pumping has occurred. These areas shall be over-excavated a minimum of 1 foot below subgrade. The over-excavated material shall be considered unsuitable for reuse in the project and be disposed of as required by these Special Provisions.

The over-excavated area shall then be backfilled with suitable material and stabilized.

3.9 QUALITY CONTROL

A. The following standards shall be used for materials acceptance testing:

1. ASTM D 698 Test for Moisture Density Relations of Soils and Soil Aggregate Mixtures, Using 5.5-pound Rammer and 12-inch Drop
2. ASTM D 1556 Test for Density of Soil In-Place by the Sand-Cone Method
3. ASTM D 1557 Test for Moisture-Density Relations of Soils and Soil Aggregate Mixtures, Using a 10-pound Rammer and 18-inch Drop
4. ASTM D 2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods
5. ASTM D 3017 Water Content of Soil and Rock In-Place by Nuclear Methods

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Excavation and Backfill shall not be measured for payment.
- B. $\frac{3}{4}$ inch Crushed Rock for structure and vault foundation bedding shall not be measured for payment.
- C. Filter Fabric shall not be measured for payment.
- D. Imported Fill will be measured by the number of cubic yards actually placed as fill as determined from field measurement.
- E. Lift Station Yard $\frac{3}{4}$ inch Crushed Rock will be measured by the number of cubic yards actually placed as determined from field measurement.

- F. Facing Class Riprap will be measured by the number of cubic yards actually placed as determined from field measurement. RSP Fabric will not be measured for payment.

4.2 PAYMENT

- A. Excavation and Backfill including the exporting of non-suitable and importing of suitable materials shall be included in the other various items of work and no additional compensation will be allowed therefor.
- B. $\frac{3}{4}$ -inch Crushed Rock for structures and vault foundation bedding shall be included in the other various items of work and no additional compensation will be allowed therefor.
- C. Filter Fabric shall be included in the other various items of work and no additional compensation will be allowed therefor.
- D. The Contract price paid per cubic yard for Imported Fill shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in imported fill complete in place, as shown on the plans and as specified in these Special Provisions.
- E. The Contract price paid per cubic yard for Lift Station Yard $\frac{3}{4}$ inch Crushed Rock shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in Lift Station Yard $\frac{3}{4}$ -inch Crushed Rock complete in place, as shown on the plans and as specified in these Special Provisions.
- F. The Contract price paid per cubic yard for Facing Class Riprap shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in Facing Class Riprap (including excavation, RSP fabric, Riprap) complete in place as shown on the plans and as specified in these Special Provisions.

END OF SECTION 31 23 16

SECTION 31 25 00

EROSION CONTROL

PART 1 – GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of furnishing, installing, moving, and maintaining temporary and permanent erosion and sedimentation control measures in accordance with these Special Provisions, as shown on the Plans. This shall include, but not be limited to, implementation of the erosion and sediment control measures, monitoring, sampling, and reporting.

B. Reference Standards:

This Special Provision makes references to the latest version of the California Stormwater Quality Association Best Management Practices (CASQA BMP) Handbook.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data on all proposed erosion and sediment control materials including fiber rolls, Gravel Bag Berm, Storm Drain Inlet Protection, or any other erosion or sediment controls proposed for use.
- B. SWPPP – prepared by contractor.
- C. Hydroseed Mix

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Erosion and sedimentation control measures installed shall conform to the latest version of the CASQA BMP Handbook, the approved SWPPP, the Plans, and these Special Provisions.

- Fiber Roll (SE-5)

- Gravel Bag Berm (SE-6)
- Storm Drain Inlet Protection (SE-10)
- Stabilized Construction Entrance/Exit (TC-1)
- Entrance/Outlet Tire Wash (TC-3)
- Stockpile Management (WM-3)
- Concrete Waste Management (WM-8)

B. Hydroseed Mix for slope areas shall conform to the Ornamental, Low Growing Native Mix specified below:

This is a mixture of showy, low growing annual and perennial species that will provide months of bright spring color in a non-irrigated setting, or year-round color when irrigated. This mix may be used alone or in conjunction with grass and shrub seeds.

<u>SPECIES</u>	<u>COMMON NAME</u>	<u>BULK #s/ACRE</u>	<u>MIN % PLS*</u>
<i>Achillea millefolium</i>	Yarrow	1.00	85
<i>Acmispon glaber</i>	Deerweed	6.00	76
<i>Camissoniopsis cheiranthifolia</i>	Beach evening primrose	1.00	86
<i>Clarkia bottae</i>	Punchbowl godetia	1.00	74
<i>Collinsia heterophylla</i>	Chinese houses	3.00	83
<i>Eschscholzia californica</i>	California poppy	2.00	83
<i>Festuca microstachys</i>	Small fescue	8.00	90
<i>Lasthenia californica</i>	Dwarf goldfields	0.50	68
<i>Layia platyglossa</i>	Dwarf goldfields	0.50	77
<i>Lupinus bicolor</i>	Bicolor lupine	1.00	83
<i>Lupinus nanus</i>	Sky lupine	2.00	83
<i>Mimulus aurantiacus longiflorus</i>	Sticky monkeyflower	1.00	3
<i>Mimulus aurantiacus puniceus</i>	Mission red monkeyflower	1.00	3
<i>Muhlenbergia microperma</i>	Littleseed muhly	2.00	48
<i>Nemophila maculata</i>	Fivespot	3.00	83
<i>Sisyrinchium bellum</i>	Blue eyed grass	<u>2.00</u>	78
		35.00	

*MIN % PLS (Pure Live Seed) = Seed Purity x Germination Rate

Seeding rate: 35 lbs. per acre

PART 3 – EXECUTION

3.1 BMP PLACEMENT

A. BMPs shall be placed on the site prior to starting any construction activities.

- B. BMPs shall be placed and maintained in accordance with the CASQA BMP Handbook, the Plans, these Special Provisions, the approved SWPPP, and as directed by the City.
- C. BMPs shall be maintained continuously throughout the duration of construction and until each work area has been accepted for use by the City. Damaged, displaced, or non-functional BMPs shall be replaced immediately.
- D. Hydroseeding of final slope grading shall be placed within 30 days of completion of the slope grading. Contractor shall water the slope as needed by water truck for hydroseed establishment for a period of not less than 3 months beyond the completion of construction or the beginning of the rainy season (December 1st) whichever occurs sooner.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Erosion Control will not be measured for payment.

4.2 PAYMENT

- A. Erosion Control including installation and maintenance of all BMPs described in the SWPPP and permanent erosion control will be paid for at the Contract lump sum amount for Erosion Control, which amount shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Erosion Control (including re-handling, relocation, and continuous maintenance, preparation of SWPPP, hydroseeding, watering, hydroseed establishment maintenance), complete in place, including regular monitoring, maintenance, repair and replacement, cleanup of erosion control features as specified in these Special Provisions, and as shown on the Plans.

END OF SECTION 31 25 00

SECTION 32 12 16

ASPHALT PAVING AND CRUSHED AGGREGATE BASE

PART 1 GENERAL

1.1 SUMMARY

A. Work Included:

This section shall consist of:

- Asphalt materials
- Aggregate materials
- Aggregate subbase
- Asphalt paving base course, binder course, and wearing course

1.2 SUBMITTALS

- A. Submit product information for asphalt and aggregate materials.
- B. Submit mix design with laboratory test results supporting design.
- C. The Contractor shall furnish vendor's certified test reports for each lot of asphalt binder material shipped to the project. The vendor's certified test report for the bituminous material can be used for acceptance or tested independently by the Owner.

1.3 RELATED SECTIONS

- A. Section 02 41 13 – Selective Site Demolition
- B. Section 03 30 00 – Cast-In-Place Concrete
- C. Section 31 25 00 – Erosion and Sedimentation Control
- D. Section 33 41 00 – Utility Drainage Piping

PART 2 PRODUCTS

2.1 HOT MIX ASPHALTS (HMA) PAVEMENT

- A. HMA shall conform to the SSPWC Section 203.
- B. Asphalt shall be PG 64-10.
- C. All base paving shall be Type B, Dense Medium Coarse. All finish or top course paving shall be Type C2, Dense Medium.

2.2 CRUSHED AGGREGATE BASE

- A. Crushed Aggregate Base shall conform to the SSPWC Section 200.

PART 3 EXECUTION

3.1 CRUSHED AGGREGATE BASE

- A. Crushed Aggregate Base shall be constructed in conformance with the SSPWC Section 301.

3.2 HOT MIX ASPHALT (HMA) PAVEMENT

- A. HMA shall be constructed in conformance with the SSPWC Section 302.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Crushed Aggregate Base for trench patch will not be measured for payment.
- B. Crushed Aggregate Base for pavement removal and replacement as necessary for adjacent improvements as indicated on the plans shall be measured per Cubic Yard installed as determined from field measurement.
- C. HMA for trench patch will not be measured for payment.
- D. HMA for pavement removal and replacement as necessary for adjacent

improvements as indicated on the plans shall be measured per Ton installed as determined from field measurement.

4.2 PAYMENT

- A. Crushed Aggregate Base used in trench patching shall be included in the other various items of work and no additional compensation will be allowed therefor.
- B. The Contract Price paid per cubic yard for Crushed Aggregate Base for pavement removal and replacement as indicated on the plans shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in Crushed Aggregate Base complete in place, as shown on the plans an as specified in these Special Provisions.
- C. HMA used in trench patching shall be included in the other various items of work and no additional compensation will be allowed therefor.
- D. The Contract Price paid per ton for HMA for pavement removal and replacement as indicated on the plans shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in HMA complete in place, as shown on the plans an as specified in these Special Provisions.

END OF SECTION 32 12 16

SECTION 32 31 19

DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Decorative metallic-coated-steel tubular picket fences.
 - 2. Swing gates.
- B. Related Requirements:
 - 1. Section 03 30 00 "Cast-in-Place Concrete"

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For fencing and gates.
- C. Samples: For each fence material and for each color specified.
 - 1. Provide Samples that are 12-inch x 48-inch in length for fence material. Submit sample to Engineer (Kimley-Horn) for review at the following address: 401 B Street, Suite 600, San Diego, CA, 92101.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Product Test Reports: For decorative metallic-coated-steel tubular picket fences, including finish, indicating compliance with referenced standard.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Wind Loading: As indicated on Plans.
- B. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

2.2 DECORATIVE METALLIC-COATED-STEEL TUBULAR PICKET FENCES

- A. Decorative Metallic-Coated-Steel Tubular Picket Fences: Comply with ASTM F 2408 for light-industrial (commercial) application (class) unless otherwise indicated.
- B. Posts: As indicated on Plans.
- C. Post Caps: As indicated on Plans
- D. Rails: As indicated on Plans
- E. Pickets: As indicated on Plans
- F. Finish: As indicated on Plans

2.3 SWING GATES

- A. Gate Configuration: Single leaf and Double leaf as indicated on Plans.
- B. Gate Frame Height: As indicated on Plans
- C. Gate Opening Width: As indicated on Plans

2.4 STEEL AND IRON

- A. Plates, Shapes, and Bars: ASTM A 36/A 36M.

- B. Bars (Pickets): Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
- C. Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Bar Grating: NAAMM MBG 531.
 - 1. Bars: Hot-rolled steel strip, ASTM A 1011/A 1011M, Commercial Steel, Type B.
 - 2. Wire Rods: ASTM A 510/A 510M.

2.5 METALLIC-COATED-STEEL FINISHES

- A. Galvanized Finish: Clean welds, mechanical connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by City.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 DECORATIVE FENCE INSTALLATION

- A. Install fences according to manufacturer's written instructions.
- B. Install fences by setting posts as indicated on the plans.

- C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

3.4 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 GROUNDING AND BONDING

- A. Fence Grounding: Install at maximum intervals of 500 feet except as follows:
 - 1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 250 feet.
 - 2. Gates and Other Fence Openings: Ground fence on each side of opening.
 - 1) Bond metal gates to gate posts.
 - 2) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.

- C. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
- D. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
- E. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
- F. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- G. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

1. Grounding-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure grounding resistance not less than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural grounding resistance. Perform tests by two-point method according to IEEE 81.
2. Excessive Grounding Resistance: If resistance to grounding exceeds specified value, notify Architect promptly. Include recommendations for reducing grounding resistance and a proposal to accomplish recommended work.
3. Report: Prepare test reports of grounding resistance at each test location certified by a testing agency. Include observations of weather and other phenomena that may affect test results.

3.7 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

3.8 DEMONSTRATION

- A. Owner's personnel to adjust, operate, and maintain gates.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. 8-foot High Tubular Steel Fence will be measured by the linear footage installed as determined from field measurement.
- B. 8-foot High 10' Wide Tubular Steel Fence Swing Gate shall not be measured for payment.

4.2 PAYMENT

- A. The Contract unit price paid for 8-foot High Tubular Steel Fence shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 8-foot High Tubular Steel Fence, including concrete footing, complete in place as shown on the Plans and as specified in these Special Provisions.
- B. The Contract unit price paid for 8-foot High 10' Wide Tubular Steel Fence Swing Gate shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 8-foot High 10' Wide Tubular Steel Fence Swing Gate, complete in place as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 32 31 19

SECTION 33 01 32

PIPELINE TESTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Testing Gravity Piping:
 - a. Low-pressure Air Test.
 - b. Infiltration Test.
2. Hydrostatic Testing of Pressure Pipe
3. Deflection Testing Plastic Piping.

B. Related Sections:

1. Section 33 41 00 – Utility Piping.

1.2 REFERENCES

A. ASTM International:

1. ASTM C924 – Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
2. ASTM D2122 - Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.
3. ASTM F1417 – Standard Test Method for Installation Acceptance of Plastic Storm Drain Lines Using Low-Pressure Air.

1.3 SUBMITTALS

A. Submit the following prior to start of testing:

1. Testing procedures.
2. List of test equipment.
3. Testing sequence schedule.
4. Provisions for disposal of flushing and test water.
5. Certification of test gauge calibration.

- 6. Deflection mandrel drawings and calculations.
- B. Test Reports: Indicate results of piping tests.

PART 2 PRODUCTS

2.1 AIR TEST EQUIPMENT

- A. Air compressor.
- B. Air supply line.
- C. Shut-off valves.
- D. Pressure regulator.
- E. Pressure relief valve.
- F. Stop watch.
- G. Plugs.
- H. Pressure gauge, calibrated to 0.1 psi.

2.2 INFILTRATION TEST EQUIPMENT

- A. Weirs.

2.3 HYDROSTATIC TEST EQUIPMENT

- A. Hydro pump.
- B. Pressure hose.
- C. Water meter.
- D. Test connections.
- E. Pressure relief valve.
- F. Pressure gauge, calibrated to 0.1 psi.

2.4 DEFLECTION TEST EQUIPMENT

- A. Go, No-Go mandrels.
- B. Pull/retrieval ropes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify piping is ready for testing.
- B. Verify trenches are backfilled.
- C. Verify pressure piping concrete reaction support blocking or mechanical restraint system is installed.

3.2 PIPING PREPARATION

- A. Lamping:
 - 1. Lamp gravity piping after flushing and cleaning.
 - 2. Perform lamping operation by shining light at one end of each pipe section between manholes; observe light at other end; reject pipe not installed with uniform line and grade; remove and reinstall rejected pipe sections; re-clean and lamp until pipe section achieves uniform line and grade.
- B. Plug outlets, wye-branches and laterals; brace plugs to resist test pressures.

3.3 FIELD QUALITY CONTROL

- A. Testing Gravity Piping shall be performed on all gravity piping (sewer and storm drain):
 - 1. Low-pressure Air Test:
 - a. Test each section of gravity piping between manholes.
 - b. Introduce air pressure slowly to approximately 4 psig.

- 1) Determine ground water elevation above spring line of pipe for every foot of ground water above spring line of pipe, increase starting air test pressure by 0.43 psig; do not increase pressure above 10 psig.
- c. Allow pressure to stabilize for at least five minutes. Adjust pressure to 3.5 psig or increased test pressure as determined above when ground water is present. Start test.
- d. Test:
 - 1) Determine test duration for pipe section with single pipe size from the following table. Do not make allowance for laterals.

TABLE 2 1 Minimum Specified Time Required for a 0.5 psig Pressure Drop for Size and Length of Pipe Indicated for Q = 0.0015

NOTE-Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 in. in diameter.

Pipe Diameter, in.	Minimum Time, min : s	Length for Minimum Time, ft	Time for Longer Length, s	Specification Time for Length (L) Shown, min:s							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	0.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	28:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:18	50:30	57:42	64:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

- 2) Record drop in pressure during test period; when air pressure has dropped more than 1.0 psig during test period, piping has failed; when 1.0 psig air pressure drop has not occurred during test period, discontinue test and piping is accepted.
- 3) When piping fails, determine source of air leakage, make corrections and retest; test section in incremental stages until leaks are isolated; after leaks are repaired, retest entire section between manholes.

2. Infiltration Test:

- a. Use only when gravity piping is submerged in ground water minimum of 4 feet above crown of pipe for entire length being tested.
- b. Maximum Allowable Infiltration: 100 gallons per inch of pipe diameter for each mile per day for section under test, include allowances for leakage from manholes. Perform test with minimum positive head of 2 feet.

B. Pressure test pressure system in accordance with AWWA C651 and the following:

1. Pressure pipe to be pressure tested shall include all PVC and ductile iron pipe and fittings. Hydrostatically test each portion of pressure piping, including valved sections to 200 psi.
2. Conduct hydrostatic test for at least a two-hour duration.
3. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
4. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
5. Correct visible deficiencies and continue testing at same test pressure for additional 2 hours to determine leakage rate. Maintain pressure within plus or minus 5.0 psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of text.
6. Compute maximum allowable leakage by the following formula:

$L = (SD\sqrt{P})/C$
L = testing allowance, in gallons per hour (liters per hour)
S = length of pipe tested, in feet (meters)
D = nominal diameter of pipe, in inches (mm)
P = average test pressure during hydrostatic test, in psig (kPa)
C = 148,000 (794,797)

When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

7. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage.

C. Deflection Testing of Plastic Pipe:

1. Perform vertical ring deflection testing on PVC piping, after backfilling has been in place for at least 30 days but not longer than 12 months.
2. Allowable maximum deflection for installed plastic pipe limited to 5 percent of original vertical internal diameter.
3. Perform deflection testing using properly sized rigid ball or 'Go, No-Go' mandrel.
4. Furnish rigid ball or mandrel with diameter not less than 95 percent of base or average inside diameter of pipe as determined by ASTM standard to which pipe is manufactured. Measure pipe in compliance with ASTM D2122.
5. Perform test without mechanical pulling devices.
6. Locate, excavate, replace and retest pipe exceeding allowable deflection.

D. Dewater Pipeline After Testing:

1. After completion of testing and acceptance of pipe line – dewater pipeline and leave in a dry condition.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Pipeline testing shall not be measured for separate payment.

4.2 PAYMENT

- A. Full compensation for pipeline testing shall be considered as included in the price paid for the various items of work requiring Pipeline Testing, and no additional compensation will be allowed therefor.

END OF SECTION 33 01 32

SECTION 33 05 14

MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cast-in-Place concrete manholes and structures with transition to cover frame, covers, anchorage, and accessories.
 - 2. Modular precast concrete manholes and structures with male/female joints with transition to cover frame, covers, anchorage, and accessories.
 - 3. Masonry Pilasters.
 - 4. Bedding and cover materials.
 - 5. Shade Structure.
 - 6. Wet well Grade Ring.
- B. Related Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - 2. Section 31 23 16 – Excavation and Backfill
 - 3. Section 33 41 00 – Utility Piping

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 530/530.1 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.
- B. ASTM International:
 - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM C361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
 - 4. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - 5. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.

6. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
 7. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
 8. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
- C. This Technical Specification makes references to the Standard Specifications for Public Works Construction (“Greenbook” or SSPWC).

1.3 SUBMITTALS

- A. Shop Drawings: Indicate structure locations, elevations, sizes and elevations of penetrations.
- B. Design Calculations: signed and stamped by a professional engineer licensed in the State of California. Calculations shall show that structure can withstand groundwater and hydrostatic force, seismic forces, and load rating (HS-20) for each structure as indicated on the drawings.
- C. Product Data: Submit manhole covers, component construction, features, configuration, and dimensions.
- D. Samples: Masonry Pilaster
 1. Provide Sample of the Masonry Pilaster Face Block Finish (one block). Submit sample to Engineer (Kimley-Horn) for review at the following address: 401 B Street, Suite 600, San Diego, CA 92101.
 2. Provide Sample of the Stone Cap that are 18-inch x 18-inch in length. Submit sample to Engineer (Kimley-Horn) for review at the following address: 401 B Street, Suite 600, San Diego, CA 92101.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Comply with precast concrete manufacturer's instructions and ASTM C913 for unloading, storing and moving precast manholes and drainage structures.
- B. Store precast concrete manholes and drainage structures to prevent damage to property or other public or private property. Repair property damaged from materials storage.
- C. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

PART 2 PRODUCTS

2.1 MANHOLES AND STRUCTURES

- A. The following are the accepted methods for Manhole and Structure Sections:
 - 1. Reinforced Cast-In-Place concrete as specified in Section 03 30 00.
 - 2. Reinforced precast concrete in accordance with ASTM C478 with gaskets in accordance with ASTM C923.
 - a. Manufacturers:
 - 1) Jensen Precast
 - 2) Teichert
 - 3) Hanson Precast
 - 4) Cook Concrete Products, Inc.
 - 5) Oldcastle Precast.
 - 6) Rinker.
 - 7) Brooks.
 - 8) Armorock.
 - 9) Or approved equivalent.

2.2 FRAMES AND COVERS

- A. Product Description: Solid covers for HS-20 rated structures as indicated on plans.
- B. Product Description: Grated covers set flush in top of concrete box for HS-20 rated structures as indicated on plans.
- C. Product Description: Grated covers set flush in top of concrete box for Parkway rated structures as indicated on plans.

2.3 COMPONENTS

- A. Foundation Slab: Cast-in-place concrete of type specified in Section 03 30 00, or Precast.

2.4 CONFIGURATION

- A. As indicated on the plans
- B. Shape: Square or rectangular.
- C. Clear Inside Dimensions: As indicated on Drawings.
- D. Design Depth: As indicated on Drawings.
- E. Clear Cover Opening: As indicated on Drawings.
- F. Pipe Entry: Furnish openings as indicated on Drawings.

2.5 BACKFILL

- A. Backfill materials shall be in accordance with SSPWC 300-3.1 and 300-3.5.

2.6 ACCESSORIES

- A. Concrete: Specified in Section 03 30 00.
- B. Grout: Specified in Section 03 30 00.
- C. Flexible Pipe Boots: as specified on plans and in Section 33 41 00.
- D. Flexible Joint Sealants: ASTM C990; rubber.

1. All precast manhole sections shall be bedded in flexible joint sealant.
 - a. Manufacturers:
 - 1) Hamilton Kent, Model Kent Seal #2.
 - 2) Henry, Model RAM-NEK RN103.
 - 3) Or approved equal.
 - a) A double bead shall be used if sealant is 3/4-inch or 1-inch diameter.
 - b) A single bead shall be used if the sealant is 1-1/4-inch or greater diameter.
2. All joints between precast manhole sections shall be wrapped in a butyl-rubber based tape.
 - a. Manufacturers:
 - 1) Press-Seal Gasket Corporations, Model EZ-WRAP Rubber.
 - 2) Henry, Model RU116 RUBR-NEK External Joint Wrap.
 - 3) Or approved equal.

2.7 SHADE STRUCTURE

- A. Shade Structure: Contractor shall provide shop drawings for a shade structure as indicated on the Plans. Design specifications for Loads, Wind and Seismic shall be per the requirements listed on the Plans.

2.8 MANHOLE EPOXY

- A. Emergency Storage Vault, Force Main Discharge Manhole and Gravity Manhole (as indicated on plans) shall be coated with Neopoxy NPR-5300 or Warren Environmental S-301 Epoxy Spray System, 200 mils, single application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify items provided by other sections of Work are properly sized and located.
- B. Verify built-in items are in proper location, and ready for roughing into Work.
- C. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

- A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.
- B. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.
- C. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify manholes and structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION - GENERAL

- A. Excavation and Backfill:
 - 1. Excavate for manholes and structures in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of manhole or structure for construction operations, and backfill.
 - 2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes or structures in dry trench.
- B. Place foundation slab, trowel top surface level.
- C. For precast manhole sections, place manhole sections plumb and level, trim to correct elevations, anchor to foundation slab.

- D. For cast-in-place manholes, install manholes and structures supported at proper grade and alignment bearing firmly and fully on crushed stone bedding.
- E. Place structure backfill per SSPWC 300-3.1 and 300-3.5. No jetting is allowed.
- F. Form and place manhole or structure plumb and level, to correct dimensions and elevations.
- G. Cut and fit for pipe.
- H. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage through the manhole.
- I. Existing manholes that are modified to accept new pipe connections shall be grouted to provide a smooth and continuous slope through the manhole.
- J. Set cover frames and covers level without tipping, to correct elevations.

3.4 PRECAST CONCRETE MANHOLE AND STRUCTURE INSTALLATION

- A. Lift precast manholes and structures at lifting points designated by manufacturer.
- B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and manhole or structure remains clean.
- C. Set precast manholes and structures bearing firmly and fully on compacted crushed stone bedding in accordance with these Special Provisions, and as shown on the Drawings.
- D. Place structure backfill per SSPWC 300-3.1 and 300-3.5. No jetting is allowed.
- E. Assemble multi-section manholes and structures by lowering each section into excavation. Install rubber joint gaskets between precast sections. Lower, set level, and firmly position base section before placing additional sections.

- F. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.
- G. Verify manholes and structures installed satisfy required alignment and grade.
- H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.
- I. Cut pipe to finish flush with interior of manhole or structure.
- J. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage through the manhole.

3.5 CAST-IN-PLACE CONCRETE MANHOLE AND STRUCTURE INSTALLATION

- A. Prepare compacted crushed stone bedding in accordance with Section 31 23 16, to receive foundation slab as specified for precast manholes, grade rings and structures.
- B. Support and protect existing pipe as needed to allow manhole construction on existing pipe.
- C. Erect and brace forms against movement.
- D. Install reinforcing steel as indicated on Drawings and in accordance with Section 03 30 00.
- E. Place and cure concrete in accordance with Section 03 30 00.

3.6 CASTINGS INSTALLATION

- A. Set frame and cover as indicated in the Drawings.

3.7 FIELD QUALITY CONTROL

- A. Test cast-in-place concrete in accordance with Section 03 30 00.
- B. Vacuum test concrete manhole and structure sections.
 - 1. Each manhole shall be tested in the presence of the Safari Park for acceptance prior to final paving and after all backfilling and

compaction is completed. Industry standards suggest that the manholes be pretested immediately after assembly and prior to backfilling. Such pretesting is of the Contractor's convenience and need not be in the presence of the inspector.

2. All testing equipment and labor shall be provided by the contractor.
3. All pipes entering the manhole shall be plugged, taking care to securely brace the plugs from being drawn into the manhole.
4. The test head shall be placed at the inside of the top of the cone section and the seal inflated in accordance with the manufacturer's recommendation.
5. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to 9 inches. The manhole shall pass if the time is greater than 60 seconds for 48-inch diameter manholes, 75 seconds for 60-inch diameter manholes, 90 seconds for 72-inch diameter manholes and 120 seconds for 96-inch diameter manholes.

C. Vertical Adjustment of Existing Manholes and Structures.

1. Where required, adjust top elevation of existing manholes and structures to elevations shown on Drawings.
2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated on Drawings.
4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete in accordance with Section 03 30 00.

3.8 SHADE STRUCTURE INSTALLATION

- A. Shade structure shall be installed in accordance with manufacturer's recommendations.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Shade Structure will not be measured for payment.
- B. Concrete Grade Rings will not be measured for payment.
- C. 8' Diameter Emergency Storage Vault will not be measured for payment.
- D. 4' Sewer Manhole will be measured by the number of 4' Sewer Manholes installed as determined from field measurement.
- E. Masonry Pilaster will be measured by the number of Masonry Pilasters actually installed as determined from field measurement.
- F. Force Main Discharge Manhole will be measured by the number of Force Main Discharge Manholes installed as determined from field measurement

4.2 PAYMENT

- A. The Contract lump sum paid for Shade Structure shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Shade Structure (including structural design, concrete foundation, rebar, excavation, shoring and backfilling) complete in place, as shown on the Plans and as specified in these Special Provisions.
- B. The Contract lump sum paid for Concrete Grade Rings shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of Concrete Grade Rings complete in place as shown on the Plans and as specified in these Special Provisions.
- C. The Contract lump sum paid for 8' Diameter Emergency Storage Vault shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of 8' Diameter Emergency Storage Vault complete in place (including vault base, 36" diameter riser, 36" diameter lid, vent, piping connections,

epoxy lining, ¾" crushed rock bedding, excavation, shoring, and backfilling), as shown on the Plans and as specified in these Special Provisions.

- D. The Contract unit price paid for each 4' Sewer Manhole shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 4' Sewer Manhole complete in place, (including excavation, backfilling, ¾" crushed rock and epoxy lining for specific manholes indicated), as shown on the Plans and as specified in these Special Provisions.
- E. The Contract unit price paid for each Masonry Pilaster shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work (including excavation, shoring and backfilling, concrete foundation, rebar, stone, pilaster cap) complete in place, as shown on the Plans and as specified in these Special Provisions.
- F. The Contract unit price paid for each Force Main Discharge Manhole shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Force Main Discharge Manhole complete in place, (including epoxy lining, excavation, backfilling, and ¾" crushed rock), as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 33 05 14

SECTION 33 41 00

UTILITY PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings.
 - 2. Accessories
 - 3. Underground pipe markers.
 - 4. Connection to existing manholes.
 - 5. Manholes.
 - 6. Bedding, backfill, and cover materials.

1.2 REFERENCES

- A. This Technical Specification makes references to the Standard Specifications for Public Works Construction ("Greenbook" or SSPWC), and to the City of Rialto Standard Drawings.
- B. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- C. ASTM International:
 - 1. ASTM B177 – Standard Test Method for Operating Salt Spray (Fog) Testing.
 - 2. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
 - 3. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
 - 4. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
 - 5. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

6. ASTM C924 – Standard Practice for Testing concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
7. ASTM C 969 – Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
8. ASTM C1103 – Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
9. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
10. ASTM D714 – Standard Test Method for Evaluating Degree of Blistering of Paints.
11. ASTM D1238 – Measuring Flow Rates of Thermoplastics by Extrusion Plastometer.
12. ASTM D1248 –Polyethylene Plastics Molding and Extrusion Materials.
13. ASTM D1505 – Density of Plastics by Density-Gradient Technique.
14. ASTM D1599 – Test for Short Term Rupture Strength of Plastic Pipe, Tubing, and Fitting.
15. ASTM D1693 – Environmental Stress Cracking of Ethylene Plastics.
16. ASTM D1784 – Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
17. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
18. ASTM D1785 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) .
19. Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
20. ASTM D1928 – Preparation of Compression Molded Polyethylene Test Samples.
21. ASTM D2152 – Test Method for Degree of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
22. ASTM D2241 – Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
23. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
24. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
25. ASTM D2657 – Heat Joining of Thermoplastic Pipe and Fittings.
26. ASTM D2665 – Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
27. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

28. ASTM D2837 – Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
29. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
30. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
31. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
32. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
33. ASTM D3035 – Polyethylene Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
34. ASTM D3212 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
35. ASTM D3261 – Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
36. ASTM F3350 – Polyethylene Plastic Pipe and Fittings Materials.
37. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
38. ASTM F585 – Insertion of Flexible Polyethylene Pipe in Existing Sewers.
39. ASTM F679 – Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings.
40. ASTM F714 – Standard Specification for Polyethylene Plastic Pipe Based on Outside Diameters.
41. ASTM F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
42. ASTM G95 – Standard Test Method for Resistance to Cathodic Disbondment by the Attached Cell Method.
43. ASTM C700-18 – Standard Specification for Vitrified Clay Pipe, Extra Strength.

D. American Water Works Association:

1. AWS Standard Qualification Procedure.

E. American Water Works Association:

1. AWWA C104 – American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

3. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
4. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C150 - ANSI Standard for the Thickness Design of Ductile Iron Pipe.
6. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
7. AWWA M23 – AWWA Manual of Supply Practices PVC Pipe – Design and Installation, Second Edition.
8. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inch through 48-inch for Water Transmission and Distribution.

F. National Fire Protection Association:

1. NFPA 24 - Installation of Private Fire Service Mains and Their Appurtenances.
2. NFPA 20 – Standard for the Installation of Stationary Pumps for Fire Protection.

G. National Sanitation Foundation, most recent version:

1. NSF-14 – Plastics Piping System Components and Related Materials.

H. Plastics Pipe Institute, most recent version:

1. PPI TR-2 – PVC Range Composition Listing of Qualified Ingredients.

I. UNI-BELL PVC Pipe Association, most recent version:

1. UNI-B-6 – Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe.
2. UNI-PUB-08 – Tapping Guide for PVC Pressure Pipe

1.3 SUBMITTALS

- A. Polyvinyl chloride pipe materials
- B. Ductile Iron Pipe Materials

- C. Vitrified Clay Pipe Materials
- D. Pipeline layout diagrams
- E. Valve types and materials
- F. Precast structure design shop drawings
- G. Grout materials
- H. Pipe penetration seal
- I. Filter fabric for bedding
- J. Pipe bedding
- K. Pipe Fittings
- L. Gaskets
- M. Bolts
- N. Flanges
- O. Victaulic Couplings
- P. Expansion Joints
- Q. Pipe Supports
- R. Air Vacuum Valves
- S. Cleanouts
- T. Samples: Ceramic Lined DIP - Provide Sample of the 4-inch Ceramic Lined DIP that is 6-inches in length. Submit sample to Engineer (Kimley-Horn) for review at the following address: 401 B Street, Suite 600, San Diego, CA 92101.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall exercise special care during the unloading, handling, and storage of all pipe to ensure that the pipe is not cut, gouged, scored, or otherwise damaged. Any pipe segment which has cuts in the pipe wall exceeding 10 percent of the wall thickness shall be cut out and removed from the site at the Contractor's expense.
- B. The pipe shall be stored so that it is not deformed axially or circumferentially which may hinder pipe installation. No vertical load shall be placed on pipe during storage. Contractor shall test all pipe for ovality prior to installation. Pipe not meeting specified requirements shall be replaced with new material.
- C. All plastic pipes shall have an ultraviolet inhibitor and shall also be stored in a covered area on blocks, such that no individual pipes weight shall bear on another pipe segment. Pipes shall be supported so as not to allow the pipe to sag along its length between blocks during storage.
- D. Block individual and stockpiled pipe lengths to prevent moving.

1.6 FIELD MEASUREMENTS

- A. Verify field measurements and elevations are as indicated.

1.7 COORDINATION

- A. Coordinate the Work with other trades and operations at the site.

PART 2 PRODUCTS

2.1 DUCTILE PIPE AND FITTINGS

- A. Dual spigot centrifugally cast ductile iron pipe conforming to AWWA C150 or AWWA C151, 250 minimum pressure class flanged ends. Joints shall conform to ANSI/AWWA C111/A21.11.
 - 1. Manufacturers:

- a. U.S. Pipe
 - b. American Ductile Iron Pipe Company
 - c. Or approved equal
2. Outside Coating: Paint in accordance with System No. 20-Exposed Metal-Exterior, as described in these Special Provisions for pipe above ground. For buried pipe: polyethylene encasement per AWWA C105.
3. Lining:
- a. Pipe and fittings: Protecto 401 Ceramic Epoxy for Sewer Mains.
 - b. Valves: Fusion Bonded Epoxy in a uniform thickness, conforming to AWWA C116.
4. Field cut pipe: Pipe shall be cut and reconditioned to make up the next joint per pipe and pipe liner manufacturer's recommendations. Remove any sharp, rough edges that might otherwise damage the joint of coupling. Freshly cut ends shall be immediately coated with Cement Mortar Liner joint compound, and compatible with interior lining of pipe. Pipe that is to be cut in the field shall be "Gauged Full Length" pipe. Field gauge all field cut ends and ensure it to be within manufacturer's tolerances. Cut ends found to be outside of manufacturer's tolerances shall be rounded in accordance with manufacturer's recommendations.
5. Ductile iron specials and fittings shall conform to ANSI A21.10 (AWWA C110) or ANSI 21.53 (AWWA C153) with joints as shown on the Drawings or as required elsewhere in these specifications or for the installation.
6. Interior lining of specials and fittings shall match the adjoining specified pipe lining. All standard fittings shall be factory lined with cement mortar lining for water mains and ceramic epoxy lining for sewer mains.
7. Flanges shall meet or exceed ANSI B16.1, Class 250 unless otherwise indicated, or required for the installation.
8. Flanges for spool pieces shall be factory installed threaded flanges. Flanges for fittings shall be cast integrally with the fitting.

9. Where specified, called for on the drawings, or otherwise required for thrust restraint, mechanical joints shall be made using retainer glands with set screws or clamping lugs. Retainer glands shall be as manufactured by EBAA Iron, Tyler Pipe, or equal.
10. Rubber gasket for mechanical or push-on joints shall meet ANSI A21.11 (AWWA C111), vulcanized natural or vulcanized synthetic rubber.
11. Flanged gaskets shall be full face, 1/16-inch thick cloth inserted rubber or metallic packing.
12. Bolts and nuts for all service conditions (above ground, submerged and buried) shall be Type 316 stainless steel.
13. Valves shall be factory lined with Fusion Bonded Epoxy.

2.2 COMBINATION AIR RELEASE VACUUM VALVES

Combination air release and air vacuum valves shall be as indicated on plans.

2.3 GATE VALVES

- A. Gate valves shall be resilient seated solid wedge gate valves. The valve shall have non-rising stem type for buried service and non-rising stem type with hand wheel for non-buried service and shall exceed the AWWA C509 and C515 standards.
- B. The valve body, bonnet, gland, and handwheel shall be cast from thick wall patterns resulting in a minimum wall thickness as shown on page 9 in Section 4.4 Table 1 of AWWA C500 and C509 and be constructed of ductile iron ASTM A536 grade 65-45-12. The wedge on 2-36" shall be ductile iron, encapsulated with EPDM rubber. The wedge shall be male guided into the body seat of the valve, plastic wedge guiding mechanism not allowed.
- C. Valve stems shall be AISI stainless steel with an integral stainless steel stem thrust collar (machined as part of the stem). Shaft seals must be EPDM triple o-rings positively located in the grooves on the shaft not in the gland for NRS valves. The valve must have two thrust washers constructed of copper: non-metallic thrust washers are not acceptable. Non-asbestos graphite packing must be used on OS&Y valves.
- D. All nuts, bolts and washers shall be 316 Stainless Steel.

- E. Gate valve shall be lined and coated with Fusion Bonded Epoxy.

2.4 PLUG VALVES

- A. Gate valves shall be resilient seated solid wedge gate valves. The valve shall have non-rising stem type for buried service and non-rising stem type with hand wheel for non-buried service and shall exceed the AWWA C509 and C515 standards.

2.5 RESTRAINED FLANGE ADAPTERS

- A. Restrained flange adapters shall be fully restrained and constructed of ASTM A536 ductile iron and have flanged bolt circles that are compatible with ANSI/AWWA C110/A21.10 (125# /Class 150 bolt pattern).
- B. Restraint for flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges.
- C. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6-inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
- D. All internal surfaces of the gasket ring (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating and gaskets shall meet ANSI/NSF-61. Exterior surfaces of the gasket ring shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.
- E. Pressure rating shall be a minimum of 250 psi.

2.6 POLYVINYL CHLORIDE PIPE (PVC) PRESSURE PIPE

- A. Segmental PVC pressure pipe shall conform to SSPWC 207-25. Minimum pressure class shall be 200 psi, DR 18.

- B. PVC shall conform to AWWA C900 for 4-inch through 48-inch pipe
- C. Segmental PVC used shall be fully restrained at fittings and bends to the limits as indicated on the plans.

2.13 PIPE CONNECTION TO CONCRETE STRUCTURES

- A. Connections to concrete structures shall be either:
 - 1. Flexible Pipe Boot Style per SSPWC Section 208-6 for sewer manholes
 - 2. Modular Interlocking Synthetic Rubber Link Assembly, Link-Seal Brand as shown on plans or approved equal for valve vaults.

Type for each connection made shall be as called out on plans and details.

2.14 UNDERGROUND PIPE MARKERS

- A. Manufacturers:
 - 1. Presco – Underground Warning Tape, Detectable.
 - 2. Reef Industries, Inc. – Terra Tape, Detectable
 - 3. or equal.
- B. Furnish materials in accordance with OSHA standards.
- C. Plastic Ribbon Tape: Bright colored green, continuously printed, minimum 6 inches wide by 4-mil thick, manufactured for direct burial service.

2.15 MANHOLES

- A. Manholes: Conform to Section 33 05 14.

2.16 BEDDING AND COVER MATERIALS

- A. Bedding: SSPWC Standards.
- B. Cover: SSPWC and as shown on the plans.
- C. Soil Backfill from Above Pipe to Finish Grade: SSPWC and as shown on the plans.

2.17 ACCESSORIES

- A. Grout: Specified in Section 03 30 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

- A. Correct over-excavation by conformance with Section 31 23 16.
- B. Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.
- C. Remove soft or loose soil and over excavate per Section 31 23 16.
- D. Protect and support existing sewer lines, utilities and appurtenances.
- E. Maintain profiles of utilities. Coordinate with other utilities to eliminate interference. Notify Engineer where crossing conflicts occur.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 16.
- B. Excavate to lines and grades shown on Plans or required to accommodate installation.
- C. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.
- D. Provide sheeting and shoring in accordance with Section 31 23 16.
- E. Place, level, and compact bedding material at trench bottom per Section 31 23 16.

3.4 Paint Coating Ferrous Surfaces

- A. Field apply paint and protective coating systems for pipes and appurtenances above ground that are not otherwise shop coated. Do not apply coating material if the relative humidity exceeds 80 percent or if the surface temperature is less than 5° F. above the dew point.
- B. Surface to be coated must be cleaned as specified in subsection 310-2.5.1, part (c) of the SSPWC and these Special Provisions.
- C. Surfaces to be coated must be cleaned and coated in conformance with manufacturer's recommendations for coating for the type of material being used. The metal must be cleaned after blasting with clean, dry compressed air. Use of rugs to remove residual dust after sandblasting will not be permitted.
- D. Before blast cleaning, remove all oil, grease or other contaminants by solvent cleaning per Subsection 310-2.3, "Solvent Cleaning," of the SSPWC.
- E. Shop-applied primer must be by spray equipment.
- F. Apply intermediate and top coat after priming and cure. White zinc salt, if present, must be cleaned off primed surface before applying intermediate coat.
- G. Apply the appropriate System No. protective system as specified in these Special Provisions.
 - 1. System No. 20 – Exposed Metal, Exterior
 - a. Type: Gloss synthetic enamel with OSHA safety color coding.
 - b. Surface Preparation: SSPC-SP 1. Apply one coat of vinyl wash primer on galvanized, zinc, or bronze surfaces. Use Sinclair No. 7113, or approved equal.
 - c. Prime Coat: Sinclair No. 15 (non-ferrous) or No. 25 (galvanized or zinc), 2 mils or approved equal.
 - d. Intermediate Coat: Sinclair No. 248, 1.5 mils or approved equal.
 - e. Finish Coat: Sinclair No. 7573 (OSHA Green), 2 mils; or approved equal.
 - f. Color: To be approved by City.

3.5 INSTALLATION - GENERAL

- A. All pipe installation shall be in accordance with manufacturer's recommendations. CONTRACTOR shall immediately notify Owner of any conflicts between manufacturer's recommendations and drawings.
- B. For plastic pipe, install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.
- C. Lay pipe to slope gradients noted on drawings. Begin at downstream end and progress upstream.
- D. Assemble and handle pipe in accordance with manufacturer's instructions except as modified on the Drawings or by Engineer.
- E. Keep pipe and fittings clean until work is completed and accepted by Engineer. Cap open ends during periods of work stoppage.
- F. Connect pipe to new manhole as detailed in this Specification.
- G. Install plastic ribbon tape continuous over top of pipe, buried 6 inches below finish grade. Coordinate with Section 31 23 17.
- H. For plastic pipe, Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

3.6 INSTALLATION - MANHOLES

- A. Install manholes in accordance with Section 33 05 14.

3.7 BACKFILLING

- A. Backfill around sides and to top of pipe in accordance with Section 31 23 16.

3.8 FIELD QUALITY CONTROL

- A. Sections 33 01 32 –Pipeline Testing

3.9 PROTECTION OF FINISHED WORK

- A. Protect pipe and aggregate cover from damage or displacement.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. 4-inch C-900 PVC DR-14 Force Main will be measured by the horizontal linear footage installed as determined from field measurement. Field measurement will be made along the centerline of the pipe.
- B. 8-inch VCP will be measured by the horizontal linear footage installed as determined from field measurement. Field measurement will be made along the centerline of the pipe.
- C. 4-inch Sewer Lateral will be measured by the horizontal linear footage installed as determined from field measurement. Field measurement will be made along the centerline of the pipe.
- D. Misc. Piping Spools and Fittings shall not be measured for payment. This item shall include all Ductile Iron Piping and Fittings (exclusive of piping provided as part of package system vault and lift station) within the lift station yard and the force main extending outside the lift station yard up to the transition to the PVC Force Main in Eucalyptus.
- E. 4-inch Eccentric Plug Valve will be measured by the number of 4-inch Eccentric Plug Valves installed as determined from field measurement (exclusive of valves provided as part of package system vault).
- F. 1-Inch Combination Sewage Air Release and Vacuum Valve will be measured by the number of 1-inch Combination Air Release and Vacuum Valves installed as determined from field measurement.
- G. 1-Inch Service and Hose Bib will not be measured for payment.
- H. 4-inch Force Main Cleanout will be measured by the number of 4-inch Force Main Cleanouts as determined from field measurement.

4.2 PAYMENT

- A. The Contract unit price paid for 4-inch C-900 PVC DR-14 Force Main shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 4-inch C-900 PVC DR-14 Force Main complete in place, (including; fittings, restrained joints, thrust blocks, testing, locating and potholing existing utilities, protection of all utility

crossings in place, saw-cutting pavement, excavation, trenching, dewatering, trench backfill material in trench zone, pipe embedment material in pipe zone, HMA trench patching and removal/disposal of abandoned utilities in conflict) as shown on the Plans and as specified in these Special Provisions and the SSPWC.

- B. The Contract unit price paid for 8-inch VCP shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 8-inch VCP complete in place, (including; fittings, testing, locating and potholing existing utilities, protection of all utility crossings in place, excavation, trenching, dewatering, trench backfill material in trench zone, pipe embedment material in pipe zone, HMA and cross gutter concrete trench patching, dewatering) as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- C. The Contract unit price paid for 4-inch Sewer Lateral shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of 4-inch Sewer Lateral complete in place, (including; fittings, cleanouts as indicated on drawings, testing, locating and potholing existing utilities, protection of all utility crossings in place, saw-cutting pavement, excavation, trenching, dewatering, trench backfill material in trench zone, pipe embedment material in pipe zone, HMA trench patching, landscape restoration, irrigation restoration) as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- D. The Contract lump sum paid for Misc. Piping Spools and Fittings shall include full compensation for furnishing all labor, materials, equipment, tools and incidentals and for doing all the work of Misc. Piping Spools and Fittings complete in place, (including; fittings, tees, crosses, blind flanges, victaulic couplings, pipe supports, restrained joints, vertical pipe spools, expansion joints, testing, locating and potholing existing utilities, protection of all utility crossings in place, trenching, dewatering, trench backfill material in trench zone, pipe embedment material in pipe zone, penetration sealant) as shown on the Plans and as specified in these Special Provisions and the SSPWC.
- E. The Contract unit price paid for 4-inch Eccentric Plug Valve shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of constructing 4-inch Eccentric Plug Valves (including valve, fittings, valve can, bedding) complete in place, as shown on the Plans and as specified in these Special Provisions.

- F. The Contract unit price paid for 1-Inch Combination Sewage Air Release and Vacuum Valve shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals and for doing all the work of constructing 1-Inch Combination Air Release and Vacuum Valve (including saddle connection, fittings, concrete, HDPE enclosure, type "K" copper pipe) complete in place, as shown on the Plans and as specified in these Special Provisions.
- G. The Contract unit price paid for 1-Inch Service and Hose Bib shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals (including type "K" copper pipe from the connection point to the 1" hose bib, water main service connection, fittings, concrete support block) and for doing all the work of constructing 1-Inch Service and Hose Bibs complete in place, as shown on the Plans and as specified in these Special Provisions.
- H. The Contract unit price paid for 4-inch Force Main Cleanout shall include full compensation for furnishing all labor, materials, equipment, tools, and incidentals (including fittings, blind flange, wye, force main cleanout manhole and lid, concrete and bedding) and for doing all the work of constructing 4-inch Force Main Cleanout complete in place, as shown on the Plans and as specified in these Special Provisions.

END OF SECTION 33 41 00

PART IV – APPENDICES

GEOTECHNICAL INVESTIGATION

FRISBIE PARK SEWER LIFT STATION EAST EASTON STREET AND NORTH EUCALYPTUS AVENUE RIALTO, CALIFORNIA



GEOCON
W E S T, I N C.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

**KIMLEY-HORN AND ASSOCIATES, INC.
SAN DIEGO, CALIFORNIA**

**PROJECT NO. T2858-22-01
APRIL 9, 2019**



Project No. T2858-22-01
April 9, 2019

Davie Cowan
Kimley-Horn and Associates, Inc.
401 B Street, Suite 600
San Diego, California 92101

Subject: GEOTECHNICAL INVESTIGATION
FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

Dear Mr. Cowan:


In accordance with Individual Project Order Number 095937008-01, dated February 20, 2019, Geocon West, Inc. (Geocon) has prepared this report of our geotechnical investigation for the proposed Frisbie Park sewer lift station, located at the intersection of East Easton Street and North Eucalyptus Avenue, in the City of Rialto, California. The accompanying geotechnical report presents the results of our study and includes our conclusions and recommendations pertaining to the geotechnical aspects of the design and construction of the proposed improvements for the sewer lift station. Based on the results of this study, it is our opinion that the geotechnical aspects of the proposed sewer lift station improvements are sufficient for the proposed construction, provided the recommendations of this report are followed.

This report is preliminary in nature, and as such, Geocon should be afforded the opportunity to review the final project design and plans and to revise this report and provide additional geotechnical recommendations, as needed.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.


Very truly yours,

GEOCON WEST, INC.


Andrew Shoashekan
EIT 151871


Lisa A. Battiato
CEG 2316




Chet E. Robinson
GE 2890



ATS:CER: LAB:hd

Distribution: Addressee (Email)
Kimley-Horn, Davie Cowan

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the findings of our geotechnical investigation for the proposed Frisbie Park sewer lift station, located at the intersection of East Easton Street and North Eucalyptus Avenue, in the City of Rialto, California as depicted on the *Vicinity Map*, Figure 1.

The purpose of this investigation was to drill exploratory borings at the approximate location of the proposed sewer lift station, and along appurtenant pipe improvements within East Easton Street and North Eucalyptus Avenue, to evaluate the subsurface geologic conditions and collect relatively undisturbed in-situ and disturbed bulk soil samples for laboratory testing. Additionally, our investigation included laboratory testing of select soil samples collected to evaluate their engineering properties and characteristics, and provide recommendations for the installation of the proposed sewer lift station and appurtenant improvements. Our scope of services included the following:

- Mark the proposed boring locations and notify Underground Service Alert (USA) to locate and mark utilities in the proposed investigation area.
- Obtain an encroachment permit from the City of Rialto.
- Drill seven exploratory borings at the approximate location of the proposed lift station site and pipe alignments. The exploratory borings were performed to evaluate subsurface geologic conditions and to collect relatively undisturbed in-situ and disturbed bulk soil samples for laboratory testing and evaluation. Appendix A presents the logs of our exploratory borings. Figure 2, *Geologic Map*, presents the approximate location of our borings.
- Conduct laboratory testing of select soil samples to evaluate the engineering properties of the site soil. Appendix B presents our laboratory test results.
- Prepare this written report, which presents our findings, conclusions and recommendations as they pertain to the geotechnical aspects of the proposed sewer lift station and appurtenant improvements.

2. SITE AND PROJECT DESCRIPTION

The proposed sewer lift station and appurtenant improvements will be located at the intersection of East Easton Street and North Eucalyptus Avenue, and along both roadways, at approximately 34.1338 latitude and -117.3573 longitude. Based on the *Frisbie Park Sewer Lift Station Details* (Kimley-Horn, 2019), cut slopes are proposed along the eastern and southern boundary of the sewer lift station pad, and will descend to the east. We expect this cut slope will be on the order of 10 feet or less at an inclination of 2:1 (horizontal:vertical). Excavations to meet finished grades are expected to be on the order of 10 feet or less. Appurtenant station piping will enter and exit the station at East Easton Street and North Eucalyptus Avenue; station piping will be aligned along and located within East Easton Street and North Eucalyptus Avenue. Lift station improvements are expected to include wet and dry wells, control panel, emergency generator, and a fence and access gate surrounding the above ground station improvements.

Preliminary structural loading information for the sewer lift station building has not been provided to us at this time. We expect that the building will be constructed of light gauge steel framing or reinforced masonry unit walls, and supported on a conventional concrete shallow foundation with a concrete slab-on-grade floor. We expect column loads for the proposed building will be up to 75 kips, and wall loads will be up to 5 kips per linear foot.

The *Frisbie Park Sewer Lift Station Details*, dated March 6, 2019, and prepared by Kimley-Horn, was utilized to cite the borings and as the base for our *Geologic Map*, Figure 2. The borings were located based on the referenced plan and landmarks near the site.

3. FIELD EXPLORATION AND LABORATORY TESTING

Our field investigation was conducted on March 8 and 11, 2019, by drilling seven exploratory borings utilizing a truck-mounted CME-75 hollow-stem auger drilling rig. The borings were drilled to depths ranging between 13 feet and 50¼ feet below the existing ground surface at the approximate location of the proposed sewer lift station and appurtenant pipe alignments. Relatively undisturbed in-situ and disturbed bulk soil samples were collected for laboratory testing. The borings were backfilled with cuttings, and capped with asphalt concrete cold patch where located within roadways. The approximate locations of the exploratory borings are depicted on Figure 2, *Geologic Map*. Detailed logs of the borings can be found in Appendix A.

Soil samples collected from our field investigation were transported to our geotechnical laboratory for evaluation of their engineering properties and characteristics. Laboratory testing included in-situ dry density and moisture content, maximum dry density and optimum moisture content, grain size distribution, consolidation characteristics, expansion index, corrosivity, sand equivalency, and in-situ and remolded direct shear. Appendix B contains the results of our laboratory testing.

4. GEOLOGIC SETTING

The site is in the northernmost part of the Peninsular Ranges Geomorphic Province which is characterized as broad northwest trending valleys subparallel to faults branching from the San Andreas fault. The Transverse Ranges Geomorphic Province is approximately 7 miles to the north, and is characterized by east-west trending series of steep mountain ranges and valleys. Due to north-south compression of the San Bernardino and San Gabriel Mountains (the Transverse Ranges) rapid uplift is occurring (CGS, 2002). As a result of that uplift, extensive modern to Quaternary-age sedimentary alluvial fans have been deposited within the San Bernardino Valley (Peninsular Range). The site is located on such an alluvial fan. Northwest-southeast trending strike-slip faults include the San Andreas and the San Jacinto fault zones and thrust faults such as the north dipping Cucamonga fault zone shape the landscape.

Locally, the site is underlain by several hundred feet of alluvial deposits which include distal alluvial fan deposits generated from the San Bernardino and San Gabriel Mountains to the north. No faults are geologically mapped within or adjacent to the site.

5. GEOLOGIC MATERIALS

The geologic contacts observed within the exploratory borings were undocumented fill (afu) and young alluvial fan deposits (Qyf), and are logged after D.M. Morton and F.K. Miller (2006).

5.1 Undocumented Fill (afu)

Undocumented fill was encountered within borings located within the existing roadways to depths ranging between 3 feet to 8 feet below existing pavement. These materials generally consist of poorly-graded sand with silt, and to a lesser extent poorly-graded sand, with varying amounts of gravel cobbles, and are loose to dense, damp to moist, and various shades of brown, grayish brown, and olive brown.

5.2 Young Alluvial Fan Deposits (Qyf)

Young alluvial fan deposits were encountered underlying the undocumented fill to the maximum depth explored of 50¼ feet, and generally consists of poorly-graded sand, poorly-graded sand with silt, silty sand, and to a lesser extent well-graded sand, poorly-graded gravel, and sandy silt, with varying amounts of gravel and cobbles, and are loose to very dense or stiff, damp to saturated, and various shades of brown, gray, olive, olive brown, olive gray, grayish brown, and pale yellow.

No groundwater or saturated soils were encountered during our field exploration.

6. GROUNDWATER

Groundwater was not encountered during this investigation. We obtained well data from the California Water Library State Well 01N05W36H006S within 1 mile of the proposed sewer lift station. The groundwater table at the well site is recorded to range between approximately 377 feet and 420 feet above mean sea level (DWR, 2019). Groundwater elevations are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result.

7. GEOLOGIC HAZARDS

7.1 Surface Fault Rupture

The numerous 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 Geological Survey (CGS, formerly known as CDMG) for the Alquist-Priolo Earthquake Fault Zone Program (Bryant and Hart, 2007). 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 entirely within the State Earthquake Fault Hazard Zone of the San Jacinto fault. According to California Geological Survey, the site is located between two branches of the San Jacinto fault which are mapped approximately 435 and 990 feet southwest and northeast of the site, respectively. There is a possibility of surface rupture at the site during the lifetime of the proposed improvements.

Faults within a 50-mile radius of the site, per *Fault Activity Map of California 2010*, are listed in Table 7.1.1. Historic earthquakes in southern California of magnitude 6.0 and greater, their magnitude, distance, and direction from the site are listed in Table 7.1.2

TABLE 7.1.1
KNOWN ACTIVE FAULTS WITHIN 50 MILES OF THE SITE

Fault Name	CGS Number	Maximum Earthquake Magnitude (Mw)	Distance from Site (miles)	Direction from Site
San Jacinto (San Bernardino Vly)	400	7	0	On site
San Andreas – San Bernardino Vly	358	8	4.8	NE
San Jacinto (Glen Helen)	402	7	4.8	NW
Cucamonga	399	7	6	NW
Ord Mountain (Western Section)	405	7	18	NE
San Jacinto (Claremont)	447	7	20	SE
San Jacinto (Casa Loma)	457	7	20	SE
Casa Loma	457	7	20	SE
Claremont	401	7	20	SE
Chino	431	7	26	SW
Elsinore (Glen Ivy North)	461	7	26	S
North Frontal (Northern and Eastern Section)	407	7	26	NE
San Gorgonio Pass	455	7	29	SE
Helendale	382	7	31	NE
Elsinore (Whittier)	444	7	34	SW
Clark	459	7	38	SE
Raymond	394	7	41	W
Pinto Mtn/Morongo Valley	425/451	7	42	E
Lenwood	365	8	42	NE
South Branch of San Andreas	427	8	42	SE
North Branch of San Andreas	312	7	44	SE
Johnson Valley	415	7	47	NE

Table 7.1.2
Historic Earthquake Events with Respect to the Site

Earthquake	Date of Earthquake	Magnitude	Distance to Epicenter (Miles)	Direction to Epicenter
San Jacinto	December 25, 1899	6.7	33	SE
San Jacinto	April 21, 1918	6.8	33	SE
Loma Linda Area	July 22, 1923	6.3	11	SE
Long Beach	March 10, 1933	6.4	50	SW
Buck Ridge	March 25, 1937	6.0	80	SE
Imperial Valley	May 18, 1940	6.9	60	E
Desert Hot Springs	December 4, 1948	6.0	57	ESE
Arroyo Salada	March 19, 1954	6.4	95	SE
Borrego Mountain	April 8, 1968	6.5	101	SE
San Fernando	February 9, 1971	6.6	68	WNW
Joshua Tree	April 22, 1992	6.1	66	E
Landers	June 28, 1992	7.3	58	E
Big Bear	June 28, 1992	6.4	34	E
Northridge	January 17, 1994	6.7	74	WNW
Hector Mine	October 16, 1999	7.1	75	ENE

7.2 Liquefaction and Seismic Settlement

Liquefaction is a phenomenon in which loose, saturated, relatively cohesion-less soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, in-situ stress conditions, and the depth to groundwater. Seismically induced settlement may occur whether the potential for liquefaction exists or not.

The current standard of practice as outlined in the *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California* (SCEC, 1999) requires a liquefaction analysis to a depth of 50 feet below the lowest portion of the proposed structure. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction.

According to the *San Bernardino County Land Use Plan* (San Bernardino, 2010), the site is located within an area mapped as having a potential for liquefaction.

We performed a liquefaction analysis of the soils underlying the sites using the spreadsheet template LIQ2_30.WQ1 developed by Thomas F. Blake (1996). This program utilizes the 1996 NCEER method of analysis. The liquefaction potential evaluation was performed by utilizing a groundwater depth of greater than 50 feet, a magnitude 7.3 earthquake, and the site-specific peak horizontal acceleration for the site. This semi-empirical method is based on a correlation between values of Standard Penetration Test (SPT) resistance.

Due to the lack of shallow groundwater and dense alluvium, the potential for liquefaction and seismic settlement are expected to be negligible and not a design consideration for the site. A copy of the seismically induced settlement analysis is included on Figure 3.

7.3 Expansive Soil

The geologic units near the ground surface at the site generally consist of sandy material. Laboratory testing on samples of the alluvial soils indicated these soils are “non-expansive” (Expansion Index [EI] less than 20) as defined by 2016 CBC Section 1803.5.3, with an Expansion Index of 0 for the site, which is classified as ‘very low’ (EI between 0 and 20) in accordance with ASTM D4829.

7.4 Hydrocompression

Hydrocompression is the tendency of unsaturated soil structure to collapse upon wetting resulting in the overall settlement of the affected soil and overlying foundations or improvements supported thereon. Potentially compressible soils underlying the site are typically removed and recompacted during remedial site grading. However, if compressible soil is left in-place, a potential for settlement due to hydrocompression of the soil exists.

We tested soil samples obtained during our investigation of the sites for hydrocompression, which exhibited a collapse potential of up to 0.7 percent when loaded to the expected post-grading pressures.

7.5 Landslides

The sites are located within a broad alluvial valley. No hills are located on or adjacent to the sites. No landslides are geologically mapped in the descending slopes of the San Jacinto Mountains to the south (D.M. Morton and F.K. Miller, 2006). The potential for landslides at the site is not a design consideration.

7.6 Slope Stability

Proposed cut slopes of up to 10 feet are expected on the eastern and southern boundaries of the station building pad. In general, permanent, graded fill slopes constructed of on-site soils with gradients of 2:1 (horizontal to vertical) or flatter and vertical heights of 10 feet or less are expected to possess factors of safety of 1.5 or greater.

7.7 Rock Fall Hazards

The project area is located within a broad valley. No hill slopes or boulders are situated above the sites. Therefore, rock fall is not considered a hazard for the site.

7.8 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 (Legg, *et al.*, 2002). The site is located approximately 50 miles from the nearest coastline with a mountain range between, at an elevation of more than 1,300 feet above mean sea level, therefore, the risk associated with tsunamis is not a design consideration.

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The project site is not located adjacent to a body of water, therefore, seiches are not a design consideration for the site.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

- 8.1.1 Neither soil nor geologic conditions were observed which would preclude the construction of the Frisbie Park sewer lift station and appurtenant improvements as presently proposed, provided that the recommendations of this report are followed and implemented during design and construction.
- 8.1.2 Potential geologic hazards at the sites include surface fault rupture, seismic shaking and hydrocompression. Based on our investigation and available geologic information, active, potentially active, or inactive faults are not present underlying or trending toward the site.
- 8.1.3 Human occupancy hours should be kept below 2,000 person hours per year for any structures due to the potential for surface fault rupture at the site.
- 8.1.4 Soil samples tested for hydrocompression exhibited a collapse potential of up to approximately 0.7 percent.
- 8.1.5 The undocumented fill and upper portions of the alluvial soils at the location of the proposed sewer lift station are considered unsuitable for the support of new compacted fill or settlement-sensitive improvements. Remedial grading of the surficial soils will be required as discussed herein. New compacted fill and competent undisturbed alluvial soils are considered suitable to support the proposed improvements.
- 8.1.6 The laboratory tests indicate that the site soils are not expansive, and have a “very low” expansion potential (expansion index of 0 to 20) in accordance with ASTM D 4829. The foundation recommendations in this report assume that the structures are founded in this material. Additional testing should be conducted during earthwork to confirm the expansion potential and additional recommendations provided, as needed.
- 8.1.7 Proper drainage should be maintained in order to preserve the engineering properties of the compacted fill in planned improvement areas. Recommendations for site drainage are provided herein.
- 8.1.8 Once design or civil grading plans are made available, the recommendations within this report should be reviewed and revised, as necessary. Additionally, as the project design progresses toward a final design, changes in the design, location, or elevation of any proposed improvement should be reviewed by this office. Geocon should be contacted to evaluate the necessity for review and possible revision of this report.

8.2 Soil and Excavation Characteristics

- 8.2.1 The in-situ soils at the site should generally be excavatable with moderate effort using conventional earth moving equipment in proper functioning order. Gravel and cobbles encountered may present difficulties during excavation operations.
- 8.2.2 Based on the material classifications and laboratory testing by Geocon, site soils generally possess an expansion potential (EI) of “very low” (EI of 0 to 20), and are considered “non-expansive” as defined by 2016 CBC Section 1803.5.3. Table 8.2.2 presents soil classifications based on the EI.

TABLE 8.2.2
SOIL CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	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	

- 8.2.3 Excavations ranging between 10 feet to 15 feet are expected during grading and trenching operations. Excavations should be performed in conformance with OSHA requirements. Some of the site soils have little cohesion and may be subject to caving in un-shored excavations. The contractor should evaluate the necessity for lay back of vertical cut areas.
- 8.2.4 Geocon performed laboratory tests on representative samples to measure the percentage of water-soluble sulfate content. Results from these tests indicate that the site materials tested possess a sulfate content of 0.000% (less than 10 part per million [ppm]), equating to an exposure class of “S0” to concrete structures as defined by 2016 CBC Section 1904.3 and ACI 318. Table 8.2.4 presents a summary of concrete requirements set forth by 2016 CBC Section 1904.3 and ACI 318.

**TABLE 8.2.4
REQUIREMENTS FOR CONCRETE EXPOSED TO
SULFATE-CONTAINING SOLUTIONS**

Exposure Class	Water-Soluble Sulfate (SO₄) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight¹	Minimum Compressive Strength (psi)
S0	SO₄<0.10	No Type Restriction	n/a	2,500
S1	0.10≤SO ₄ <0.20	II	0.50	4,000
S2	0.20≤SO ₄ ≤2.00	V	0.45	4,500
S3	SO ₄ >2.00	V+Pozzolan or Slag	0.45	4,500

¹ Maximum water to cement ratio limits do not apply to lightweight concrete

8.2.5 The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the sites could yield different concentrations. Additionally, over time landscaping activities along the access roads or from nearby developments (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

8.2.6 Laboratory testing indicates the site soils have a minimum electrical resistivity of 3,500, possess 510 ppm chloride, less than 10 ppm sulfate, and have a pH of 6.7. As shown in Table 8.2.6, the site would be classified as “corrosive” to buried improvements in accordance with the Caltrans Corrosion Guidelines (Caltrans, 2018) based on the chloride content.

**TABLE 8.2.6
CALTRANS CORROSION GUIDELINES**

Corrosion Exposure	Resistivity (ohm-cm)	Chloride (ppm)	Sulfate (ppm)	pH
Corrosive	<1,100	500 or greater	1,500 or greater	5.5 or less

8.2.7 Geocon 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.

8.3 Grading

- 8.3.1 Earthwork should be observed, and compacted fill tested by representatives of Geocon.
- 8.3.2 Grading should be performed in accordance with the *Recommended Grading Specifications* contained in *Appendix C*, and the Grading Ordinances of the City of Rialto.
- 8.3.3 Prior to commencing grading operations, a preconstruction conference should be held at the site with a representative of the City of Rialto, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.
- 8.3.4 Site preparation should begin with the removal of previous structures and infrastructure, deleterious material, debris, buried trash, and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site. Rock over 6 inches in diameter should be screened and removed, and not used in the fill.
- 8.3.5 The undocumented fill and upper portion of alluvial soils within a 1:1 (h:v) projection of the lift station building pad area should be removed to expose competent alluvial soils. Removals should extend at least 6 feet below the existing ground surface or 2 feet below the bottom of the planned foundations, whichever is deeper. Removal bottoms should extend until encountering alluvial soil with 85 percent or greater relative compaction, based on the determined laboratory maximum dry density in accordance with ASTM D 1557. Removals in pavement and walkway areas should extend at least 4 feet beneath the pavement or flatwork subgrade elevation. Areas of loose, dry, or compressible soils will require deeper excavation and processing prior to fill placement. The actual depth of removal should be evaluated by the engineering geologist during grading operations. Where over excavation and compaction is to be conducted, the excavations should be extended laterally a minimum distance of 8 feet beyond the foundation footprint or for a distance equal to the depth of removal, whichever is greater. The bottom of the excavations should be scarified to a depth of at least 1 foot, moisture conditioned at or slightly above optimum moisture content, and properly compacted.
- 8.3.6 Geocon should observe the removal bottoms to check the competence of the exposed soil. Deeper excavations may be required if dry, loose, soft, or porous materials are present at the base of the removals.

- 8.3.7 The fill placed within 3 feet of proposed foundations should possess a “low” expansion potential (EI of 50 or less).
- 8.3.8 If perched groundwater or saturated materials are encountered during remedial grading, extensive drying and mixing with dryer soil may be required, if the saturated material is to be utilized as fill material in achieving finished grades. The excavated materials should then be moisture conditioned at or slightly above optimum moisture content prior to placement as compacted fill.
- 8.3.9 The site should be brought to finish grade elevations with fill compacted in layers. Oversize materials (greater than 6 inches in dimension) should be removed from the excavated soils prior to use as fill. Layers of fill should be no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density and moisture conditioned at or slightly above optimum moisture content as evaluated by ASTM D 1557. Fill materials placed below the recommended moisture content may require additional moisture conditioning prior to placing additional fill.
- 8.3.10 If needed, import fill should consist of granular materials with a “low” expansion potential (EI of 50 or less), non-corrosive, generally free of deleterious material, and contain rock no larger than 6 inches. Geocon should be notified of the import soil source and should be afforded the opportunity to perform laboratory testing of the import soil prior to its arrival at the site to evaluate its suitability as fill material.

8.4 Earthwork Grading Factors

- 8.4.1 Estimates of shrinkage factors are based on empirical judgments comparing the material in its existing or natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates as rough approximations. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximately 10 percent range of control over the fill volume. Based on our experience with similar site soils, the shrinkage of alluvial material is expected to be up to 15 percent for the site, when site soils are compacted to at least 90 percent of the laboratory maximum dry density. This estimate is for preliminary quantity estimates only. Due to the variations in the actual shrinkage/bulking factors, a balance area should be provided to accommodate variations.

8.5 Utility Trench Backfill

- 8.5.1 Utility trenches should be properly backfilled in accordance with the requirements of the City of Banning and the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). The pipes should be bedded with well-graded crushed rock or clean sands (Sand Equivalent greater than 30) to a depth of at least one foot over the pipe. A sample of material tested for sand equivalence exhibited a sand equivalent test result of 60. The bedding material must be inspected and approved in writing by a qualified representative of Geocon. The use of well-graded crushed rock is only acceptable if used in conjunction with filter fabric to prevent the gravel from having direct contact with soil. The remainder of the trench backfill may be derived from onsite soil or approved import soil. Backfill of utility trenches should not contain rocks greater than 3 inches in diameter. The use of 2-sack slurry and controlled low strength material (CLSM) are also acceptable as backfill. However, consideration should be given to the possibility of differential settlement where the slurry ends and earthen backfill begins. These transitions should be minimized and additional stabilization should be considered at these transitions.
- 8.5.2 Trench excavation bottoms must be observed and approved in writing by a qualified representative of Geocon, prior to placement of bedding materials, fill, gravel, or concrete.
- 8.5.3 Utility trench backfill should be placed in layers no thicker than will allow for adequate bonding and compaction. Utility backfill should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density and moisture conditioned at or slightly above optimum moisture content as evaluated by ASTM D 1557. Backfill at the finish subgrade elevation of new pavements should be compacted to at least 95 percent of the maximum dry density. Backfill materials placed below the recommended moisture content may require additional moisture conditioning prior to placing additional fill.
- 8.5.4 Oversize materials such as cobbles and boulders were encountered during our investigation and should be expected by the contractor.

8.6 Seismic Design Criteria

- 8.6.1 We used the computer program *U.S. Seismic Design Maps*, provided by the California Office of Statewide Health Planning and Development (OSHPD) to evaluate the seismic design criteria. Table 8.6.1 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 building structure and improvements as currently proposed should be designed using a Site Class C in accordance with ASCE 7-10 Section 20.3.1. 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 using blow count data presented on the boring logs in *Appendix A*. The values presented in Table 8.6.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 8.6.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Site Class	C	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	2.498g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	1.144g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.0	Table 1613.3.3(1)
Site Coefficient, F_V	1.3	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	2.498g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	1.488g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.665g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.992g	Section 1613.3.4 (Eqn 16-40)

- 8.6.2 Table 8.6.2 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 8.6.2
2016 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.960g	Figure 22-7
Site Coefficient, F_{PGA}	1.0	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.960g	Section 11.8.3 (Eqn 11.8-1)

- 8.6.3 The Maximum Considered Earthquake Ground Motion (MCE) is the level of ground motion that has a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years. According to the 2016 California Building Code and ASCE 7-10, the MCE is to be utilized for the evaluation of liquefaction, lateral spread, and seismic settlements. We understand the intent of the building code is to maintain “Life Safety” during an MCE event.
- 8.6.4 Deaggregation of the MCE peak ground acceleration was performed using the online *Unified Hazard Tool* (USGS, 2018b) provided by the USGS. The result of the deaggregation analysis indicates that the predominant earthquake contributing to the MCE peak ground acceleration is characterized as a 7.3 magnitude event occurring at a hypocentral distance of 2.4 kilometers from the site.
- 8.6.5 Conformance to the criteria in the tables presented herein 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.

8.7 Foundation and Concrete Slabs-On-Grade

- 8.7.1 The foundation recommendations presented herein are for the proposed buildings subsequent to the recommended grading. We understand that future buildings will be supported on conventional shallow foundations with a concrete slab-on-grade deriving support in newly placed engineered fill.

- 8.7.2 Foundations for the structures may consist of either continuous strip footings and/or isolated spread footings. Conventionally reinforced continuous footings should be at least 12 inches wide and extend at least 18 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 24 inches and should extend at least 18 inches below lowest adjacent pad grade. A wall/column footing dimension detail depicting footing embedment is provided on Figure 4.
- 8.7.3 From a geotechnical engineering standpoint, concrete slabs-on-grade for the structure should be at least 4 inches thick and be reinforced with No. 3 steel reinforcing bars placed 24 inches on center in both directions. The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slab for supporting equipment and storage loads. A thicker concrete slab may be required for heavier loading conditions. To reduce the effects of differential settlement on the foundation system, thickened slabs and/or an increase in steel reinforcement can provide a benefit to reduce concrete cracking.
- 8.7.4 Following remedial grading, foundations for the buildings may be designed for an allowable soil bearing pressure of 3,000 psf (dead plus live load). The allowable bearing pressure may be increased by one-third for transient loads due to wind or seismic forces.
- 8.7.5 The maximum expected static settlement for the planned structures, supported on conventional foundation systems with the above allowable bearing pressures, and deriving support in engineered fill is estimated to be 1 inch and to occur below the heaviest loaded structural element. Settlement of the foundation system is expected to occur on initial application of loading. Differential settlement is not expected to exceed ½ inch over the length of the structure.
- 8.7.6 Once the design and foundation loading configuration proceeds to a more finalized plan, the estimated settlements within this report should be reviewed and revised, if necessary.
- 8.7.7 Steel reinforcement for continuous footings should consist of at least four No. 4 steel reinforcing bars placed horizontally in the footings, two near the top and two near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer.
- 8.7.8 Foundation excavation bottoms must be observed and approved in writing by a qualified representative of Geocon, prior to placement of reinforcing steel or concrete.

- 8.7.9 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). 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.
- 8.7.10 The bedding sand thickness should be evaluated by the project foundation engineer, architect, and/or developer. However, we should be contacted to provide recommendations if the bedding sand is thicker than 4 inches. Placement of 3 inches and 4 inches of sand is common practice in southern California for 5-inch and 4-inch thick slabs, respectively. The foundation engineer should provide appropriate concrete mix design criteria and curing measures that may be utilized to assure proper curing of the slab to reduce 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.
- 8.7.11 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.
- 8.7.12 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, 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.
- 8.7.13 Geocon should be consulted to provide additional design parameters as required by the structural engineer.

8.8 Exterior Concrete Flatwork

- 8.8.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein assuming the subgrade materials possess an Expansion Index of 50 or less. Subgrade soils should be compacted to 90 percent relative compaction. Slab panels should be a minimum of 4 inches thick and when in excess of 8 feet square should be reinforced with No. 3 steel reinforcing bars placed 24 inches on center in both directions at slab mid-point. 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 verified prior to placing concrete. Base materials will not be required below concrete improvements.
- 8.8.2 Even with the incorporation of the recommendations of this report, the exterior concrete flatwork has a potential to experience some uplift due to expansive soil beneath grade or differential settlement. The steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork.
- 8.8.3 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.
- 8.8.4 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.9 Conventional Retaining Walls

- 8.9.1 The recommendations presented herein are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 10 feet. In the event that walls higher than 10 feet or other types of walls are planned, Geocon should be consulted for additional recommendations.
- 8.9.2 Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 35 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 EI of 50 or less. For walls where backfill materials do not conform to the criteria herein, Geocon should be consulted for additional recommendations.
- 8.9.3 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 in feet) at the top of the wall. Where walls are restrained from movement at the top, the walls should be designed for a soil pressure equivalent to the pressure exerted by a fluid density of 55 pcf.
- 8.9.4 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, proposed retaining walls in excess of 6 feet in height should be designed with seismic lateral pressure (Section 1803.5.12 of the 2016 CBC).
- 8.9.5 A seismic load of 10 pcf should be used for design of walls that support more than 6 feet of backfill in accordance with Section 1803.5.12 of the 2016 CBC. The seismic load is applied as an equivalent fluid pressure along the height of the wall and the calculated loads result in a maximum load exerted at the base of the wall and zero at the top of the wall. This seismic load should be applied in addition to the active earth pressure. The earth pressure is based on half of two-thirds of PGA_M calculated from ASCE 7-10 Section 11.8.3.
- 8.9.6 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.

- 8.9.7 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 soil immediately adjacent to the backfilled retaining wall should be composed of free draining material completely wrapped in Mirafi 140N (or equivalent) filter fabric for a lateral distance of 1 foot for the bottom two-thirds of the height of the retaining wall. The upper one-third should be backfilled with less permeable compacted fill to reduce water infiltration. Alternatively, a drainage panel, such as a Miradrain 6000 or equivalent, can be placed along the back of the wall. Typical retaining wall drainage details are shown on Figure 5. 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 (EI of 50 or less) with no hydrostatic forces or imposed surcharge load. If conditions different than those described are expected or if specific drainage details are desired, Geocon should be contacted for additional recommendations.
- 8.9.8 Wall foundations should be designed in accordance with the above foundation recommendations.

8.10 Lateral Design

- 8.10.1 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 against newly compacted fill or dense alluvium material. The allowable 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 slabs or pavement should not be included in design for passive resistance.
- 8.10.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between soil and concrete of 0.40 should be used for design.
- 8.10.3 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.

8.11 Pavement Design

- 8.11.1 Final pavement and roadway sections should be designed in accordance with the City of Rialto *Standard Drawings*, when final Traffic Indices (TI's) and R-Value test results of subgrade soil are completed. Based on the material type, we have used an assumed R-value of 40 for the preliminary pavement design recommendations. Preliminary flexible pavement design sections are presented in Table 8.11.1, and are based on a range of Traffic Indices. The civil engineer should evaluate the final traffic indices for pavements.

**TABLE 8.11.1
PRELIMINARY FLEXIBLE PAVEMENT SECTIONS**

Road Classification/Use	Assumed Subgrade R-Value	Asphalt Concrete (Inches)	Base Material (Inches)
Light Duty Vehicles, Local Roads (TI = 6.0)	40	4.0	6.0
Medium to Heavy Duty Vehicles, Collector Roads (TI = 7.0)	40	4.0	8.0

- 8.11.2 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near or slightly above optimum moisture content.
- 8.11.3 The aggregate base materials and asphalt concrete materials should conform to Section 200-2.2 and Section 203-6, respectively, of the Greenbook. Base materials 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 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.
- 8.11.4 A rigid Portland cement concrete (PCC) pavement section should be placed in driveway aprons and cross gutters. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R *Guide for Design and Construction of Concrete Parking Lots* using the parameters presented in Table 8.11.4.

**TABLE 8.11.4
RIGID PAVEMENT DESIGN PARAMETERS**

Design Parameter	Design Value
Modulus of subgrade reaction, k	200 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

- 8.11.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 8.11.5.

**TABLE 8.11.5
RIGID PAVEMENT RECOMMENDATIONS**

Location	Portland Cement Concrete (inches)
Access Lanes (TC=A)	5.5
Entrance / Driveway Aprons (TC=C)	7.0

- 8.11.6 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 or 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). Base material will not be required beneath concrete improvements.
- 8.11.7 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 9-inch-thick slab would have an 11-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.
- 8.11.8 In order 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 in accordance with the referenced ACI report.
- 8.11.9 Performance of the pavements is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement surfaces will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

8.12 Temporary Excavations and Shoring

- 8.12.1 Excavations on the order of 15 feet in vertical height are expected during the construction of the sewer main improvements. The contractor's competent person should evaluate the necessity for lay back of vertical cut areas. Vertical excavations up to 5 feet may be attempted where loose soils or caving sands are not present, and where not surcharged by existing structures or vehicle/construction equipment loads.
- 8.12.2 Vertical excavations greater than 5 feet will require sloping or shoring measures in order to provide a stable excavation. Due to the existing improvements within the roadways, we expect that shoring will be needed.
- 8.12.3 We expect that braced shoring, such as conventionally braced shields, cross-braced hydraulic shoring, or driven sheet piles will be utilized; however, the selection of the shoring system is the responsibility of the contractor. Shoring systems should be designed by a California licensed civil or structural engineer with experience in designing shoring systems.
- 8.12.4 We recommend that an equivalent fluid pressure based on the table below be utilized for design of temporary shoring. These pressures are based on the assumption that the shoring is supporting a level backfill and there are no hydrostatic pressures above the bottom of the excavation.

**TABLE 8.12.4
RECOMMENDED SHORING PRESSURES**

HEIGHT OF SHORED EXCAVATION (FEET)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (ACTIVE PRESSURE)	EQUIVALENT FLUID PRESSURE (Pounds Per Cubic Foot) (AT-REST PRESSURE)
Up to 15	30	50

- 8.12.5 Active pressures can only be achieved when movement in the soil (earth wall) occurs. If movement in the soil is not acceptable, such as adjacent to an existing structure or where braced shoring will be utilized, the at-rest pressure should be considered for design purposes.
- 8.12.6 Additional active pressure should be added for a surcharge condition due to sloping ground, construction equipment, vehicular traffic, or adjacent structures and should be designed for each condition as the project progresses.

- 8.12.7 In addition to the recommended earth pressure, shored excavations adjacent to roadways or driveway areas should be designed to resist a uniform lateral pressure of 100 psf, acting as a result of an assumed 300 psf surcharge behind the shoring due to normal street traffic. If the traffic is kept back at least 15 feet from the shoring, the traffic surcharge may be neglected. Higher surcharge loads may be required to account for construction equipment.
- 8.12.8 It is difficult to accurately predict the amount of deflection of a shored embankment. Some deflection will occur. We recommend that the deflection be minimized to prevent damage to existing structures and adjacent improvements. Where public right-of-ways are present or adjacent offsite structures do not surcharge the shoring excavation, the shoring deflection should be limited to less than 1 inch at the top of the shored embankment. Where offsite structures are within the shoring surcharge area, we recommend the beam deflection be limited to less than ½ inch at the elevation of the adjacent offsite foundation, and no deflection at all if deflections will damage existing structures. The allowable deflection is dependent on many factors, such as the presence of structures and utilities near the top of the embankment, and will be assessed and designed by the project shoring engineer.

8.13 Site Drainage and Moisture Protection

- 8.13.1 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 or within open trenches. The site should be graded and maintained such that surface drainage is directed away from structures and open trenches 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.
- 8.13.2 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.

8.14 Plan Review

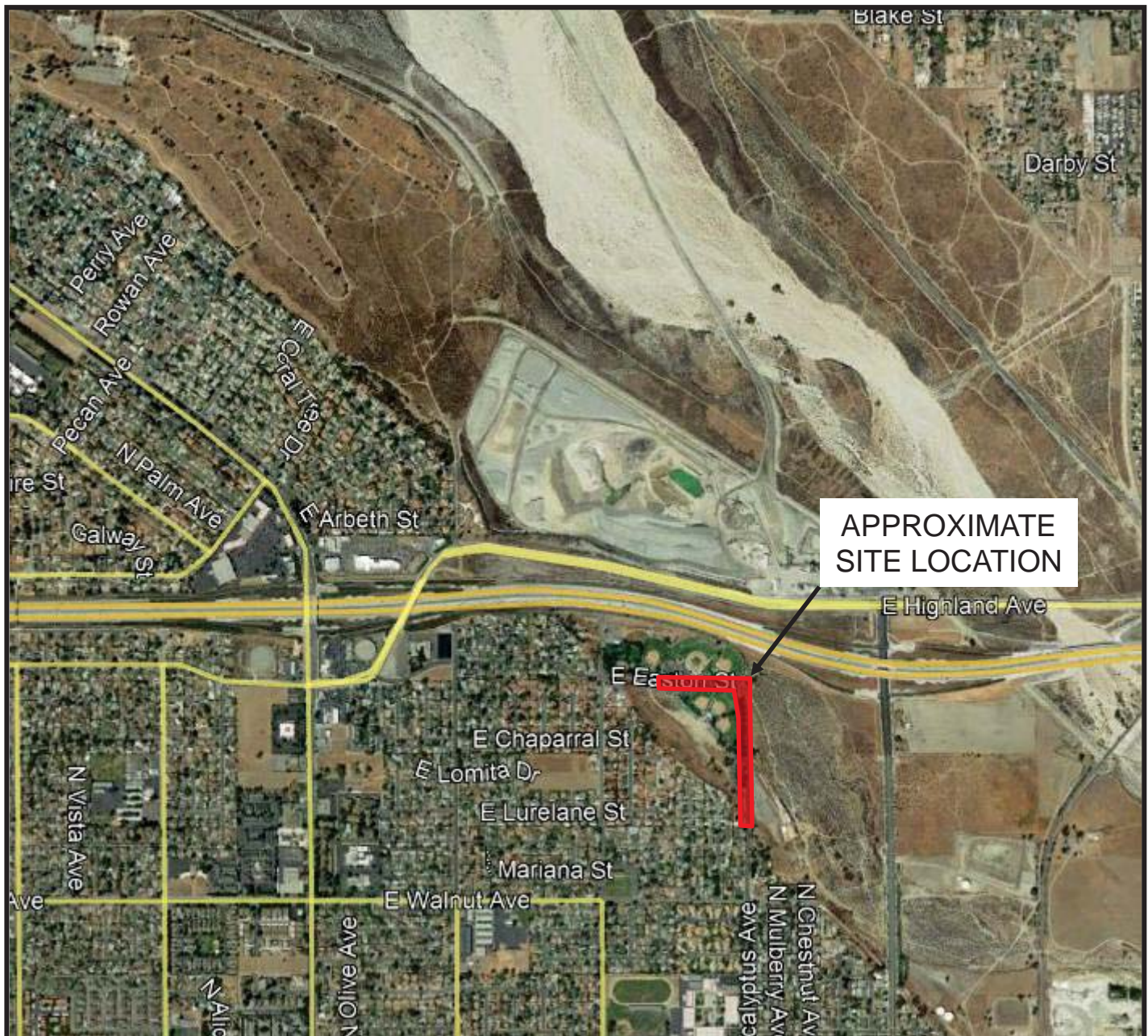
- 8.14.1 Geocon should be provided the opportunity to review the structural foundation plans prior to final submittal to verify substantial conformance with the recommendations of this report.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The 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 expected herein, Geocon 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.
2. This report is issued with the understanding that it is the responsibility of the owner, or of their 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 that 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 date of this report. However, changes in the conditions of a site 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.

LIST OF REFERENCES

1. California Building Standards Commission, 2016, *California Building Code (CBC)*, California Code of Regulations Title 24, Part 2.
2. California Department of Transportation (Caltrans), 2015, Highway Design Manual, dated July 1.
3. California Department of Transportation (Caltrans), 2010, Standard Specifications.
4. California Department of Transportation (Caltrans), 2008, Maintenance Technical Advisory Guide, Volume I – Flexible Pavement Preservation, Second Edition, dated March 7.
5. California Department of Transportation (Caltrans), Division of Engineering Services, Materials Engineering and Testing Services, *Corrosion Guidelines, Version 2.0*, dated November, 2012.
6. California Department of Water Resources, Water Data Library, www.water.ca.gov/waterdatalibrary/, accessed April 9, 2019.
7. City of Rialto, Public Works Department 2015, *Standard Drawings*, undated.
8. County of San Bernardino, 2010, *San Bernardino County Land Use Plan, GENERAL PLAN, Geologic Hazard Overlays*, FH22 C, dated March 9.
9. D.M. Morton and F.K. Miller, 2006, *Geologic Map of the San Bernardino and Santa Ana 30' x 60' Quadrangles, California*, Open-File Report 2006-1217, Version 1.0, undated.
10. Google Inc., 2019, Google Earth Pro, accessed April 9, 2019.
11. Kimley-Horn, 2019, *Conceptual Layout Plan*, Scale: 1"=40', Sheet 1 of 2, dated March 6.
12. Public Works Standards, Inc., 2015, *"Greenbook" Standard Specifications for Public Works Construction*, Published by BNI Building News.



SOURCE: Google Earth Pro, 2019

SCALE: 1" = 1,400'

VICINITY MAP

GEOCON
WEST, INC.



GEOTECHNICAL CONSULTANTS
41571 CORNING PLACE SUITE 101 MURRIETA, CA 92562-7065
PHONE 951-304-2300 FAX 951-304-2392

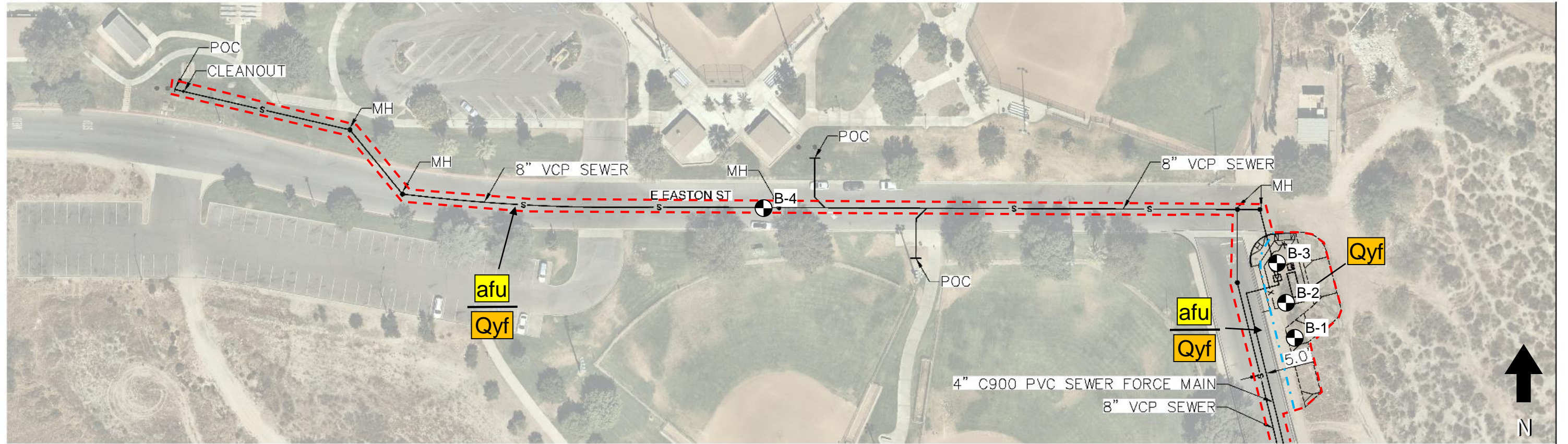
ATS

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

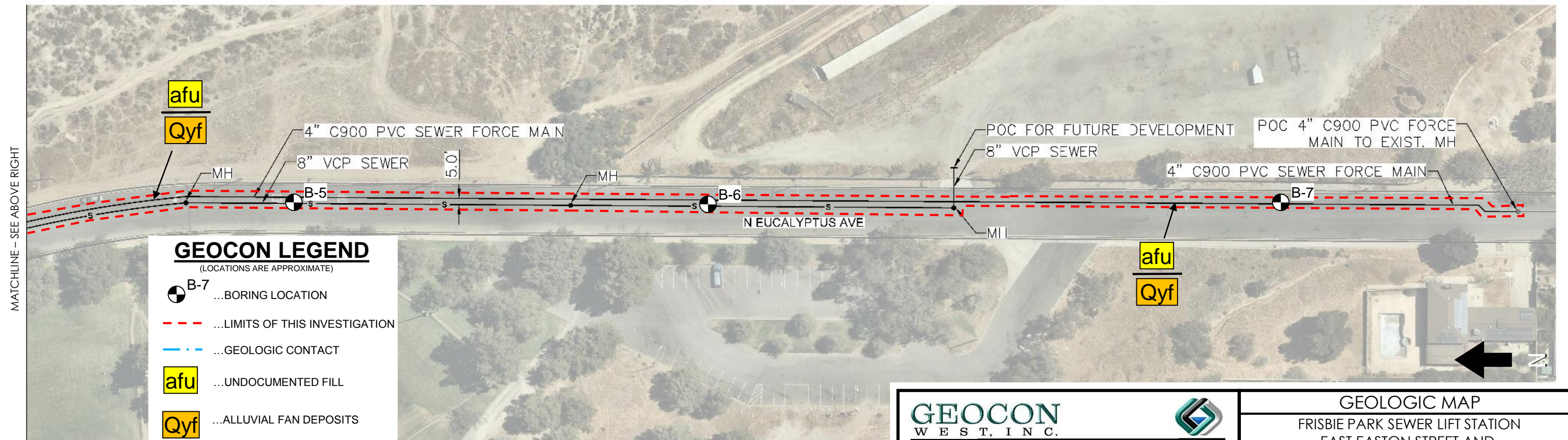
APRIL, 2019

PROJECT NO. T2858-22-01

FIG. 1



MATCHLINE - SEE BELOW LEFT

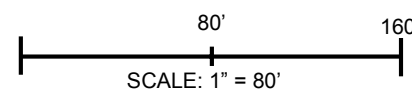


GEOCON LEGEND

(LOCATIONS ARE APPROXIMATE)

- B-7 ...BORING LOCATION
- ...LIMITS OF THIS INVESTIGATION
- ...GEOLOGIC CONTACT
- ...UNDOCUMENTED FILL
- ...ALLUVIAL FAN DEPOSITS

MATCHLINE - SEE ABOVE RIGHT



GEOCON
WEST, INC.

GEOTECHNICAL ENVIRONMENTAL MATERIALS
78-075 Main Street #G-203 ■ La Quinta, California 92253
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GEOLOGIC MAP

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA



Project : Sewer Lift Station
File No. : T2305-22-10f
Boring : B-1/B-2/B-3

TECHNICAL ENGINEERING AND DESIGN GUIDES AS ADAPTED FROM THE US ARMY CORPS OF ENGINEERS, NO. 9

EVALUATION OF EARTHQUAKE-INDUCED SETTLEMENTS IN DRY SANDY SOILS

MAXIMUM CONSIDERED EARTHQUAKE

MCE EARTHQUAKE INFORMATION:

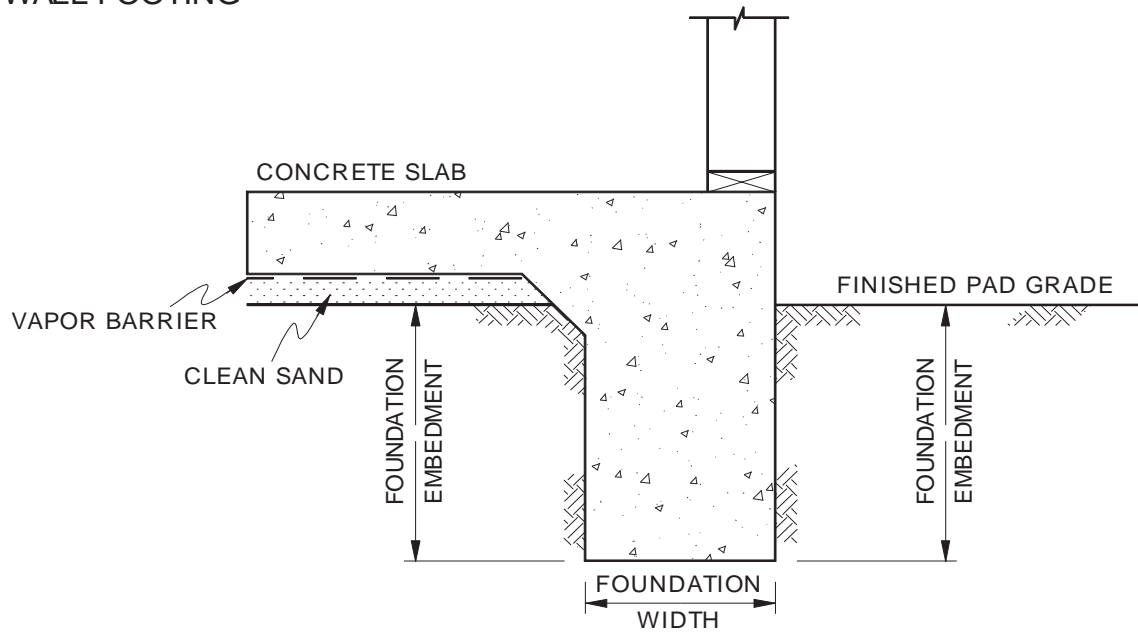
Earthquake Magnitude:	7.30
Peak Horiz. Acceleration (g):	0.960

Depth of Base of Strata (ft)	Thickness of Layer (ft)	Depth of Mid-point of Layer (ft)	Soil Unit Weight (pcf)	Overburden Pressure at Mid-point (tsf)	Mean Effective Pressure at Mid-point (tsf)	Average Cyclic Shear Stress [Tav] (tsf)	Field SPT [N]	Correction Factor [C _{er}]	Relative Density [D _r] (%)	Correction Factor [C _{cn}]	Corrected [N]160	rd Factor	Maximum Shear Mod. [G _{max}] (tsf)	[veff]*[G _{eff}] [G _{max}]	veff Shear Strain	[veff]*100%	Volumetric Strain M7.5 [E15] (%)	Number of Strain Cycles [N _c]	Corrected Vol. Strains [E _c]	Estimated Settlement [S] (inches)
1.0	1.0	0.5	120.2	0.03	0.02	0.019	24	1.25	112.3	2.0	63.7	1.0	253.351	7.33E-05	1.40E-04	0.014	3.48E-03	13.3406	3.31E-03	0.001
2.0	1.0	1.5	120.2	0.09	0.06	0.056	24	1.25	112.3	2.0	63.7	1.0	438.817	1.24E-04	2.30E-04	0.023	5.72E-03	13.3406	5.43E-03	0.001
3.0	1.0	2.5	120.2	0.15	0.10	0.094	24	1.25	112.3	2.0	63.7	1.0	566.510	1.58E-04	1.70E-04	0.017	4.23E-03	13.3406	4.01E-03	0.001
4.0	1.0	3.5	120.2	0.21	0.14	0.131	24	1.25	112.3	2.0	63.7	1.0	670.304	1.83E-04	1.70E-04	0.017	4.23E-03	13.3406	4.01E-03	0.001
5.0	1.0	4.5	85.1	0.26	0.18	0.163	89	1.25	206.4	2.0	231.6	1.0	1149.442	1.30E-04	1.70E-04	0.017	8.99E-04	13.3406	8.53E-04	0.000
6.0	1.0	5.5	85.1	0.30	0.20	0.189	89	1.25	206.4	1.9	214.9	1.0	1208.865	1.41E-04	1.50E-04	0.015	8.68E-04	13.3406	8.23E-04	0.000
7.0	1.0	6.5	85.1	0.35	0.23	0.215	89	1.25	206.4	1.7	201.4	1.0	1262.999	1.51E-04	1.50E-04	0.015	9.38E-04	13.3406	8.90E-04	0.000
8.0	1.0	7.5	85.1	0.39	0.26	0.242	85	1.25	192.3	1.6	181.7	1.0	1293.092	1.63E-04	1.50E-04	0.015	1.06E-03	13.3406	1.01E-03	0.000
9.0	1.0	8.5	85.1	0.43	0.29	0.268	85	1.25	192.3	1.6	172.6	1.0	1338.794	1.71E-04	1.50E-04	0.015	1.13E-03	13.3406	1.07E-03	0.000
10.0	1.0	9.5	117.0	0.48	0.32	0.298	118	1.25	219.3	1.5	226.2	1.0	1548.426	1.62E-04	1.50E-04	0.015	8.16E-04	13.3406	7.74E-04	0.000
11.0	1.0	10.5	117.0	0.54	0.36	0.334	118	1.25	219.3	1.4	213.7	1.0	1608.874	1.72E-04	1.50E-04	0.015	8.74E-04	13.3406	8.29E-04	0.000
12.0	1.0	11.5	117.0	0.60	0.40	0.369	118	1.25	219.3	1.3	203.1	0.9	1665.125	1.81E-04	1.50E-04	0.015	9.29E-04	13.3406	8.81E-04	0.000
13.0	1.0	12.5	117.0	0.66	0.44	0.404	118	1.25	219.3	1.3	193.9	0.9	1717.843	1.89E-04	1.50E-04	0.015	9.82E-04	13.3406	9.32E-04	0.000
14.0	1.0	13.5	117.0	0.72	0.48	0.439	118	1.25	219.3	1.2	185.9	0.9	1767.536	1.96E-04	1.50E-04	0.015	1.03E-03	13.3406	9.80E-04	0.000
15.0	1.0	14.5	117.0	0.77	0.52	0.474	89	1.25	174.0	1.2	145.4	0.9	1693.481	2.18E-04	3.70E-04	0.037	3.42E-03	13.3406	3.25E-03	0.001
16.0	1.0	15.5	117.0	0.83	0.56	0.508	89	1.25	174.0	1.1	140.2	0.9	1735.308	2.25E-04	3.70E-04	0.037	3.57E-03	13.3406	3.39E-03	0.001
17.0	1.0	16.5	117.0	0.89	0.60	0.542	89	1.25	174.0	1.1	135.6	0.9	1775.234	2.31E-04	3.70E-04	0.037	3.72E-03	13.3406	3.53E-03	0.001
18.0	1.0	17.5	117.0	0.95	0.64	0.575	89	1.25	174.0	1.0	131.4	0.9	1813.463	2.37E-04	3.70E-04	0.037	3.86E-03	13.3406	3.67E-03	0.001
19.0	1.0	18.5	117.0	1.01	0.68	0.609	89	1.25	174.0	1.0	127.6	0.9	1850.165	2.42E-04	3.70E-04	0.037	4.00E-03	13.3406	3.80E-03	0.001
20.0	1.0	19.5	128.2	1.07	0.72	0.643	120	1.25	187.1	1.0	183.0	0.9	2148.863	2.18E-04	3.70E-04	0.037	2.60E-03	13.3406	2.46E-03	0.001
21.0	1.0	20.5	128.2	1.13	0.76	0.679	120	1.25	187.1	1.0	177.7	0.9	2190.936	2.22E-04	3.70E-04	0.037	2.69E-03	13.3406	2.55E-03	0.001
22.0	1.0	21.5	128.2	1.20	0.80	0.715	120	1.25	187.1	0.9	172.9	0.9	2231.453	2.27E-04	3.70E-04	0.037	2.78E-03	13.3406	2.64E-03	0.001
23.0	1.0	22.5	126.2	1.26	0.85	0.750	120	1.25	187.1	0.9	168.5	0.9	2270.249	2.31E-04	3.70E-04	0.037	2.87E-03	13.3406	2.72E-03	0.001
24.0	1.0	23.5	126.2	1.33	0.89	0.784	120	1.25	174.2	0.9	175.5	0.9	2358.213	2.30E-04	3.70E-04	0.037	2.73E-03	13.3406	2.59E-03	0.001
25.0	1.0	24.5	126.2	1.39	0.93	0.817	120	1.25	174.2	0.9	171.5	0.9	2395.066	2.33E-04	3.70E-04	0.037	2.81E-03	13.3406	2.66E-03	0.001
26.0	1.0	25.5	126.2	1.45	0.97	0.850	120	1.25	174.2	0.8	167.7	0.9	2430.818	2.37E-04	3.70E-04	0.037	2.88E-03	13.3406	2.74E-03	0.001
27.0	1.0	26.5	126.2	1.51	1.01	0.883	120	1.25	174.2	0.8	164.2	0.9	2465.549	2.40E-04	3.00E-04	0.030	2.40E-03	13.3406	2.28E-03	0.001
28.0	1.0	27.5	126.2	1.58	1.06	0.915	120	1.25	174.2	0.8	160.9	0.9	2499.328	2.42E-04	3.00E-04	0.030	2.46E-03	13.3406	2.33E-03	0.001
29.0	1.0	28.5	126.2	1.64	1.10	0.947	120	1.25	174.2	0.8	157.7	0.9	2532.217	2.45E-04	3.00E-04	0.030	2.52E-03	13.3406	2.39E-03	0.001
30.0	1.0	29.5	125.7	1.70	1.14	0.978	79	1.25	132.9	0.8	106.7	0.9	2264.927	2.80E-04	3.00E-04	0.030	4.02E-03	13.3406	3.82E-03	0.001
31.0	1.0	30.5	125.7	1.77	1.18	1.008	79	1.25	132.9	0.8	104.8	0.9	2292.444	2.82E-04	3.00E-04	0.030	4.11E-03	13.3406	3.90E-03	0.001
32.0	1.0	31.5	125.7	1.83	1.23	1.038	79	1.25	132.9	0.8	103.0	0.9	2319.317	2.85E-04	3.00E-04	0.030	4.20E-03	13.3406	3.98E-03	0.001
33.0	1.0	32.5	125.7	1.89	1.27	1.068	79	1.25	132.9	0.7	101.2	0.9	2345.581	2.87E-04	3.00E-04	0.030	4.29E-03	13.3406	4.07E-03	0.001
34.0	1.0	33.5	125.7	1.95	1.31	1.097	79	1.25	132.9	0.7	99.6	0.8	2371.269	2.89E-04	3.00E-04	0.030	4.37E-03	13.3406	4.15E-03	0.001
35.0	1.0	34.5	125.7	2.02	1.35	1.125	120	1.25	155.0	0.7	149.0	0.8	2755.165	2.53E-04	3.00E-04	0.030	2.70E-03	13.3406	2.56E-03	0.001
36.0	1.0	35.5	125.7	2.08	1.39	1.153	120	1.25	155.0	0.7	146.7	0.8	2783.486	2.54E-04	3.00E-04	0.030	2.75E-03	13.3406	2.60E-03	0.001
37.0	1.0	36.5	125.7	2.14	1.44	1.180	120	1.25	155.0	0.7	144.5	0.8	2811.241	2.55E-04	3.00E-04	0.030	2.80E-03	13.3406	2.65E-03	0.001
38.0	1.0	37.5	125.7	2.21	1.48	1.207	120	1.25	155.0	0.7	142.5	0.8	2838.460	2.57E-04	3.00E-04	0.030	2.84E-03	13.3406	2.70E-03	0.001
39.0	1.0	38.5	125.7	2.27	1.52	1.233	120	1.25	155.0	0.7	140.5	0.8	2865.166	2.58E-04	3.00E-04	0.030	2.89E-03	13.3406	2.74E-03	0.001
40.0	1.0	39.5	125.7	2.33	1.56	1.259	120	1.25	147.5	0.7	138.6	0.8	2891.384	2.59E-04	3.00E-04	0.030	2.94E-03	13.3406	2.79E-03	0.001
41.0	1.0	40.5	125.7	2.39	1.60	1.284	120	1.25	147.5	0.7	136.7	0.8	2917.135	2.60E-04	3.00E-04	0.030	2.99E-03	13.3406	2.83E-03	0.001
42.0	1.0	41.5	125.7	2.46	1.65	1.308	120	1.25	147.5	0.7	135.0	0.8	2942.440	2.60E-04	3.00E-04	0.030	3.03E-03	13.3406	2.88E-03	0.001
43.0	1.0	42.5	125.7	2.52	1.69	1.332	120	1.25	147.5	0.6	133.3	0.8	2967.317	2.61E-04	3.00E-04	0.030	3.08E-03	13.3406	2.92E-03	0.001
44.0	1.0	43.5	125.7	2.58	1.73	1.356	120	1.25	147.5	0.6	131.7	0.8	2991.784	2.62E-04	3.00E-04	0.030	3.13E-03	13.3406	2.97E-03	0.001
45.0	1.0	44.5	108.3	2.64	1.77	1.376	120	1.25	141.1	0.6	130.2	0.8	3014.203	2.62E-04	3.00E-04	0.030	3.17E-03	13.3406	3.01E-03	0.001
46.0	1.0	45.5	108.3	2.70	1.81	1.394	120	1.25	141.1	0.6	128.9	0.8	3034.663	2.62E-04	3.00E-04	0.030	3.21E-03	13.3406	3.04E-03	0.001
47.0	1.0	46.5	108.3	2.75	1.84	1.411	120	1.25	141.1	0.6	127.6	0.8	3054.850	2.62E-04	3.00E-04	0.030	3.25E-03	13.3406	3.08E-03	0.001
48.0	1.0	47.5	108.3	2.80	1.88	1.428	120	1.25	141.1	0.6	126.4	0.8	3074.775	2.62E-04	3.00E-04	0.030	3.28E-03	13.3406	3.12E-03	0.001
49.0	1.0	48.5	108.3	2.86	1.92	1.444	120	1.25	141.1	0.6	125.2	0.8	3094.444	2.61E-04	3.00E-04	0.030	3.32E-03	13.3406	3.15E-03	0.001
50.0	1.0	49.5	108.3	2.91	1.95	1.460	200	1.25	175.7	0.6	206.6	0.8	3691.619	2.20E-04	3.00E-04	0.030	1.82E-03	13.3406	1.73E-03	0.000

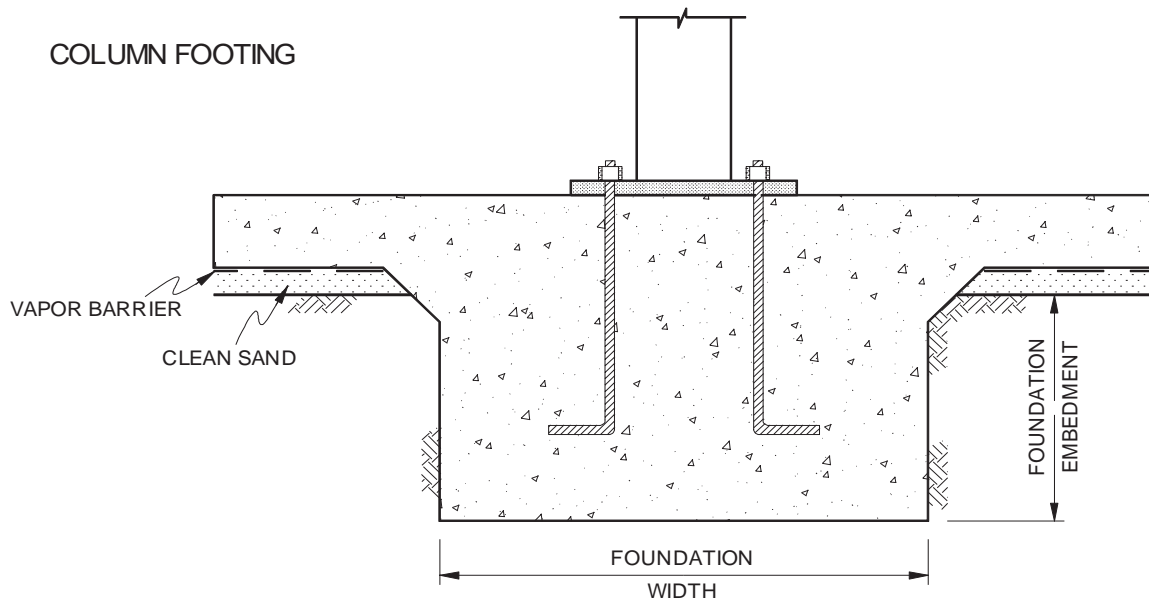
TOTAL SETTLEMENT = 0.03

Figure 3

WALL FOOTING



COLUMN FOOTING



NOTE: SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

GEOCON
WEST, INC.



GEOTECHNICAL ENVIRONMENTAL MATERIALS
41571 CORNING PLACE, SUITE 101, MURRIETA, CA 92562-7065
PHONE 951-304-2300 FAX 951-304-2392

ATS

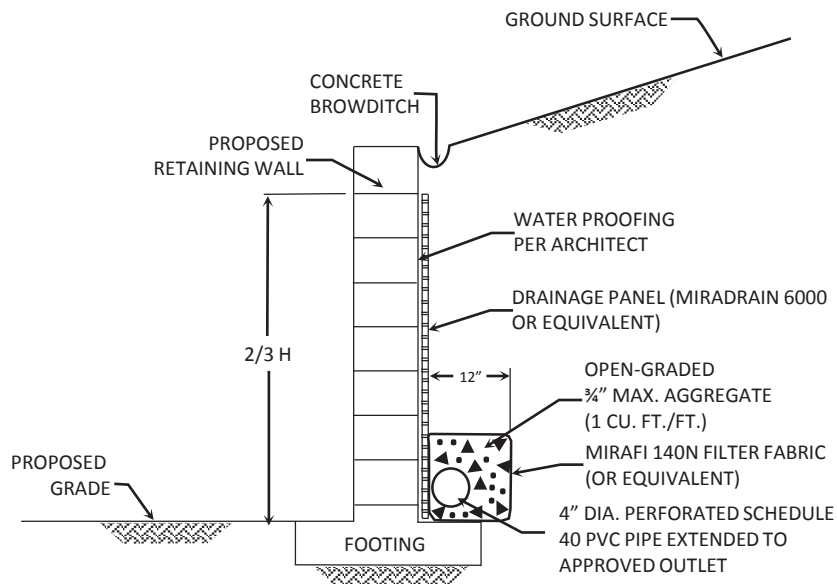
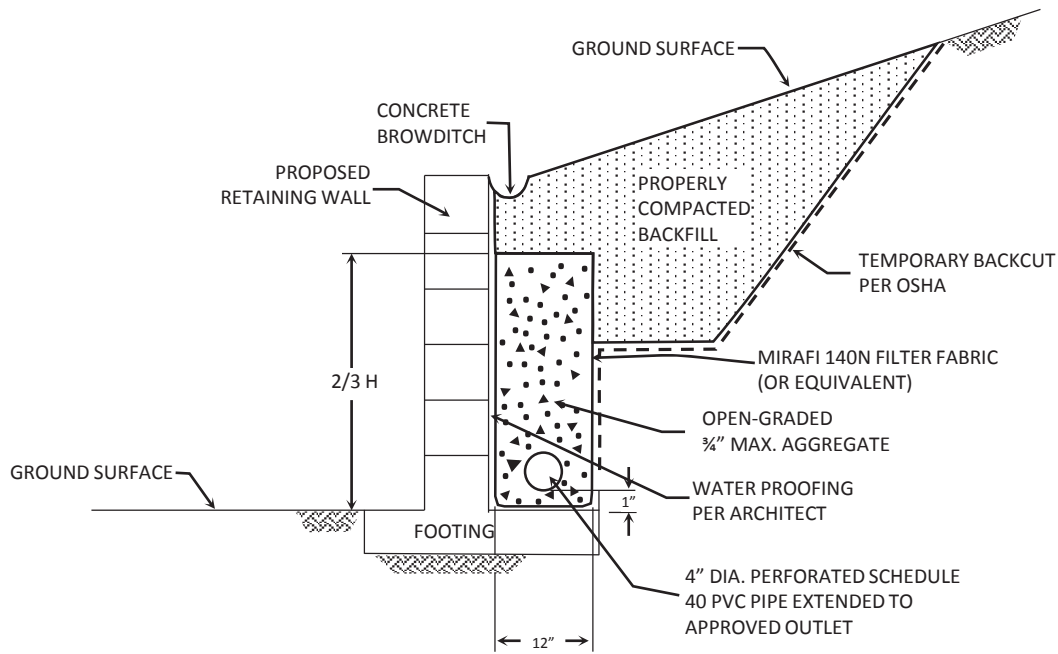
WALL / COLUMN FOOTING DETAIL

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

APRIL, 2019

PROJECT NO. T2858-22-01

FIG. 4



NOTES:

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

CONCRETE BROW DITCH RECOMMENDED FOR SLOPE HEIGHTS GREATER THAN 6 FEET

NO SCALE

GEOCON
WEST, INC.



GEOTECHNICAL ENVIRONMENTAL MATERIALS
41571 CORNING PLACE, SUITE 101, MURRIETA, CA 92562-7065
PHONE 951-304-2300 FAX 951-304-2392

ATS

TYPICAL RETAINING WALL DRAIN DETAIL

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

APRIL, 2019

PROJECT NO. T2859-22-01

FIG. 5

APPENDIX

A

APPENDIX A

FIELD INVESTIGATION

Our field investigation was conducted on March 8 and 11, 2019 and consisted of the drilling of seven exploratory borings at the location of the proposed Frisbie Park sewer lift station and appurtenant improvements. The borings were drilled to the maximum depth explored of approximately 50¼ feet below the existing ground surface utilizing a truck mounted hollow-stem augur drilling machine. We collected bulk samples, and relatively undisturbed samples from the borings by driving a 3-inch O. D. California Modified Sampler into the “undisturbed” soil mass with blows from a 140-pound auto-hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by 2³/₈-inch inside diameter brass sampler rings to facilitate removal and testing. Relatively undisturbed samples and bulk samples of disturbed soils were transported to our laboratory for testing.

The soil conditions encountered in the borings were visually examined, classified and logged in general accordance with the Unified Soil Classification System (USCS). Figures A-1 through A-7 present the boring logs. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. Figure 2 indicates the approximate locations of our borings.









DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-1 ELEV. (MSL.) <u>1304</u> DATE COMPLETED <u>03/08/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-1@0-5'			SM	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Silty SAND with trace gravel, loose, wet, brown; fine sand with little coarse sand			
2	B-1@2.5'			SP-SM	Poorly-graded SAND with silt and trace gravel, medium dense, wet, olive brown; fine to medium sand with few coarse sand; 5" boulder encountered -increase gravel	24	110.8	8.5
4	B-1@5'				-becomes very dense	74/10"		4.8
6	B-1@7.5'				-becomes moist, olive gray; fine to coarse sand; some gravel; some cobbles	85		
8	B-1@10'				-becomes damp; fine to medium sand with few coarse sand	98/10"	114.4	2.3
10	B-1@15'				-becomes dark olive gray	82/11"		
12								
14								
16	B-1@20'			GP	Poorly-graded GRAVEL, very dense, damp, light gray; coarse gravel; granitic clast	50/5"		
18								
20								
22								
24	B-1@25'			SP	Poorly-graded SAND with few gravel, very dense, damp, olive brown; fine to medium sand; little cobbles	50/5"		
26								
28								

Figure A-1,
Log of Boring B-1, Page 1 of 2

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

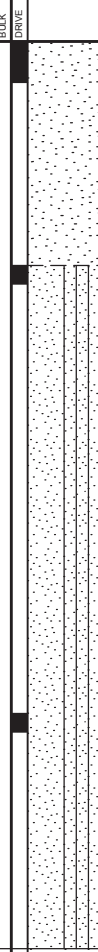
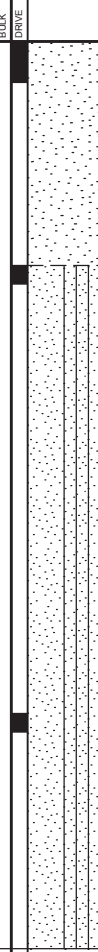
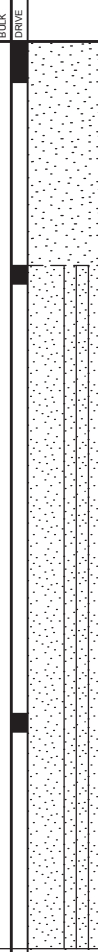
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-1 ELEV. (MSL.) <u>1304</u> DATE COMPLETED <u>03/08/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B-1@30'			SP	Poorly-graded SAND with little gravel, very dense, wet, olive brown; fine to medium sand; few cobbles	72/11"	123.3	2.0
32								
34								
36	B-1@35'			SP-SM	Poorly-graded SAND with silt and some gravel, very dense, wet, olive brown; fine to coarse sand; few cobbles	50/5"		
38								
40	B-1@40'					50/5"		
42								
44								
46	B-1@45'					50/5"	105.0	3.1
48								
50	B-1@50'				Total Depth = 50'-3" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings on 03/08/2019	50/3"		

Figure A-1,
Log of Boring B-1, Page 2 of 2

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-2 ELEV. (MSL.) <u>1305</u> DATE COMPLETED <u>03/08/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
2	B-2@2.5'			SM	YOUNG ALLUVIAL FAN DEPOSITS (Q _{yt}) Silty SAND with few gravel, loose, moist, olive brown; fine sand with trace coarse sand	7	106.7	13.8
4					-increase cobbles			
6	B-2@5' B-2@5-10'			ML	Sandy SILT with few gravel, stiff, moist, olive; fine to medium sand; few cobbles	21	111.7	10.9
8	B-2@7.5'			SM	Silty SAND with few gravel, very dense, moist, olive brown; fine sand with few coarse sand; few cobbles	76/11"	125.1	9.4
10	B-2@10'			SP	Poorly-graded SAND with few gravel, very dense, moist, olive brown; fine to coarse sand; trace cobbles	85		
12								
14	B-2@15'			GP	Poorly-graded GRAVEL, very dense, damp, light gray; medium to coarse gravel; some cobbles	50/2"	124.5	3.0
16								
18								
20	B-2@20'			SP	Poorly-graded SAND with few gravel, very dense, moist, olive gray; trace cobbles	77/10"		
22								
24								
26	B-2@25'				-becomes damp	50/5"	123.8	1.9
28								

Figure A-2,
Log of Boring B-2, Page 1 of 2

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS

 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

GEOCON

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-3 ELEV. (MSL.) <u>1305</u> DATE COMPLETED <u>03/08/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-3@0-5'			SP-SM	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Poorly-graded SAND with silt and few gravel, medium dense, moist, olive brown; fine sand with few medium and coarse sand; few cobbles			
2	B-3@2.5'				-becomes dense, damp	65	139.7	2.7
4	B-3@5'				-becomes moist; fine to coarse sand; some gravel	50	103.9	7.0
6	B-3@7.5'				-becomes very dense, damp; few gravel	50/5"	115.1	4.2
8	B-3@10'				-becomes fine sand with little coarse sand	50/5"		
10								
12								
					Total Depth = 13' Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings on 03/08/2019			

Figure A-3,
Log of Boring B-3, Page 1 of 1

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-4 ELEV. (MSL.) <u>1320</u> DATE COMPLETED <u>03/11/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
0				SP-SM	PAVEMENT 5" Asphalt Concrete 4" Base Material			
2				SP	UNDOCUMENTED FILL (afu) Poorly-graded SAND with silt and little gravel, medium dense, damp, light grayish brown; fine sand with few medium and coarse sand; trace cobbles			
4					Poorly-graded SAND with little gravel, medium dense, moist, olive brown; fine to medium sand; trace cobbles; granitic clast	42	132.4	4.5
6	B-4@5'							
8				SP	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Poorly-graded SAND with few gravel, very dense, moist, pale yellow; fine to coarse sand; trace cobbles			
10	B-4@10'					95/11"		
12	B-4@10-15'							
14				SW	Well-graded SAND with trace gravel, very dense, wet, pale yellow; fine to coarse; trace cobbles			
16	B-4@15'				-becomes saturated	98/11"	110.9	17.5
18								
20	B-4@20'				-few gravel; few cobbles	97/12"		
					Total Depth = 21' Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings and AC capped on 03/11/2019			

Figure A-4,
Log of Boring B-4, Page 1 of 1

T2858-22-01 BORING LOGS.GPJ


SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-5 ELEV. (MSL.) <u>1306</u> DATE COMPLETED <u>03/11/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
0				SP-SM	PAVEMENT 5" Asphalt Concrete No Base Material			
2					UNDOCUMENTED FILL (afu) Poorly-graded SAND with silt and trace gravel, medium dense, moist, light brown; fine sand with trace coarse sand; trace cobbles			
4				SP	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Poorly-graded SAND with few gravel, dense, moist, olive brown; fine to medium sand with little coarse sand; trace cobbles			
6	B-5@5'				-increase cobbles	42	119.1	3.0
8								
10	B-5@10'				-becomes very dense, light olive brown; trace gravel; little cobbles	100/7"		
12	B-5@10-15'							
14								
16	B-5@15'				-becomes light olive gray; fine to medium sand with little coarse sand	50/4"	124.8	3.5
18								
20	B-5@20'				-fine sand with little medium to coarse sand	50/4"		
					Total Depth = 20'-6" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings and AC capped on 03/11/2019			

Figure A-5,
Log of Boring B-5, Page 1 of 1

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-6 ELEV. (MSL.) <u>1311</u> DATE COMPLETED <u>03/11/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
0					PAVEMENT 6" Asphalt Concrete			
2				SP-SM	7" Base Material			
4					UNDOCUMENTED FILL (afu) Poorly-graded SAND with silt and some gravel, medium dense, moist, light brown; fine sand with some coarse sand; few cobbles -boulder encountered			
6	B-6@5'				-becomes wet; rootlets	22	100.1	8.3
8				SP	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Poorly-graded SAND with some gravel, dense, wet, light olive gray; fine to coarse sand; some cobbles			
10	B-6@10'				-becomes damp	57	128.6	2.0
12					-decrease cobbles			
14								
16	B-6@15'				-fine to medium sand with little coarse sand; few cobbles	52		
18								
20	B-6@20'				-becomes moist; few gravel; trace cobbles	60	119.9	4.0
					Total Depth = 21'-6" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings and AC capped on 03/11/2019			

Figure A-6,
Log of Boring B-6, Page 1 of 1

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS			□ ... SAMPLING UNSUCCESSFUL	□ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	■ ... CHUNK SAMPLE			▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-7 ELEV. (MSL.) <u>1327</u> DATE COMPLETED <u>03/11/2019</u> EQUIPMENT <u>HOLLOW STEM AUGER</u> BY: <u>A. Shoashekan</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					MATERIAL DESCRIPTION			
0				SP-SM	PAVEMENT 6" Asphalt Concrete No Base Material			
2					UNDOCUMENTED FILL (afu) Poorly-graded SAND with silt and few gravel, loose, damp, light brown; fine sand with few coarse sand			
4								
6	B-7@5'				-becomes moist, olive brown; fine sand; trace gravel	8	117.7	4.5
8				SP	YOUNG ALLUVIAL FAN DEPOSITS (Qyf) Poorly-graded SAND with few gravel, medium dense, moist, light olive brown; fine to medium sand with few coarse sand			
10	B-7@10'					22		
12	B-7@10-15'							
14								
16	B-7@15'				-becomes very dense, olive; fine to coarse sand	87	130.3	3.6
18								
20	B-7@20'				-contains fine to medium sand with little coarse sand; few cobbles	92/10"		
					Total Depth = 20' - 10" Groundwater not encountered Penetration resistance for 140-lb. hammer falling 30" by auto-hammer Backfilled with cuttings and AC capped on 03/11/2019			

Figure A-7,
Log of Boring B-7, Page 1 of 1

T2858-22-01 BORING LOGS.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX

**B**

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in general accordance with test methods of ASTM International (ASTM), Caltrans test methods, or other suggested procedures. Selected samples were tested to evaluate in-situ dry density and moisture content, maximum dry density and optimum moisture content, grain size distribution, consolidation characteristics, expansion index, corrosivity, sand equivalency, and in-situ and remolded direct shear. The results of our laboratory tests are presented on Figures B-1 through B-5. The in-place dry density and moisture content of the samples tested are presented on the boring logs in *Appendix A*.

**SUMMARY OF LABORATORY MAXIMUM DRY DENSITY
AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D1557**

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% of dry wt.)
B-1 @ 0-5'	Poorly-graded SAND with silt and trace gravel, brown	136.7	6.8

**SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D4829**

Sample No.	Moisture Content		After Test Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B-1 @ 0-5'	8.5	12.6	115.7	0

SUMMARY OF CORROSIVITY TEST RESULTS

Sample No.	Chloride Content (ppm)	Sulfate Content (%)	pH	Resistivity (ohm-centimeter)
B-1 @ 0-5'	510	0.000	6.7	3,500

Chloride content determined by California Test 422.

Water-soluble sulfate determined by California Test 417.

Resistivity and pH determined by Caltrans Test 643.

**SUMMARY OF LABORATORY SAND EQUIVALENT TEST RESULTS
ASTM D 2419**

Sample No.	Soil Description	Sand Equivalent
B-4 @ 5'	Poorly-graded SAND with little gravel, olive brown, trace cobbles	60

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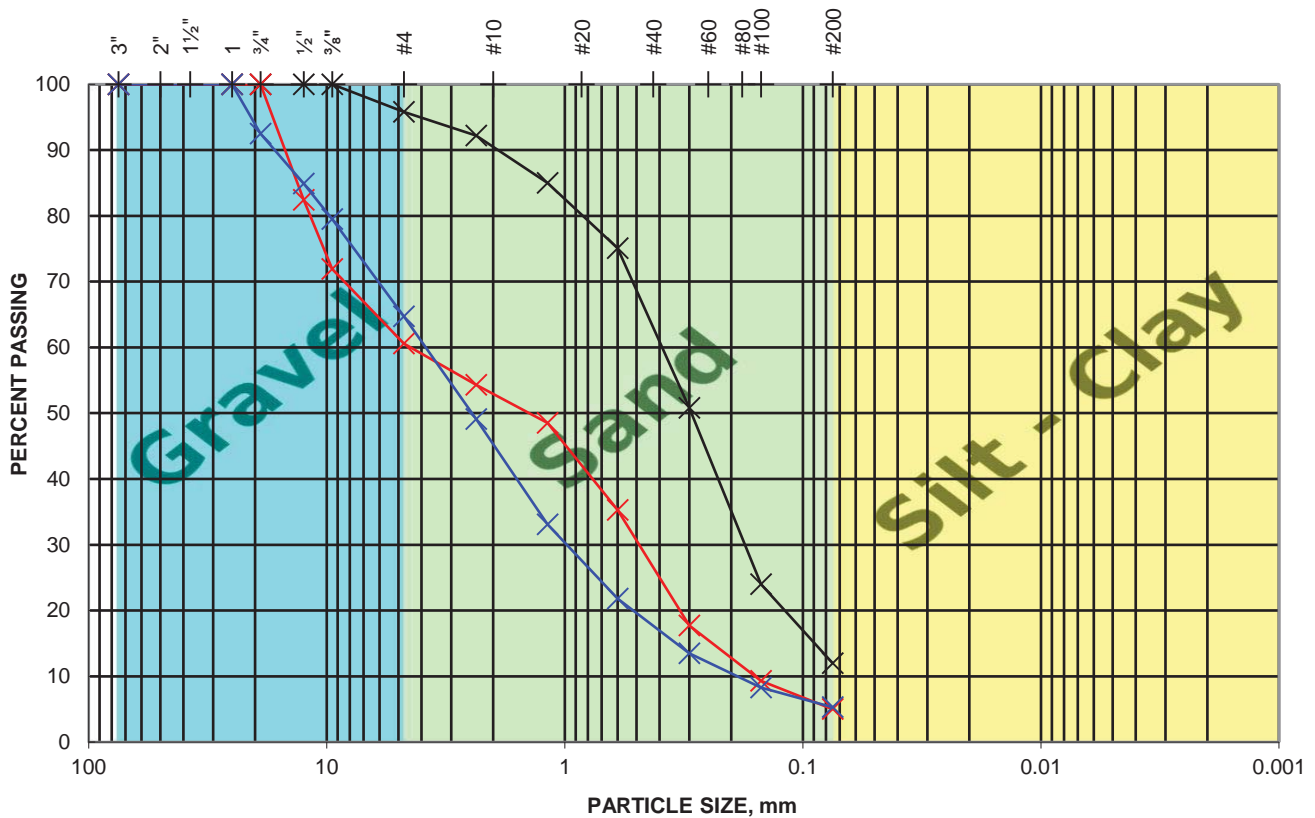
LABORATORY TEST RESULTS

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

APRIL 2019

PROJECT NO. T2858-22-01

FIG B-1



SAMPLE ID	SAMPLE DESCRIPTION
B-1 @ 2.5'	Poorly-graded SAND with silt and trace gravel
B-1 @ 10'	Poorly-graded SAND with silt and some gravel
B-1 @ 35'	Poorly-graded SAND with silt and some gravel

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GRAIN SIZE DISTRIBUTION

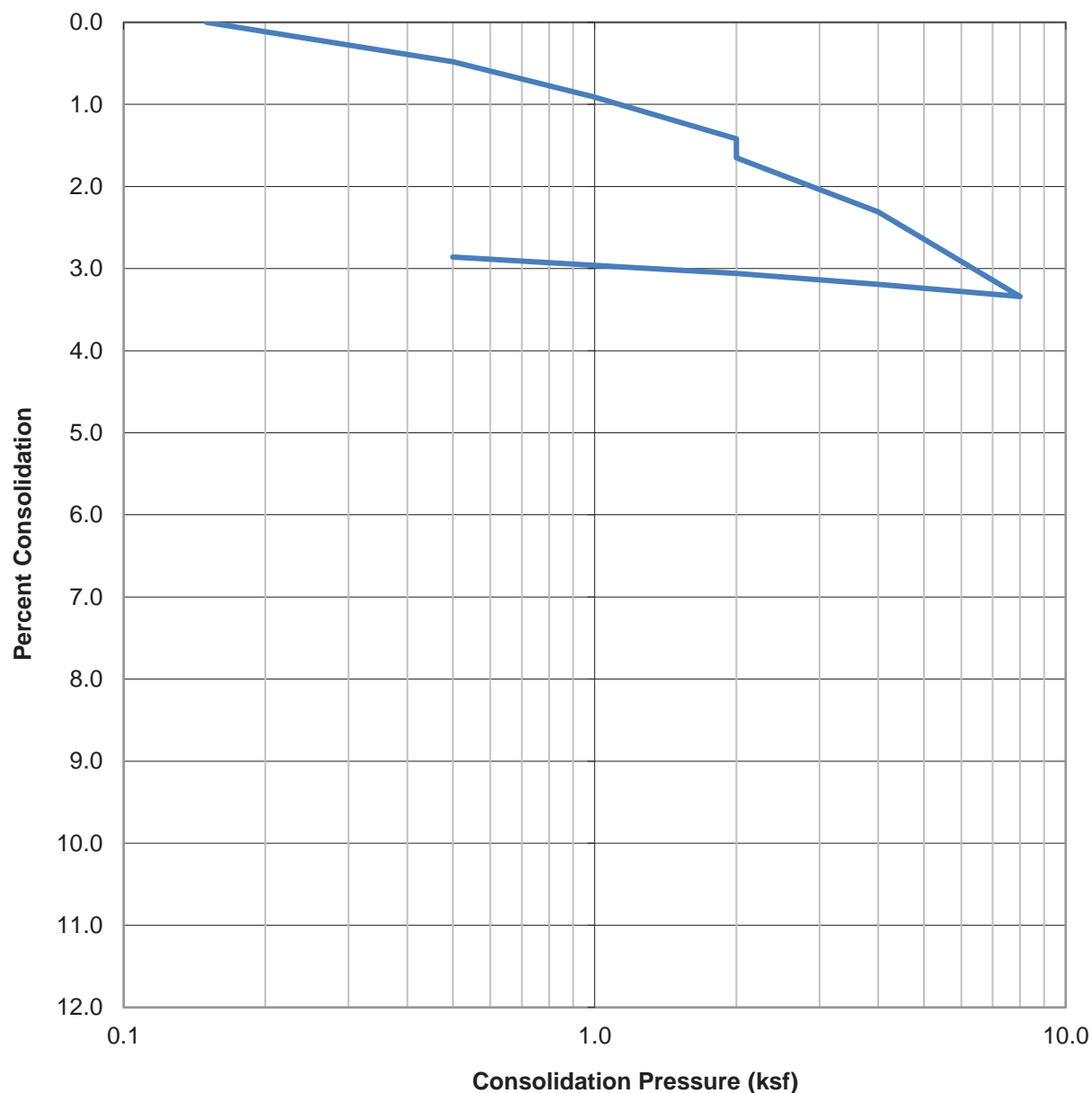
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FIG B-2

WATER ADDED AT 2 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2 @ 2.5'	SM	106.7	13.8	16.3

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CONSOLIDATION TEST RESULTS

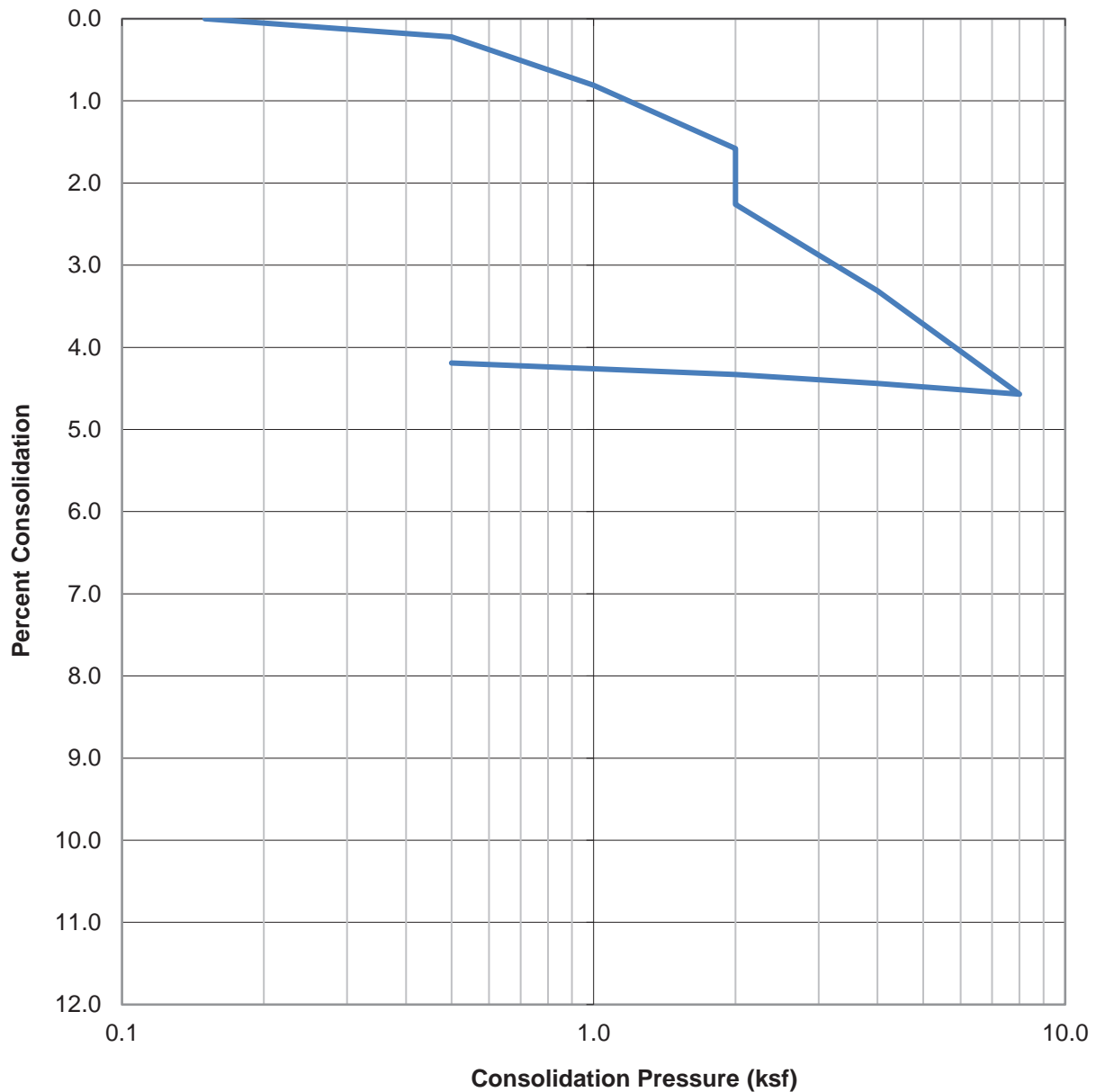
FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

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PROJECT NO. T2858-22-01

FIG B-3

WATER ADDED AT 2 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3 @ 5'	SP-SM	103.9	7.0	14.6

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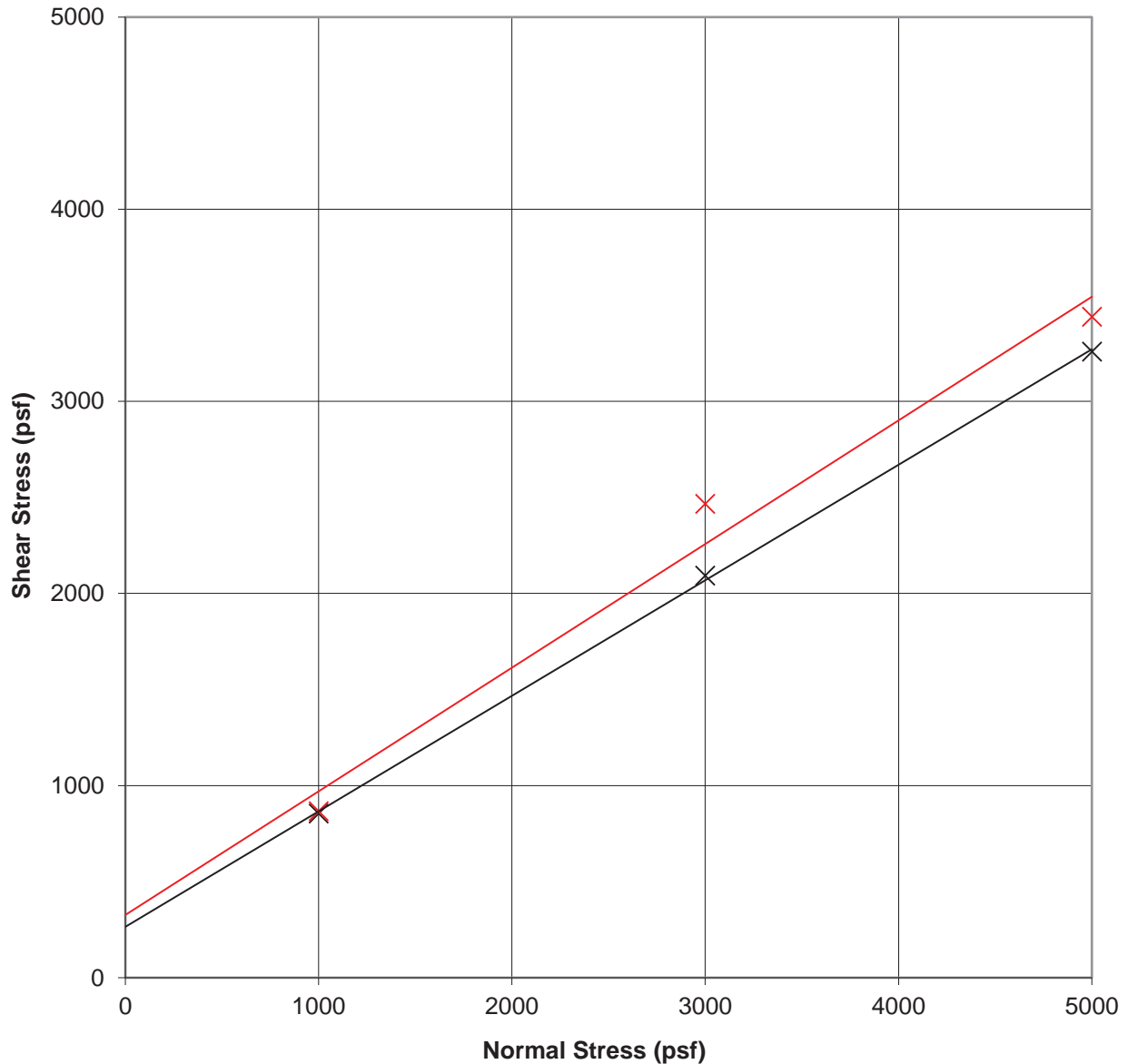
CONSOLIDATION TEST RESULTS

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

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PROJECT NO. T2858-22-01

FIG B-4



SAMPLE ID	SOIL TYPE	INITIAL DRY DENSITY (pcf)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)	C (psf)	ϕ (deg)
*B-1 @ 0-5'	SP-SM	114.3	9.7	13.3	260	31
B-7 @ 5'	SP-SM	117.7	4.5	15.8	330	33

*Sample removed to approximately 90% of the test maximum dry density at optimum moisture content.

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DIRECT SHEAR TEST RESULTS

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

APRIL 2019

PROJECT NO. T2858-22-01

FIG B-5

APPENDIX

A teal pennant graphic pointing to the left, containing the letter 'C' in white.

C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

FRISBIE PARK SEWER LIFT STATION
EAST EASTON STREET AND
NORTH EUCALYPTUS AVENUE
RIALTO, CALIFORNIA

PROJECT NO. T2858-22-01

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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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.

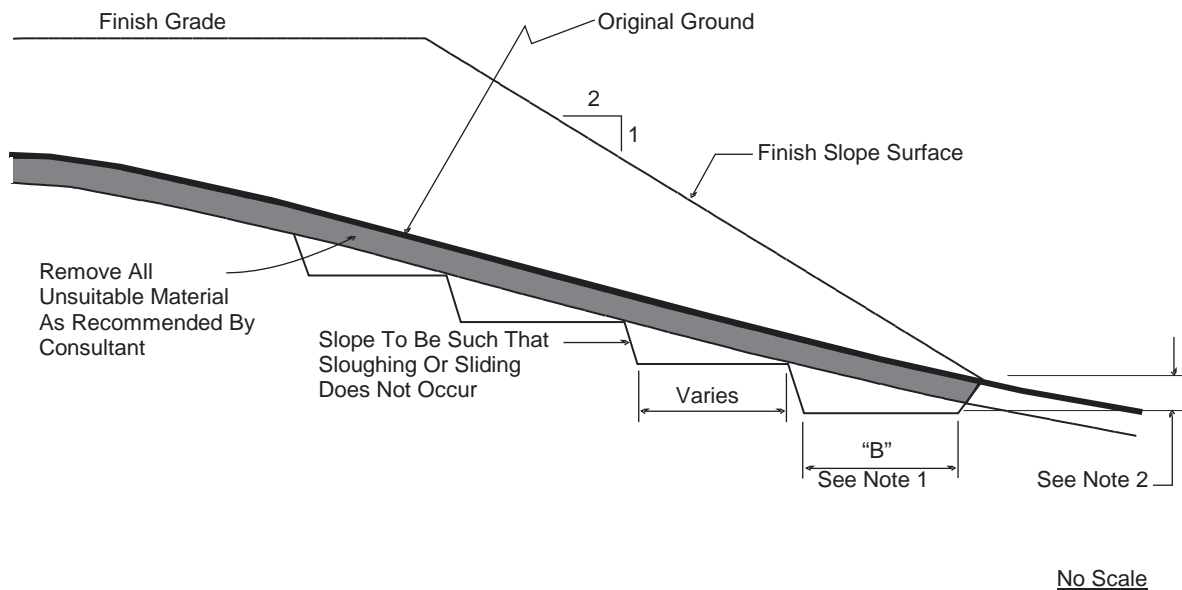
- 3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker 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



- 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

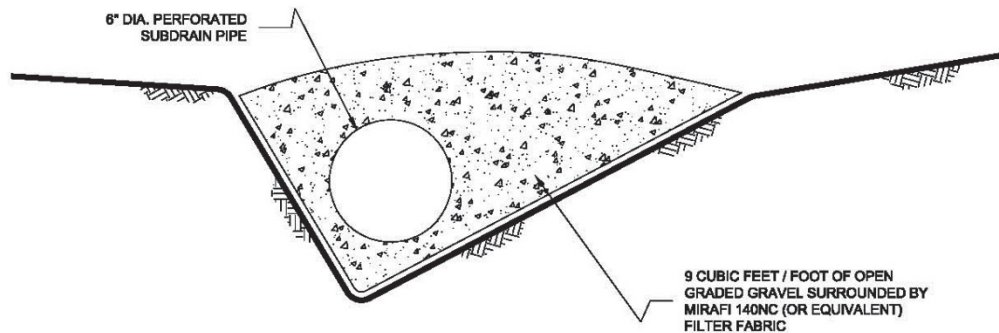
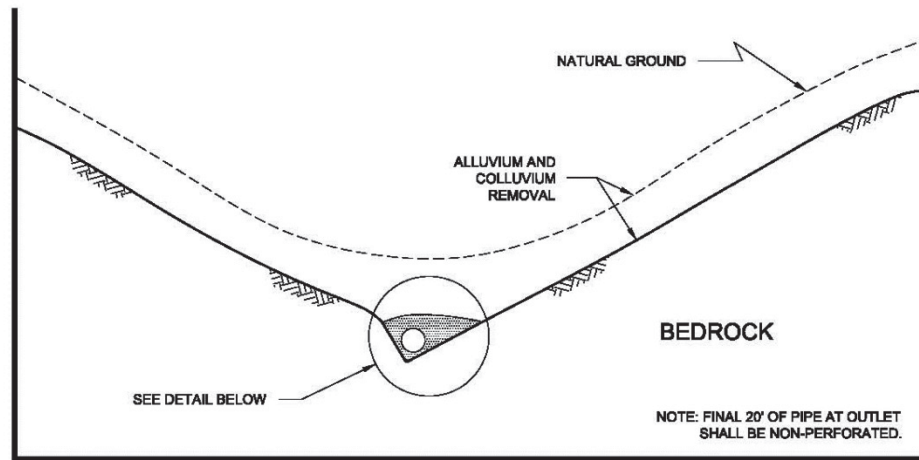
variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

- 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



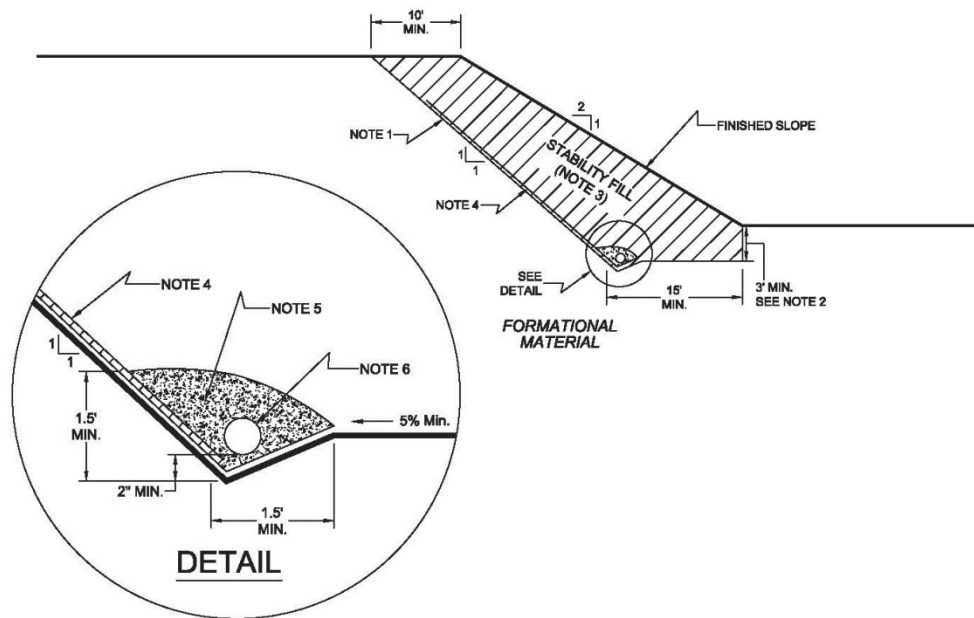
NOTES:

- 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 larger) 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.

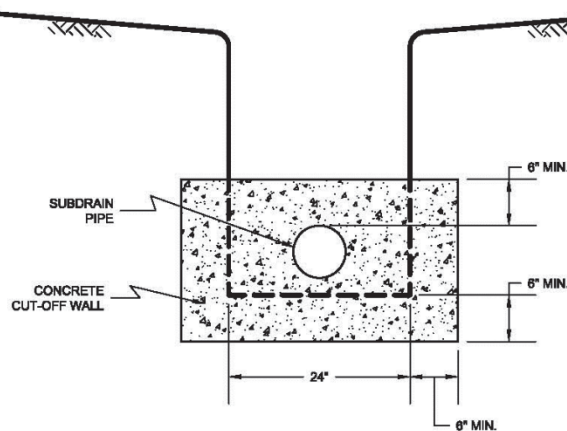
NO SCALE

- 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.

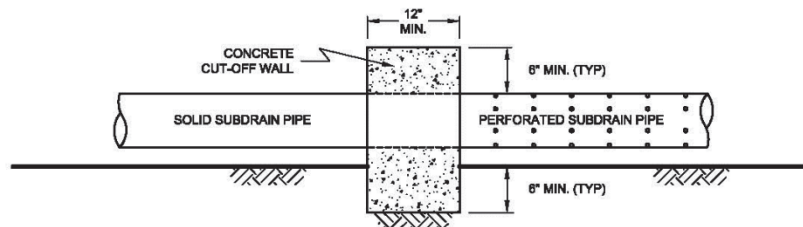
- 7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



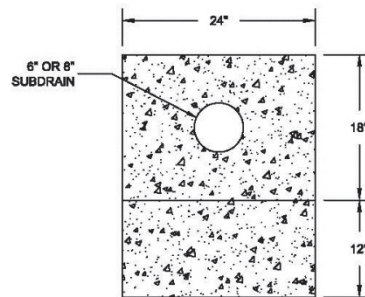
SIDE VIEW



- 7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

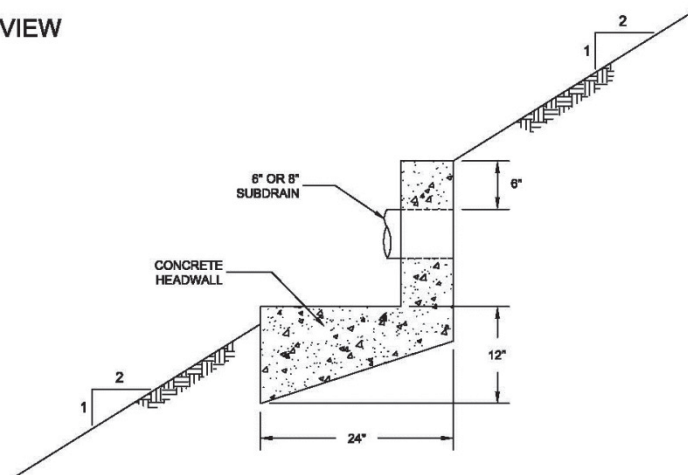
TYPICAL HEADWALL DETAIL

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.

STANDARDS AND PLANS: PLAN:

ALL CONSTRUCTION AND PLANS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE CITY OF RIALTO, STANDARD SPECIFICATIONS AND DETAILS, WITH THESE PLANS, THE PROJECT SPECIFICATIONS, AND UNLESS SHOWN OR SPECIFIED OTHERWISE, WITH THE LATEST EDITIONS OF THE STATE ("CALTRANS") STANDARD SPECIFICATIONS AND STANDARD PLANS, SIGN SPECIFICATION SHEETS AND TRAFFIC MANUAL.

IT IS INTENDED THAT THESE PLANS AND SPECIFICATIONS REQUIRE ALL LABOR AND MATERIALS NECESSARY AND PROPER FOR THE WORK CONTEMPLATED AND THAT THE WORK BE COMPLETED IN ACCORDANCE WITH THEIR TRUE INTENT AND PURPOSE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY REGARDING ANY DISCREPANCIES OR AMBIGUITIES WHICH MAY EXIST IN THE PLANS OR SPECIFICATIONS. THE ENGINEER'S INTERPRETATION OR CORRECTION THEREOF SHALL BE CONCLUSIVE.

WHERE THE PLANS OR SPECIFICATIONS DESCRIBE PORTIONS OF THE WORK IN GENERAL TERMS BUT NOT IN COMPLETE DETAIL, IT IS UNDERSTOOD THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIALS AND WORKMANSHIP OF THE FIRST QUALITY ARE TO BE USED.

THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

2. EXISTING UTILITIES AND COORDINATION OF WORK:

THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE IMPROVEMENT PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY, THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. KIMLEY-HORN AND ASSOCIATES, INC., HEREINAFTER DESIGNATED AS THE ENGINEER, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF SUCH UNDERGROUND UTILITIES, NOR FOR THE EXISTENCE OF OTHER BURIED OBJECTS OR UTILITIES WHICH ARE NOT SHOWN ON THESE DRAWINGS.

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE UTILITY COMPANIES INVOLVED AND REQUESTING A VISUAL VERIFICATION OF THE LOCATIONS OF THEIR UNDERGROUND FACILITIES. THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR OF THE SCHEDULED TIME AND PLACE OF SUCH VISUAL VERIFICATION TO ENABLE SAID FIRM TO HAVE A REPRESENTATIVE PRESENT.

THE CITY IS A MEMBER OF THE UNDERGROUND SERVICE ALERT (U.S.A.) ONE-CALL PROGRAM. THE CONTRACTOR OR ANY SUBCONTRACTOR FOR THIS CONTRACT SHALL NOTIFY MEMBERS OF U.S.A. 48 HOURS IN ADVANCE OF PERFORMING EXCAVATION WORK BY CALLING THE TOLL-FREE NUMBER 1-800-227-2600.

3. CONFLICTS:

THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO PERFORMING ANY CORRECTIVE ACTION REQUIRED DUE TO UNFORESEEN CONFLICTS IN THE IMPROVEMENT PLANS OR DUE TO POSSIBLE STAKING ERRORS. THE ENGINEER ASSUMES NO LIABILITY FOR THE COST OR DESIGN OF ANY MODIFICATION PERFORMED WITHOUT SUCH NOTIFICATION, AND ALSO ASSUMES NO LIABILITY FOR STAKING PROVIDED BY OTHERS.

4. CONTROL POINTS AND SURVEY MONUMENTS:

CERTAIN CONTROL POINTS WILL BE SET BY THE ENGINEER, OR ITS REPRESENTATIVE, WHICH ARE CRITICAL TO THE CONSTRUCTION STAKING OF THE PROJECT. THESE POINTS WILL BE DESIGNATED AT A PRE-CONSTRUCTION CONFERENCE BETWEEN REPRESENTATIVES OF THE ENGINEER AND THE CONTRACTOR. THE CONTROL POINTS WILL BE CLEARLY MARKED ON THE JOB SITE. THE CONSTRUCTION SHALL NOT DISTURB THE CONTROL POINTS IN ANY MANNER. IF IT BECOMES NECESSARY TO REMOVE SAID CONTROL POINTS DURING CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER 48 HOURS IN ADVANCE OF SAID REMOVAL TO ALLOW FOR REFERENCING SAID CONTROL POINTS AND THEIR EVENTUAL REPLACEMENT. IF CONTROL POINTS ARE REMOVED OR DESTROYED WITHOUT SAID NOTIFICATION, THE COST OF REPLACEMENT SHALL BE DEDUCTED FROM THE CONTRACTOR'S PAYMENT, AND PAYMENT SHALL BE MADE BY OWNER TO THE ENGINEER.

5. OBSTRUCTIONS:

THE CONTRACTOR SHALL REMOVE ALL OBSTRUCTIONS, BOTH ABOVE GROUND AND UNDERGROUND, EXCEPT AS NOTED IN ITEM 2 ABOVE, AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED IMPROVEMENT.

ALL UNSUITABLE AND SURPLUS MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE UNLESS SPECIFIED OTHERWISE.

TREE AND STUMP REMOVAL SHALL INCLUDE REMOVAL OF THE MAJOR ROOT SYSTEM TO THE SATISFACTION OF THE CITY ENGINEER. SUCH REMOVAL SHALL BE PERFORMED WITHOUT DAMAGE TO ADJACENT TREES THAT ARE TO BE PRESERVED. STUMP REMOVAL WITH THE DRIP LINE OF A TREE TO BE REMOVED SHALL BE BY GRINDING METHOD TO A DEPTH OF 0.5 FEET BELOW ADJACENT GRADE EXISTING OR PROPOSED WHICH EVER IS DEEPER.

ALL WELLS AND SEPTIC SYSTEMS FOUND ON THE SITE SHALL BE ABANDONED IN ACCORDANCE WITH COUNTY HEALTH DEPARTMENT STANDARDS.

6. PUBLIC SAFETY AND TRAFFIC CONTROL:

CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ANY CURRENTLY APPLICABLE SAFETY LAW OF ANY JURISDICTIONAL BODY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL BARRICADES, SAFETY DEVICES, AND CONTROL OF TRAFFIC WITHIN AND AROUND THE CONSTRUCTION AREA. FOR ALL TRENCH EXCAVATIONS 5 FEET OR MORE IN DEPTH, THE CONTRACTOR SHALL OBTAIN A PERMIT FROM THE DIVISION OF INDUSTRIAL SAFETY, PRIOR TO BEGINNING ANY EXCAVATION.

PUBLIC SAFETY AND TRAFFIC CONTROL SHALL BE PROVIDED IN ACCORDANCE WITH THE CALTRANS TRAFFIC MANUAL (SEE CHAPTER 5: MANUAL OF TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE WORK ZONES). SAFE VEHICULAR AND PEDESTRIAN ACCESS SHALL BE PROVIDED AT ALL TIMES DURING CONSTRUCTION.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONALS HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.

7. ENCROACHMENT PERMITS:

UNLESS SPECIFIED OTHERWISE, THE CONTRACTOR SHALL OBTAIN THE NECESSARY ENCROACHMENT PERMITS FROM THE CITY, COUNTY, CALTRANS AND ALL OTHER AGENCIES HAVING JURISDICTION PRIOR TO COMMENCING ANY WORK. THE CONTRACTOR SHALL NOTIFY THE CITY AT LEAST 48 HOURS PRIOR TO THE INTENT TO COMMENCE WORK.

8. PIPELINES

ANY EXISTING UTILITY, WHICH IS TO BE EXTENDED, WHICH IS THE CONNECTION POINT FOR NEW UNDERGROUND UTILITIES, OR WHICH NEW FACILITIES CROSS, SHALL BE EXPOSED BY THE CONTRACTOR PRIOR TO PLACEMENT OF THE NEW UTILITIES. COST OF SUCH EXCAVATION AND SUBSEQUENT BACKFILL SHALL BE INCLUDED IN THE PRICES PAID FOR THE VARIOUS ITEMS OF WORK. THE ELEVATIONS AND LOCATIONS OF THE EXISTING FACILITIES WILL BE CHECKED BY THE PUBLIC WORKS INSPECTOR AND THE ENGINEER. IF IN THE OPINION OF THE INSPECTOR A CONFLICT EXISTS, THEN THE ENGINEER SHALL MAKE ANY NEEDED GRADE AND/OR ALIGNMENT ADJUSTMENTS AND REVISE THE PLANS ACCORDINGLY. ALL GRAVITY FLOW PIPELINES TO BE LAID UPGRADE FROM THE LOWEST POINT STARTING AT THE END OF EXISTING IMPROVEMENTS.

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 24 HOURS PRIOR TO BACKFILLING OF ANY PIPE WHICH STUBS TO A FUTURE PHASE OF CONSTRUCTION FOR INVERT VERIFICATION. TOLERANCE SHALL BE IN ACCORDANCE WITH CITY STANDARD SPECIFICATIONS.

- ADJUSTING MANHOLES, VALVE AND MONUMENT BOXES:

THE CONTRACTOR SHALL ADJUST AND/OR RECONSTRUCT TO GRADE, ALL EXISTING UTILITY STRUCTURES, INCLUDING MANHOLES AND VALVE BOXES AND MONUMENT BOXES, WITHIN THE WORK AREA UNLESS NOTED OTHERWISE.
10. STORM DRAIN SYSTEM:

F. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING DRAINAGE FACILITIES WITHIN THE CONSTRUCTION AREA UNTIL THE DRAINAGE IMPROVEMENTS ARE IN PLACE AND FUNCTIONING AND ACCEPTED BY THE CITY.

G. STORM DRAIN PIPE SHALL BE HDPE, UNLESS OTHERWISE SHOWN ON PLAN, AND FITTINGS INSTALLED IN ACCORDANCE WITH THESE PLANS AND THE MANUFACTURER'S RECOMMENDATIONS.

H. EACH STUB END PIPE SHALL BE PLUGGED WITH A PREFABRICATED, WATERTIGHT PLUG.

I. TRENCH EXCAVATION, BEDDING AND BACKFILL SHALL COMPLY WITH CITY STANDARDS AND PROJECT GEOTECHNICAL REPORT.
11. PRESERVATION OF PROPERTY:


TREES AND SHRUBBERY THAT ARE NOT TO BE REMOVED, AND POLE LINES, FENCES, SIGNS, SURVEY MARKERS AND MONUMENTS, BUILDINGS AND STRUCTURES, CONDUITS, PIPELINES, ALL STREET FACILITIES, AND ANY OTHER IMPROVEMENTS OR FACILITIES WITHIN OR ADJACENT TO THE STREET OR CONSTRUCTION AREA SHALL BE PROTECTED FROM INJURY OR DAMAGE, AND UPON ORDER BY THE CITY ENGINEER, THE CONTRACTOR SHALL PROVIDE AND INSTALL SAFE-GUARDS APPROVED BY THE CITY ENGINEER TO PROTECT SUCH OBJECTS FROM INJURY OR DAMAGE. IF SUCH OBJECTS ARE INJURED OR DAMAGED BY REASON OF THE CONTRACTOR'S OPERATIONS, THEY SHALL BE REPLACED OR RESTORED AT THE CONTRACTOR'S EXPENSE. THE FACILITIES SHALL BE REPLACED OR RESTORED TO A CONDITION AS GOOD AS WHEN THE CONTRACTOR ENTERED UPON THE WORK, OR AS GOOD AS REQUIRED BY THE SPECIFICATION ACCOMPANYING THE CONTRACT, IF ANY SUCH OBJECTS ARE A PART OF THE WORK BEING PERFORMED UNDER CONTRACT. THE CITY ENGINEER MAY MAKE OR CAUSE TO BE MADE SUCH TEMPORARY REPAIRS AS ARE NECESSARY TO RESTORE TO SERVICE ANY DAMAGED FACILITY. THE COST OF SUCH REPAIRS SHALL BE BORNE BY THE CONTRACTOR.
12. DEMOLITION:

EXISTING FEATURES THAT ENCOMBER THE PROPOSED CONSTRUCTION AREA ARE INTENDED TO BE SHOWN AND SCHEDULED FOR REMOVAL. SOME INCIDENTAL ITEMS MAY HAVE BEEN INADVERTENTLY OMITTED FROM THE PLAN. THE CONTRACTOR IS ENCOURAGED TO THOROUGHLY INSPECT THE SITE AS WELL AS REVIEW THE PLANS AND SPECIFICATIONS.

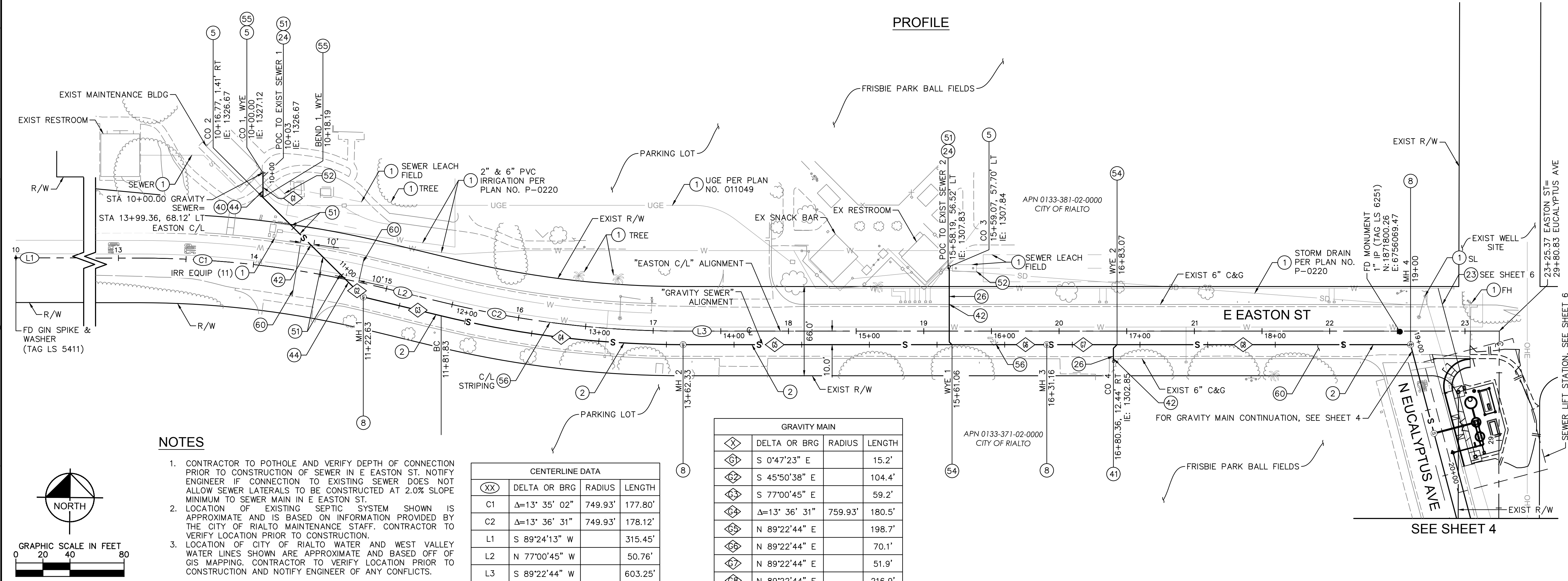
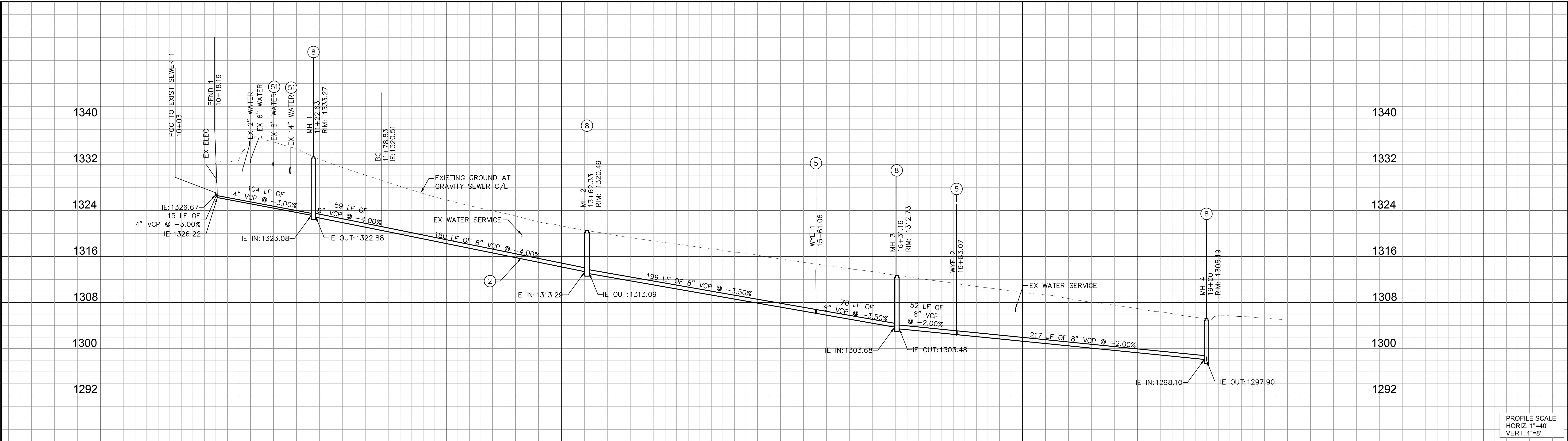
THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO COMMENCING CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES FOR ONSITE LOCATIONS OF EXISTING UTILITIES AND FIELD VERIFY ALL UNDERGROUND UTILITIES.
13. DAMAGE TO ALL EXISTING CONDITIONS TO REMAIN WILL BE REPLACED/RESTORED TO ORIGINAL CONDITION AT CONTRACTOR'S EXPENSE.

3. ALL FILL MATERIAL IS TO BE IN PLACE AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
2. CONTRACTOR SHALL NOTIFY THE UTILITIES AUTHORITY INSPECTOR 72 HOURS BEFORE CONNECTING TO ANY EXISTING LINE.
3. UNDERGROUND LINES SHALL BE INSTALLED, INSPECTED AND APPROVED BEFORE BACKFILLING.
4. DRAWINGS DO NOT PURPORT TO SHOW ALL EXISTING UTILITIES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING WATER MAINS, FORCE MAINS, SANITARY SEWER AND STORM MAIN AND MAINTAIN MINIMUM CLEARANCES BETWEEN WATER MAINS AND OTHER UTILITIES AT ALL POINTS ALONG THEIR LENGTH AS REQUIRED IN THE PLANS, DETAILS AND SPECIFICATIONS.
6. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE LOCAL UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.
7. THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH THE SPECIFICATIONS OF THE LOCAL AUTHORITIES WITH REGARD TO MATERIALS AND INSTALLATION OF WATER AND SEWER LINES.
8. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICE.
9. THE CONTRACTOR SHALL COORDINATE WITH ALL UTILITY COMPANIES FOR INSTALLATION REQUIREMENTS AND SPECIFICATIONS.
10. WATER FOR FIREFIGHTING SHALL BE AVAILABLE FOR USE PRIOR TO COMBUSTIBLES BEING BROUGHT ON SITE.
11. ALL MANHOLE TOP ELEVATIONS ARE APPROXIMATE. CONTRACTOR SHALL SET MANHOLE TOPS LEVEL WITH FINISH GRADES IN PAVED AND UNPAVED AREAS.
12. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR PRECISE BUILDING DIMENSIONS, BUILDING UTILITY ENTRANCE LOCATIONS/INVERTS, EXACT LOCATIONS AND DIMENSIONS OF EXIT PORCHES, RAMPS, TRUCK DOCKS, DOWNSPOUTS AND BOLLARDS.
13. TRACER WIRE SHALL BE INSTALLED ON ALL WATER, SEWER AND RECLAIMED WATER MAINS. CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING THE CONTINUITY OF THE WIRE.

3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CITY OF RIALTO STANDARD DRAWINGS, STANDARD SPECIAL PROVISIONS, AND THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, WITH SUPPLEMENTS. ANY VARIATION FROM OR EXCEPTION TO THE STANDARDS OR FOLLOWING GENERAL NOTES MUST BE APPROVED BY THE CITY ENGINEER.
2. ALL MAINLINE SEWERS SHALL BE VCP BELL AND SPIGOT. RESIDENTIAL LATERALS SHALL BE 4" VCP BELL AND SPIGOT. COMMERCIAL LATERALS SHALL BE 6" MINIMUM VCP BELL AND SPIGOT, NO SUBSTITUTIONS ALLOWED.
3. THE CONTRACTOR SHALL NOTIFY THE CITY OF RIALTO PUBLIC WORKS DEPARTMENT AT LEAST 48 HOURS PRIOR TO THE START OF ANY PHASE OF CONSTRUCTION AND 24 HOURS PRIOR TO THE NEED OF INSPECTION.
4. EXCAVATION AND TRENCH WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE STATE CONSTRUCTION SAFETY ORDERS. THE CONTRACTOR SHALL BE REQUIRED TO SHOW THAT A PERMIT FROM THE DIVISION OF INDUSTRIAL SAFETY HAS BEEN OBTAINED BEFORE SEWER CONSTRUCTION PERMIT CAN BE ISSUED.
5. MANHOLE COVERS SHALL BE LEFT AT LEAST 6" BELOW SUB GRADE AND BROUGHT TO FINAL GRADE UPON COMPLETION OF PAVING.
6. FOUR-INCH (4") V.C.P. SEWER LATERAL CONNECTIONS SHALL BE LAID TO GRADE AS ESTABLISHED BY THE ENGINEER SO THAT THE 4" V.C.P. WILL HAVE A MINIMUM COVER OF FOUR (4") TO THE TOP OF PIPE AT PROPERTY LINE AND SHALL HAVE A MINIMUM GRADE OF 2%. ALL SEWER LATERALS SHALL BE LAID 90 DEGREES TO THE MAIN LINE. CONSTRUCTION SHALL BE PER CITY STANDARD DRAWING NO. SS-209. NO LATERAL SHALL BE PLACED UNDER ANY DRIVEWAY APPROACH OR DRIVEWAY.
7. ALL COMPACTION SHALL BE PERFORMED AS SHOWN ON CITY OF RIALTO STANDARD NO. SC-231 AND THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION AND ADDENDUMS.
8. ALL VITRIFIED CLAY PIPE JOINTS TO BE TYPE D OR TYPE G AS SPECIFIED IN THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CURRENT EDITION.
9. FINAL AIR TESTING FOR PIPELINE LEAKAGE SHALL BE MADE IN THE PRESENCE OF THE CITY INSPECTOR AFTER BACKFILL AND COMPACTION HAVE BEEN COMPLETED BY THE CONTRACTOR AND INSPECTED, APPROVED AND ACCEPTED BY THE CITY.
10. ALL SEWER LINES TO BE BALLED IN THE PRESENCE OF THE CITY INSPECTOR AFTER FINAL TESTING AND MANHOLE COVERS HAVE BEEN BROUGHT TO GRADE UPON COMPLETION OF PAVING. BALLING MUST BE COMPLETED TO THE SATISFACTION OF THE CITY ENGINEER PRIOR TO OCCUPANCY RELEASES BEING ISSUED.
11. THE DEVELOPERS ENGINEER SHALL FURNISH A COMPLETE SET OF "AS-BUILT" PLANS ON ORIGINAL MYLARS TO THE CITY AT THE COMPLETION OF THE SEWER WORK AND PRIOR TO PAVING OF STREETS, SHOWING LOCATION OF WYES AND END OF HOUSE LATERALS AT THE PROPERTY LINE.
12. SAND BEDDING SHALL BE S.E. MIN. 30, 4" UNDER THE PIPE, AND 12" OF COLORED SAND OVER THE TOP OF PIPE UNLESS OTHERWISE NOTED ON PLANS. COLOR TO BE APPROVED BY FIELD INSPECTOR PRIOR TO LAYING.
13. THE CURB AND GUTTER SHALL BE "ETCHED" SHOWING LATERAL LOCATIONS: "S" FOR SEWER, "G" FOR GAS, "E" FOR ELECTRICAL, AND "W" FOR WATER.
14. STATE LAW (SB3019) REQUIRES THE CONTRACTOR TO CONTACT UNDERGROUND SERVICE ALERT (USA) AND OBTAIN AN IDENTIFICATION NUMBER PRIOR THE ISSUANCE OF THE CITY'S ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (48 HOURS MINIMUM) IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES.
15. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A PERMIT TO WORK WITHIN THE PUBLIC RIGHT OF WAY, FROM THE CITY OF RIALTO PUBLIC WORKS DEPARTMENT.
16. DRIVE APPROACH CENTERLINES SHALL BE STAKED WHEN SEWER LINES ARE STAKED.
17. NO TRENCH BACKFILL SHALL TAKE PLACE WITHOUT PRIOR APPROVAL OF THE CITY'S INSPECTOR.
18. STREET TRENCHING, BACKFILLING AND PAVEMENT REPAIRS SHALL BE IN ACCORDANCE WITH CITY OF RIALTO STANDARD DRAWING NO. SC-231.
19. APPROVAL OF THESE PLANS BY THE CITY OR ITS AGENTS DOES NOT RELIEVE THE ENGINEER AND THE CONTRACTOR FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.
20. ALL NEW SANITARY SEWERS SHALL BE VIDEOTAPED, WITH TAPE SUPPLIED TO THE CITY ENGINEER, PRIOR TO CITY'S ACCEPTANCE OF ANY NEW SEWER.
21. ALL SANITARY SEWER APPURTENANCES SHALL BE ABANDONED, RELOCATED AND/OR UPGRADED PER THE DIRECTION OF THE CITY INSPECTOR, PER CITY OF RIALTO STANDARDS, REGARDLESS IF SHOWN ON PLANS OR NOT.

 <p>UNDERGROUND SERVICE ALERT</p> <p>CALL BEFORE YOU DIG</p> <p>1-800-227-2600</p> <p>TWO WORKING DAYS BEFORE YOU DIG</p>	<p>SEAL-DESIGN ENGINEER</p> <p>PREPARED UNDER THE SUPERVISION OF:</p> <p><u>Samuel L. McWhorter</u> 6/4/19</p> <p>SAMUEL LAKE MCWHORTER, RCE 61788 DATE</p>		<p>Kimley»Horn</p> <p>401 B Street, Suite 600, San Diego, CA 92101</p> <p>Phone: (619) 234-9411</p> <p>WWW.KIMLEY-HORN.COM</p>	<p>CITY OF RIALTO</p> <p>FRISBIE PARK SEWER LIFT STATION</p> <p>CITY PROJECT #190501</p> <p>GENERAL NOTES</p>		<p>2</p> <p>OF 16 SHEETS</p>
	<p>RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:</p> <p><u>Carleton W. Lockwood, Jr.</u> DATE</p> <p>CARLETON W. LOCKWOOD, JR., RCE 45935 DATE</p>			<p>CITY OF RIALTO BENCH MARK: 061-88 ELEVATION=1466.77 FEET</p> <p>DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "18-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.</p>		<p>FOR: CITY OF RIALTO</p> <p>PLAN No. _____</p>
	<p>ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931 DATE</p>			<p>DESIGNED BY: SM DRAWN BY: MM CHECKED BY: MA</p>		

Plotted By: Miller, Morgan, Sheet Set: Checkers - Onsite Precise Plans Layout: G1 June 06, 2019 10:18:30am K:\SND WATER\050937008 Frisbie Park Lift Station\Design\Plan\Sheet\Easton - Plan and Profile.dwg



NOTES

- CONTRACTOR TO POTHOLE AND VERIFY DEPTH OF CONNECTION PRIOR TO CONSTRUCTION OF SEWER IN E EASTON ST. NOTIFY ENGINEER IF CONNECTION TO EXISTING SEWER DOES NOT ALLOW SEWER LATERALS TO BE CONSTRUCTED AT 2.0% SLOPE MINIMUM TO SEWER MAIN IN E EASTON ST.
- LOCATION OF EXISTING SEPTIC SYSTEM SHOWN IS APPROXIMATE AND IS BASED ON INFORMATION PROVIDED BY THE CITY OF RIALTO MAINTENANCE STAFF. CONTRACTOR TO VERIFY LOCATION PRIOR TO CONSTRUCTION.
- LOCATION OF CITY OF RIALTO WATER AND WEST VALLEY WATER LINES SHOWN ARE APPROXIMATE AND BASED OFF OF GIS MAPPING. CONTRACTOR TO VERIFY LOCATION PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER OF ANY CONFLICTS.

CENTERLINE DATA			
XX	DELTA OR BRG	RADIUS	LENGTH
C1	Δ=13° 35' 02"	749.93'	177.80'
C2	Δ=13° 36' 31"	749.93'	178.12'
L1	S 89°24'13" W		315.45'
L2	N 77°00'45" W		50.76'
L3	S 89°22'44" W		603.25'

GRAVITY MAIN			
Δ	DELTA OR BRG	RADIUS	LENGTH
Δ1	S 0°47'23" E		15.2'
Δ2	S 45°50'38" E		104.4'
Δ3	S 77°00'45" E		59.2'
Δ4	Δ=13° 36' 31"	759.93'	180.5'
Δ5	N 89°22'44" E		198.7'
Δ6	N 89°22'44" E		70.1'
Δ7	N 89°22'44" E		51.9'
Δ8	N 89°22'44" E		216.9'

CONSTRUCTION NOTES

- PROTECT IN PLACE
- CONSTRUCT 8" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- INSTALL SEWER CLEANOUT PER CITY OF RIALTO STD SS-205
- INSTALL 48" SEWER MANHOLE PER CITY OF RIALTO STD SS-202
- INSTALL 1" TYPE "K" COPPER WATER SERVICE LINE WITH METER BOX PER CITY OF RIALTO STD W-700. INSTALL WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231. CONTRACTOR TO LOCATE AND POTHOLE EXIST WATER LINE UTILITY TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION
- CONNECT TO EXISTING SEWER WITH CAULDER COUPLING
- CONSTRUCT 4" VCP SEWER LATERAL PER CITY OF RIALTO STD SS-206
- REMOVE AND REPLACE SIDEWALK AS NEEDED
- STUB AND PLUG FOR FUTURE PARK CONNECTION
- REMOVE AND REPLACE 10' OF EXISTING CURB AND GUTTER
- CONSTRUCT 4" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- CONTRACTOR TO LOCATE AND POTHOLE EXIST UTILITY TO VERIFY DEPTH PRIOR TO CONSTRUCTION AND PRIOR TO ORDERING PACKAGE TYPE LIFT STATION. NOTIFY ENGINEER OF ANY DISCREPANCIES THAT WILL CAUSE A CONFLICT WITH THE PROPOSED GRAVITY AND FORCE MAIN PROFILES SHOWN ON THESE PLANS.
- REMOVE EXISTING SEPTIC TANK AND ABANDON EXISTING LEACH LINE IN PLACE. SEE SPECIAL PROVISIONS
- INSTALL 8"x8"x4" VCP WYE PER CITY OF RIALTO STD SS-209
- INSTALL 4" DIP WYE
- REPLACE EXISTING STRIPING IN KIND, SEE SPECIAL PROVISIONS
- SLURRY SEAL LIMITS, HALF-WIDTH OF ROADWAY UNLESS OTHERWISE NOTED. SEE SPECIAL PROVISIONS

UNDERGROUND SERVICE ALERT

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TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE
DESIGNED BY: SM	DRAWN BY: MM	CHECKED BY: MA	

SEAL-DESIGN ENGINEER



PREPARED UNDER THE SUPERVISION OF:

Samuel Lake McWhorter, RCE 61788

RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:

CARLETON W. LOCKWOOD, JR., RCE 45935

ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931

6/4/19

DATE

DATE

DATE

Kimley»Horn

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Phone: (619) 234-9411
WWW.KIMLEY-HORN.COM

CITY OF RIALTO BENCH MARK: 061-88
ELEVATION=1466.77 FEET
DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.

FOR:
CITY OF RIALTO

PLAN No.

CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
EASTON ST - PLAN AND PROFILE

3

OF 16 SHEETS

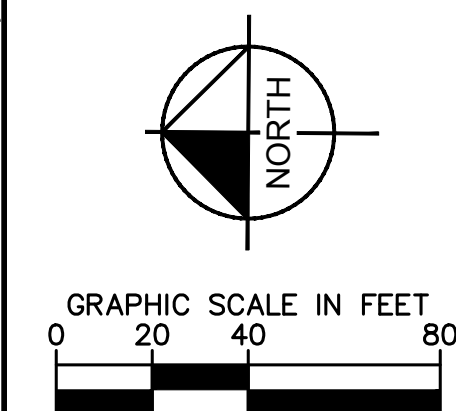
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FORCE MAIN				
Δ	DELTA OR BRG	RADIUS	LENGTH	MATERIAL
Δ1	N 15°26'47" W		83.3'	C-900 PVC DR-14
Δ2	Δ=14° 59' 09"	795.00'	207.9'	C-900 PVC DR-14
Δ3	N 0°27'38" W		135.5'	C-900 PVC DR-14
Δ4	N 0°27'38" W		100.0'	C-900 PVC DR-14
Δ5	N 0°27'38" W		100.0'	C-900 PVC DR-14

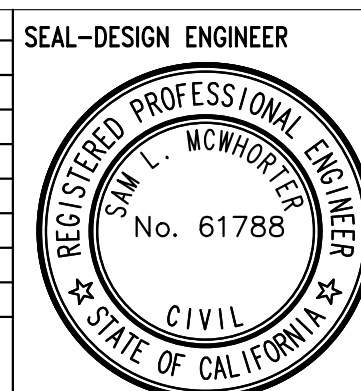
GRAVITY MAIN			
Δ	DELTA OR BRG	RADIUS	LENGTH
Δ6	N 15°26'48" W		67.9'
Δ7	N 15°26'47" W		101.7'
Δ8	Δ=14° 59' 09"	785.00'	205.3'
Δ9	N 0°27'38" W		314.3'

CENTERLINE DATA			
XX	DELTA OR BRG	RADIUS	LENGTH
* L1	S 0°27'38" E		1980.83'

*L1 CONTINUED ON SHEET 5



MARK	REVISIONS	APPR.	DATE
DESIGNED BY: SM	DRAWN BY: MM	CHECKED BY: MA	



SEAL-DESIGN ENGINEER	
PREPARED UNDER THE SUPERVISION OF:	
Sam McWhorter	6/4/19
SAMUEL LAKE MCWHORTER, RCE 61788	DATE
RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:	
CARLETON W. LOCKWOOD, JR., RCE 45935	DATE
ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931	
	DATE

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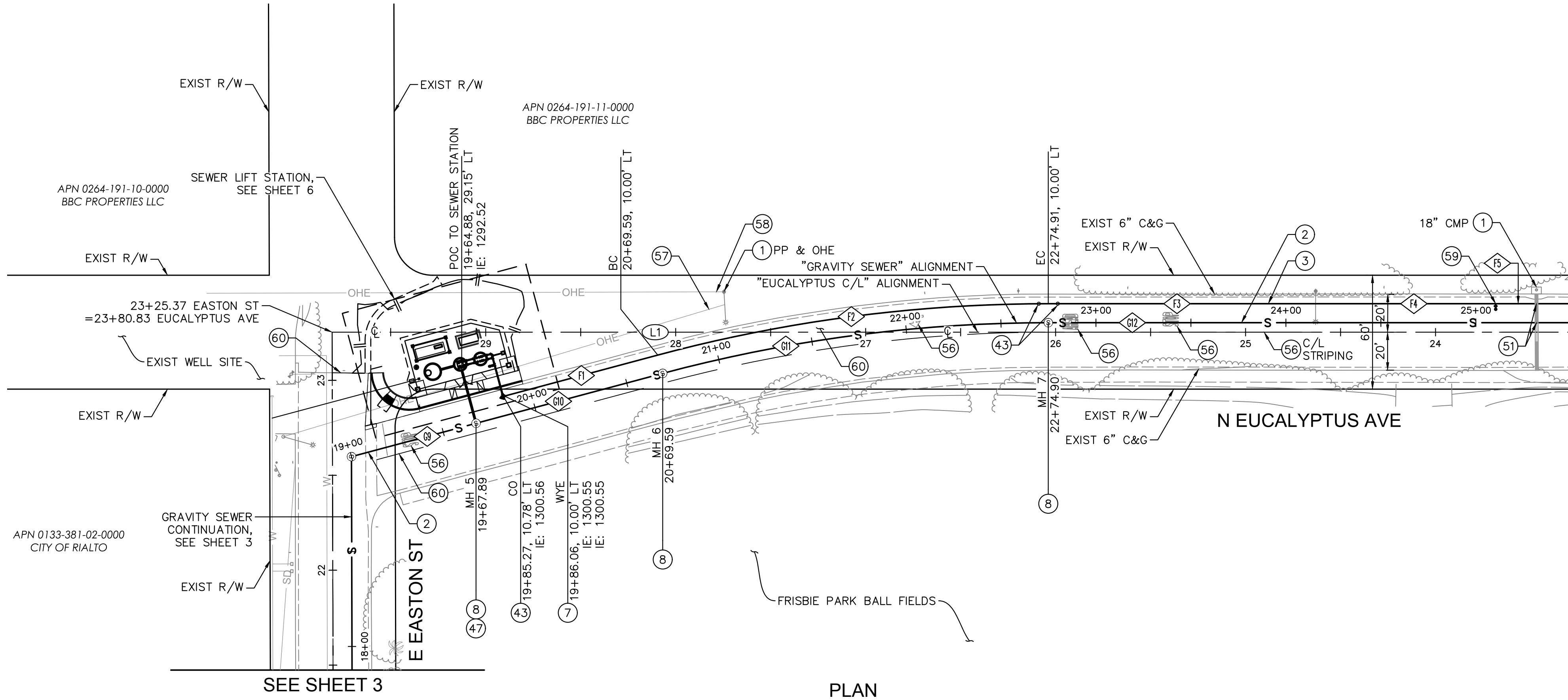
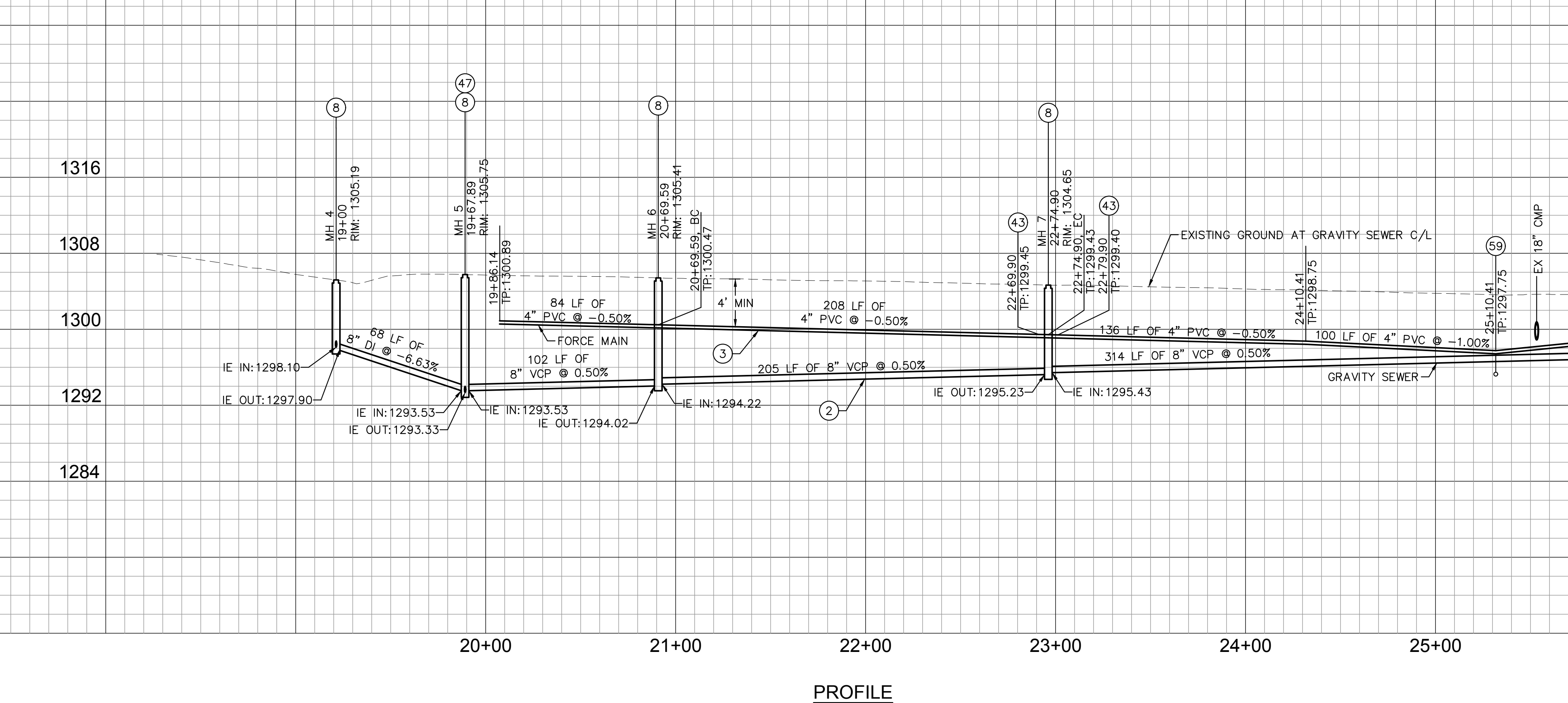
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ELEVATION=1466.77 FEET
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CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
EUCALYPTUS AVE - PLAN AND PROFILE

FOR: CITY OF RIALTO

PLAN No. _____

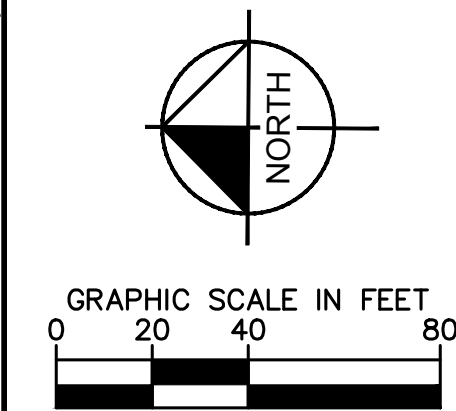
4
of 16 SHEETS



CONSTRUCTION NOTES

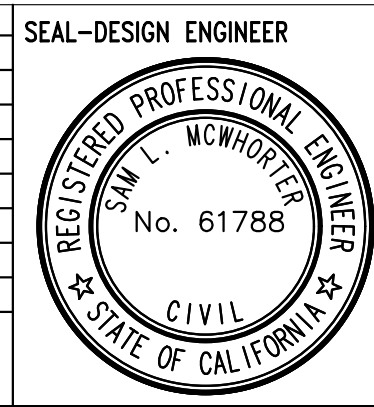
- PROTECT IN PLACE
- CONSTRUCT 8" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- CONSTRUCT 4" C900 PVC DR-14 SEWER FORCE MAIN WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- CONSTRUCT 4"x4"x4" DIP SEWER WYE
- INSTALL 48" SEWER MANHOLE PER CITY OF RIALTO STD SS-202
- FORCE MAIN CLEANOUT. SEE DETAIL 03, SHEET 11
- EPOXY LINE MANHOLE PER SPECIAL PROVISIONS
- CONTRACTOR TO LOCATE AND POTHOLE EXIST UTILITY TO VERIFY DEPTH PRIOR TO CONSTRUCTION AND PRIOR TO ORDERING PACKAGE TYPE LIFT STATION. NOTIFY ENGINEER OF ANY DISCREPANCIES THAT WILL CAUSE A CONFLICT WITH THE PROPOSED GRAVITY AND FORCE MAIN PROFILES SHOWN ON THESE PLANS.
- REPLACE EXISTING STRIPING IN KIND, SEE SPECIAL PROVISIONS
- RELOCATE EXISTING OVERHEAD STREET LIGHT POWER (BY SCE)
- POWER SOURCE FOR LIFT STATION (BY SCE)
- INSTALL 4" BLOW OFF VALVE WITH 4x4 DIP TEE, 4" PLUG VALVE, 4" 90° DIP BEND, 4" DIP SPOOL WITH BLIND FLANGE, AND 12" SEWER CLEANOUT COVER
- SLURRY SEAL LIMITS, HALF-WIDTH OF ROADWAY UNLESS OTHERWISE NOTED. SEE SPECIAL PROVISIONS

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MARK	REVISIONS	APPR.	DATE
DESIGNED BY: SM	DRAWN BY: MM	CHECKED BY: MA	



PREPARED UNDER THE SUPERVISION OF: SAMUEL LAKE MCWHORTER, RCE 61788 RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING: CARLETON W. LOCKWOOD, JR., RCE 45935 ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931	6/4/19 DATE
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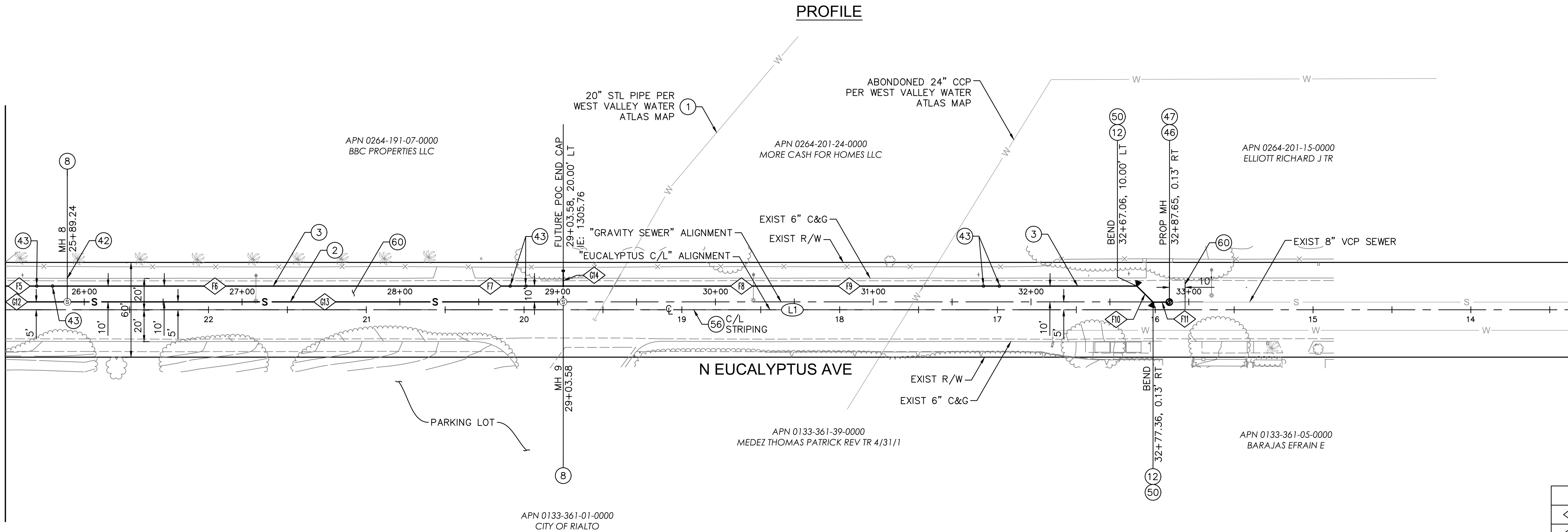
CENTERLINE DATA			
(XX)	DELTA OR BRG	RADIUS	LENGTH
* L1	S 0°27'38" E		1980.83'

*L1 CONTINUED ON SHEET 4

GRAVITY MAIN			
(X)	DELTA OR BRG	RADIUS	LENGTH
G12	N 0°27'38" W		314.3'
G13	N 0°27'38" W		314.3'
G14	S 89°32'22" W		20.0'

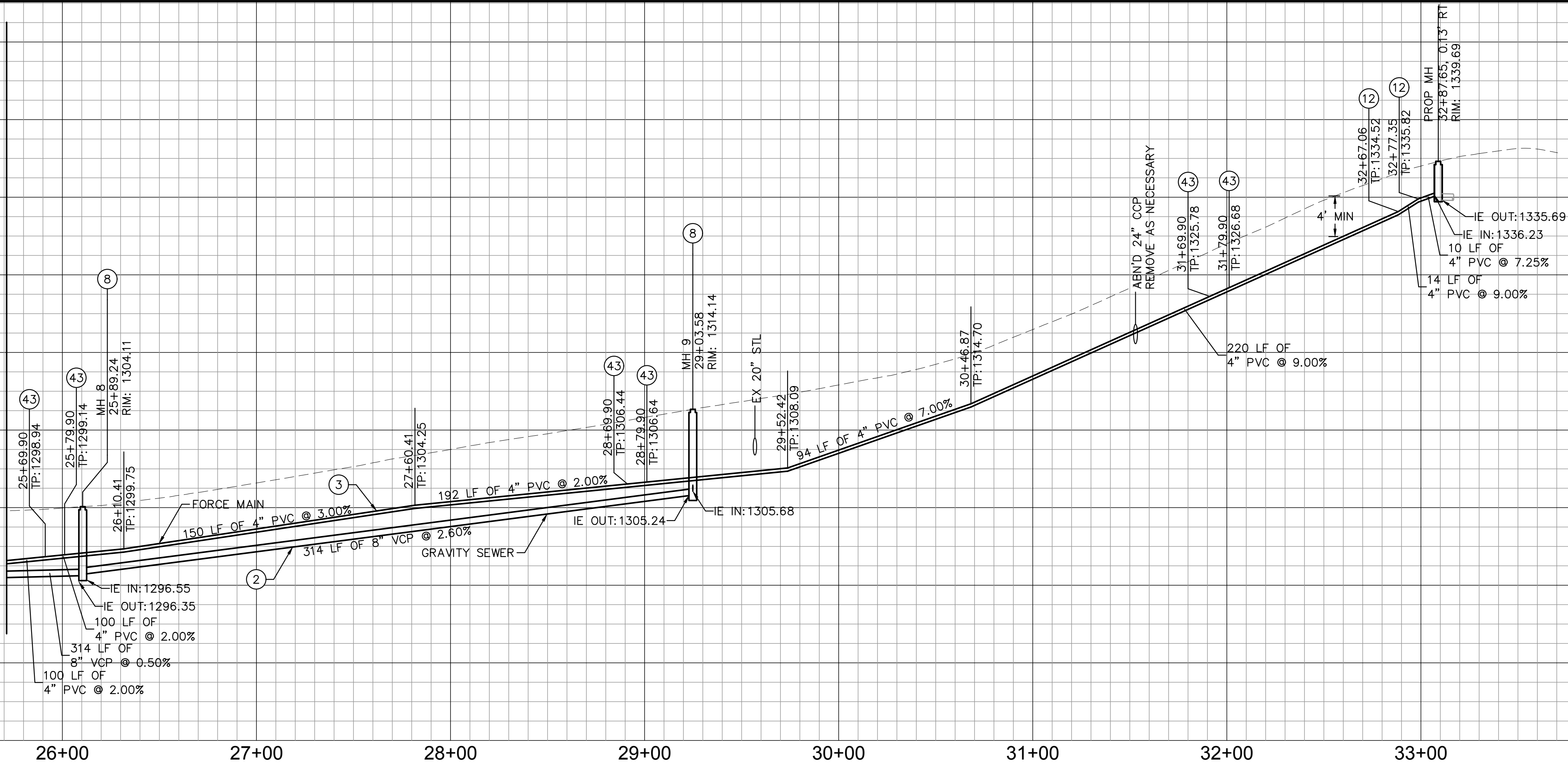
FORCE MAIN			
(X)	DELTA OR BRG	RADIUS	LENGTH
F5	N 0°27'38" W		100.0'
F6	N 0°27'38" W		150.0'
F7	N 0°27'38" W		192.0'
F8	N 0°27'38" W		94.4'
F9	N 0°27'38" W		220.2'
F10	N 44°05'47" E		14.4'
F11	N 0°27'38" W		10.3'

MATCHLINE STA 25+50.00 - SEE SHEET 4



PROFILE

MATCHLINE STA 25+50.00 - SEE SHEET 4



PROFILE SCALE
HORIZ. 1"=40'
VERT. 1"=8'

CONSTRUCTION NOTES

- PROTECT IN PLACE
- CONSTRUCT 8" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- CONSTRUCT 4" C900 PVC DR-14 SEWER FORCE MAIN WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- INSTALL 48" SEWER MANHOLE PER CITY OF RIALTO STD SS-202
- INSTALL 4" 45" DIP BEND
- REMOVE AND REPLACE 10' OF EXISTING CURB AND GUTTER
- FORCE MAIN CLEANOUT. SEE DETAIL 03, SHEET 11
- INSTALL FORCE MAIN DISCHARGE MANHOLE. SEE DETAIL 05, SHEET 11
- EPOXY LINE MANHOLE PER SPECIAL PROVISIONS
- INSTALL THRUST BLOCK PER CITY OF RIALTO STD W-723
- REPLACE EXISTING STRIPING IN KIND, SEE SPECIAL PROVISIONS
- SLURRY SEAL LIMITS, HALF-WIDTH OF ROADWAY UNLESS OTHERWISE NOTED. SEE SPECIAL PROVISIONS

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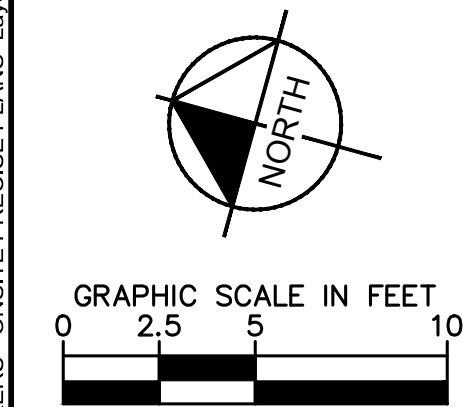
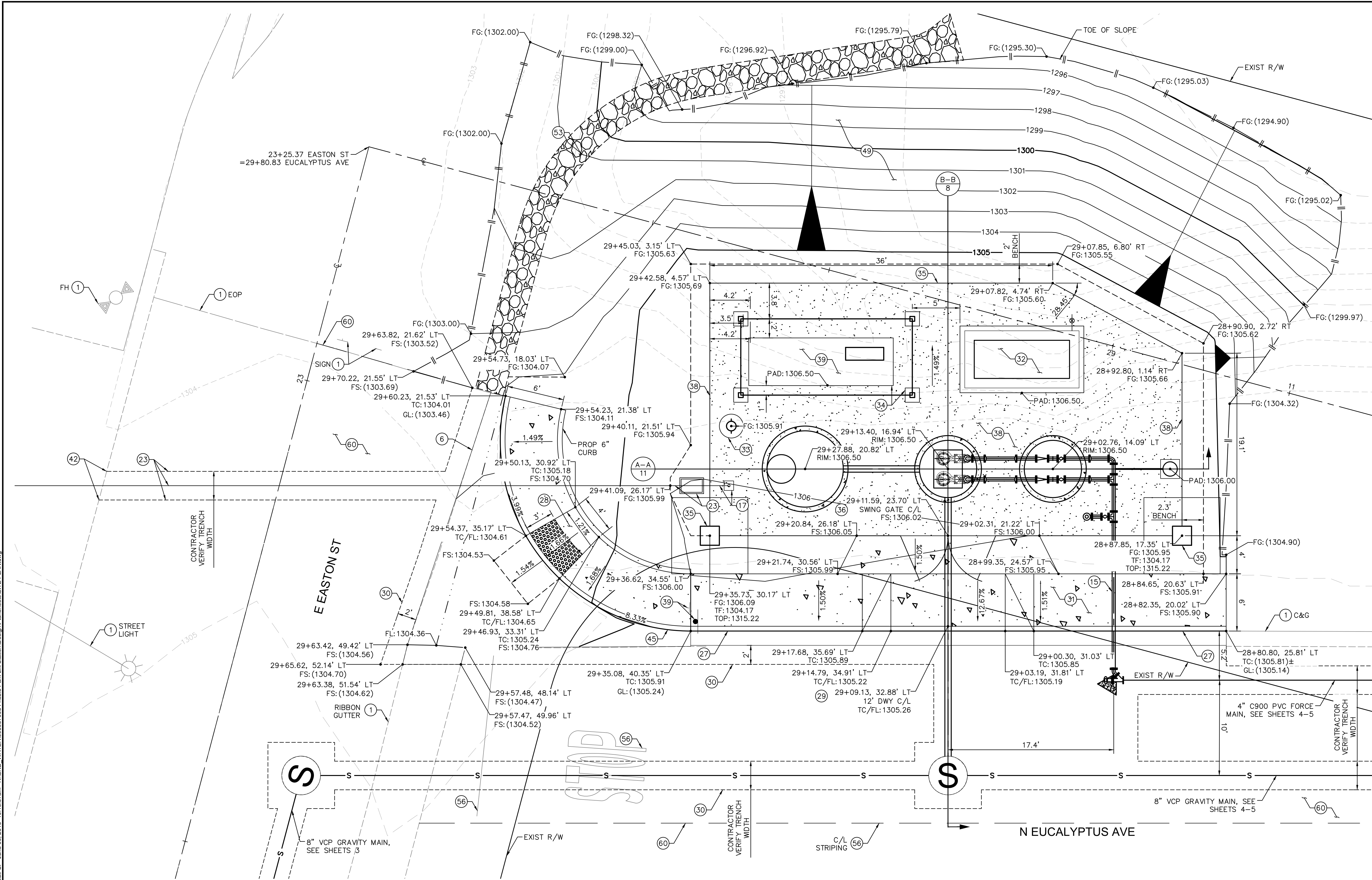
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CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
EUCALYPTUS AVE - PLAN AND PROFILE

5
OF 16 SHEETS

FOR: CITY OF RIALTO
PLAN No. _____

Plotted By: Miller, Morgan; Sheet Set Checkers: - ONSITE PRECISE PLANS Layout: SP June 06, 2019 10:18:57 am K:\SND_WATER\0505037008 Frisbie Park Lift Station\Design\Plan\sheet\SITE PLAN.dwg



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MARK	REVISIONS	APPR.	DATE
DESIGNED BY: SM	DRAWN BY: MM	CHECKED BY: MA	

SEAL-DESIGN ENGINEER
REGISTERED PROFESSIONAL ENGINEER
SAMUEL LAKE MCWHORTER
No. 61788
CIVIL
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
SAMUEL LAKE MCWHORTER, RCE 61788
RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:
CARLETON W. LOCKWOOD, JR., RCE 45935
ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931

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CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
SITE AND GRADING PLAN
FOR: CITY OF RIALTO
PLAN No. _____

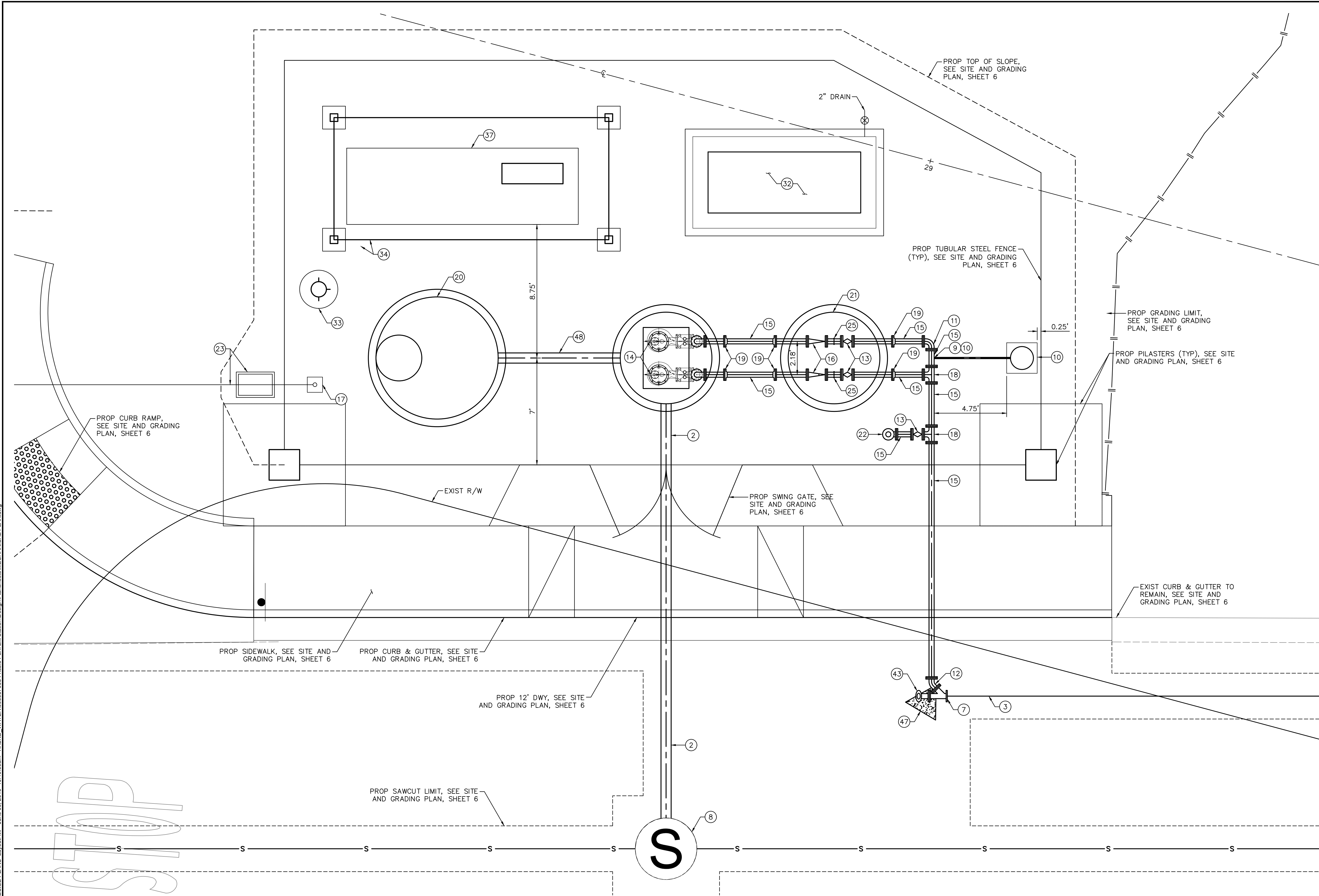
CONSTRUCTION NOTES

- PROTECT IN PLACE
- CONSTRUCT CROSS GUTTER PER CITY OF RIALTO STD SC-216
- INSTALL 4" DIP
- INSTALL 1" RED BRASS SPOOL, RISER AND HOSE BIB. SET IN 12"x12"x12" THICK CONCRETE BLOCK
- INSTALL 1" TYPE "K" COPPER WATER SERVICE LINE WITH METER BOX PER CITY OF RIALTO STD W-700. INSTALL WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231. CONTRACTOR TO LOCATE AND POTHOLE EXIST WATER LINE UTILITY TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION
- 8" CURB AND GUTTER PER CITY OF RIALTO STD SC-200
- MODIFIED CURB RAMP PER CITY OF RIALTO STD SC-215, CASE B TYPE 1. DIMENSIONS PER PLAN. CONSTRUCT GUTTER PAN PER DETAIL 05, SHEET 10
- CONSTRUCT DRIVEWAY PER CITY OF RIALTO STD SC-213
- SAWCUT WITH FULL DEPTH REMOVAL AND MILL AND OVERLAY. SEE DETAIL 06, SHEET 10
- CONSTRUCT SIDEWALK PER CITY OF RIALTO STD SC-203
- GENERATOR AND GENERATOR FOUNDATION. SEE DETAIL 1, SHEET 10
- SITE LIGHT. SEE FOUNDATION DETAIL 06, SHEET 11
- CONSTRUCT SHADE STRUCTURE AND SHADE STRUCTURE FOUNDATION PER SPECIAL PROVISIONS
- INSTALL 8' HIGH TUBULAR STEEL FENCE AND PILASTERS, SEE SHEET 12
- INSTALL 8' HIGH, 10' WIDE TUBULAR STEEL SWING GATE
- 4" DEPTH OF 3/4" CRUSHED ROCK OVER FILTER FABRIC TO COVER ENTIRE SITE. INSTALL 2"x8" REWOOD HEADER AROUND SITE PERIMETER STAKED AT 2' O.C.
- RELOCATE EXISTING STOP SIGN, POSITION PER CITY OF RIALTO STD SC-223
- REMOVE AND REPLACE 10' OF EXISTING CURB AND GUTTER
- CONSTRUCT 8" CURB PER CITY OF RIALTO STD SS-202
- HYDROSEED SLOPE PER SPECIAL PROVISIONS
- RIPRAP EROSION CONTROL - FACING CLASS AT DEPTH=1.5' OVER RSP FABRIC. SEE DETAIL 04, SHEET 11
- REPLACE EXISTING STRIPING IN KIND, SEE SPECIAL PROVISIONS
- SLURRY SEAL LIMITS, HALF-WIDTH OF ROADWAY UNLESS OTHERWISE NOTED. SEE SPECIAL PROVISIONS

NOTE

- STATION OFFSET STATIONING SHOWN HERE IS BASED OFF OF EUCALYPTUS AVE CENTERLINE INFORMATION.

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CONSTRUCTION NOTES

- ② CONSTRUCT 8" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- ③ CONSTRUCT 4" C900 PVC DR-14 SEWER FORCE MAIN WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
- ⑦ CONSTRUCT 4"x4"x4" DIP SEWER WYE
- ⑧ INSTALL 48" SEWER MANHOLE PER CITY OF RIALTO STD SS-202
- ⑨ INSTALL SADDLE TAP PER CITY OF RIALTO STD W-709
- ⑩ INSTALL 1" SEWER COMBINATION AIR RELEASE VALVE ON 2'x2'x12' CONCRETE PAD INSIDE GREEN HDPE AIR RELEASE VALVE ENCLOSURE
- ⑪ INSTALL 4" 90° DIP BEND
- ⑫ INSTALL 4" 45° DIP BEND
- ⑬ INSTALL 4" ECCENTRIC PLUG VALVE
- ⑭ INSTALL DUPLEX PACKAGE SUBMERSIBLE PUMP, Q=150 GPM, 100' TDH EACH PUMP. SEE DETAIL 01, SHEET 11 FOR PUMP CURVE
- ⑮ INSTALL 4" DIP
- ⑯ INSTALL 4" SWING CHECK VALVE
- ⑰ INSTALL 1" RED BRASS SPOOL, RISER AND HOSE BIB. SET IN 12"x12"x12" THICK CONCRETE BLOCK
- ⑱ INSTALL 4"x4"x4" DIP TEE
- ⑲ INSTALL 4" DIP RESTRAINED FLANGE COUPLING ADAPTER
- ⑳ 8' DIA EMERGENCY STORAGE VAULT WITH 36" FLUSH TOP MANHOLE COVER
- ㉑ 6' DIA PACKAGE VALVE VAULT
- ㉒ INSTALL 4" DIP BYPASS CONNECTION WITH 90° UPWARD BEND, THRUST BLOCK AND BLIND FLANGE
- ㉓ INSTALL 1" TYPE "K" COPPER WATER SERVICE LINE WITH METER BOX PER CITY OF RIALTO STD W-700. INSTALL WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231. CONTRACTOR TO LOCATE AND POT-HOLE EXIST WATER LINE UTILITY TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION
- ㉔ PIPE SUPPORT. SEE DETAIL 04, SHEET 10
- ㉕ GENERATOR AND GENERATOR FOUNDATION. SEE DETAIL 1, SHEET 10
- ㉖ SITE LIGHT. SEE FOUNDATION DETAIL 06, SHEET 11
- ㉗ CONSTRUCT SHADE STRUCTURE AND SHADE STRUCTURE FOUNDATION PER SPECIAL PROVISIONS
- ㉘ EQUIPMENT FOUNDATION. SEE DETAIL 02, SHEET 10
- ㉙ FORCE MAIN CLEANOUT. SEE DETAIL 03, SHEET 11
- ㉚ EPOXY LINE MANHOLE PER SPECIAL PROVISIONS
- ㉛ INSTALL 8" DIP



UNDERGROUND SERVICE ALERT CALL-TOLL FREE 1-800-227-2600 TWO WORKING DAYS BEFORE YOU DIG	<table border="1"><thead><tr><th>MARK</th><th>REVISIONS</th><th>APPR.</th><th>DATE</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td><td> </td></tr></tbody></table>	MARK	REVISIONS	APPR.	DATE																																					SEAL-DESIGN ENGINEER DESIGNED BY: SM DRAWN BY: MM CHECKED BY: MA	PREPARED UNDER THE SUPERVISION OF: Sam McWhorter SAMUEL LAKE MCWHORTER, RCE 61788 RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING: CARLETON W. LOCKWOOD, JR., RCE 45935 ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931	Kimley»Horn 401 B Street, Suite 600, San Diego, CA 92101 Phone: (619) 234-9411 WWW.KIMLEY-HORN.COM CITY OF RIALTO BENCH MARK: 061-88 ELEVATION=1466.77 FEET DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.	CITY OF RIALTO FRISBIE PARK SEWER LIFT STATION CITY PROJECT #190501 MECHANICAL PLAN FOR: CITY OF RIALTO PLAN No. _____	7 of 16 SHEETS
		MARK	REVISIONS	APPR.	DATE																																									

- ① BASIN CYLINDER ASSEMBLY, 6" DIAMETER
- ② COVER, 6' DIAMETER WITH HATCH AND FALL PROTECTION GRATE
- ③ VENT PIPE 4" STAINLESS STEEL – GOOSE NECK STYLE WITH INSECT SCREEN
- ④ DISCHARGE CONNECTION, LEFT, 4"
- ⑤ DISCHARGE CONNECTION, RIGHT, 4"
- ⑧ SEAL CABLE WALL, LEVEL SENSOR
- ⑨ SEAL CABLE WALL, PUMP POWER
- ⑬ U-BOLT PER MANUFACTURER
- ⑬ 8" PIPE CONNECTION-INFLUENT
- ⑮ PIPE, 4" SCH 10, 316 STAINLESS STEEL
- ⑮ PIPING KIT
- ⑮ CONCRETE BALLAST RING PER MFR RECOMMENDATIONS
- ⑮ CONCRETE FOUNDATION TO BE CLASS 560-C-3250. FOUNDATION PREP PER MFR RECOMMENDATIONS AND GEOTECH REPORT
- ⑮ ANTI-FLOTATION FLANGE
- ⑮ 2 FLYGT NON-CLOG SUBMERSIBLE PUMPS Q=150 GPM AT 100' TDH EACH PUMP, NP-3127.070 11 HP, 3 PHASE 460V 3,550 RPM
- ⑮ 12" DEPTH OF 3/4" CRUSHED ROCK BEDDING
- ⑮ #6 @ 12" O.C. EACH WAY
- ⑮ EPOXY LINE EMERGENCY STORAGE PER SPECIAL PROVISIONS
- ⑮ GROUT TO SLOPE TO OUTLET
- ⑮ GRANULAR BACKFILL PER MFR RECOMMENDATIONS

- (11) INSTALL 4" 90° DIP BEND
- (13) INSTALL 4" ECCENTRIC PLUG VALVE
- (15) INSTALL 4" DIP
- (16) INSTALL 4" SWING CHECK VALVE
- (19) INSTALL 4" DIP RESTRAINED FLANGE COUPLING ADAPTER
- (20) 8" DIA EMERGENCY STORAGE VAULT WITH 36" FLUSH TOP MANHOLE COVER
- (21) 6" DIA PACKAGE VALVE VAULT
- (25) PIPE SUPPORT. SEE DETAIL 04, SHEET 10
- (34) CONSTRUCT SHADE STRUCTURE AND SHADE STRUCTURE FOUNDATION PER SPECIAL PROVISIONS
- (35) INSTALL 8" HIGH TUBULAR STEEL FENCE AND PILASTERS, SEE SHEET 12
- (37) EQUIPMENT FOUNDATION. SEE DETAIL 02, SHEET 10
- (38) 4" DEPTH OF 3/4" CRUSHED ROCK OVER FILTER FABRIC TO COVER ENTIRE SITE. INSTALL 2"x8" REWOOD HEADER AROUND SITE PERIMETER STAKED AT 2' O.C.
- (48) INSTALL 8" DIP



SEAL-DESIGN ENGINEER

REGISTERED PROFESSIONAL ENGINEER
 SAM L. MCWHORTER
 No. 61788
 CIVIL
 STATE OF CALIFORNIA

Kimley»»Horn

CITY OF RIALTO BENCH MARK: 061-88	ELEVATION=1466.77 FEET
DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.	

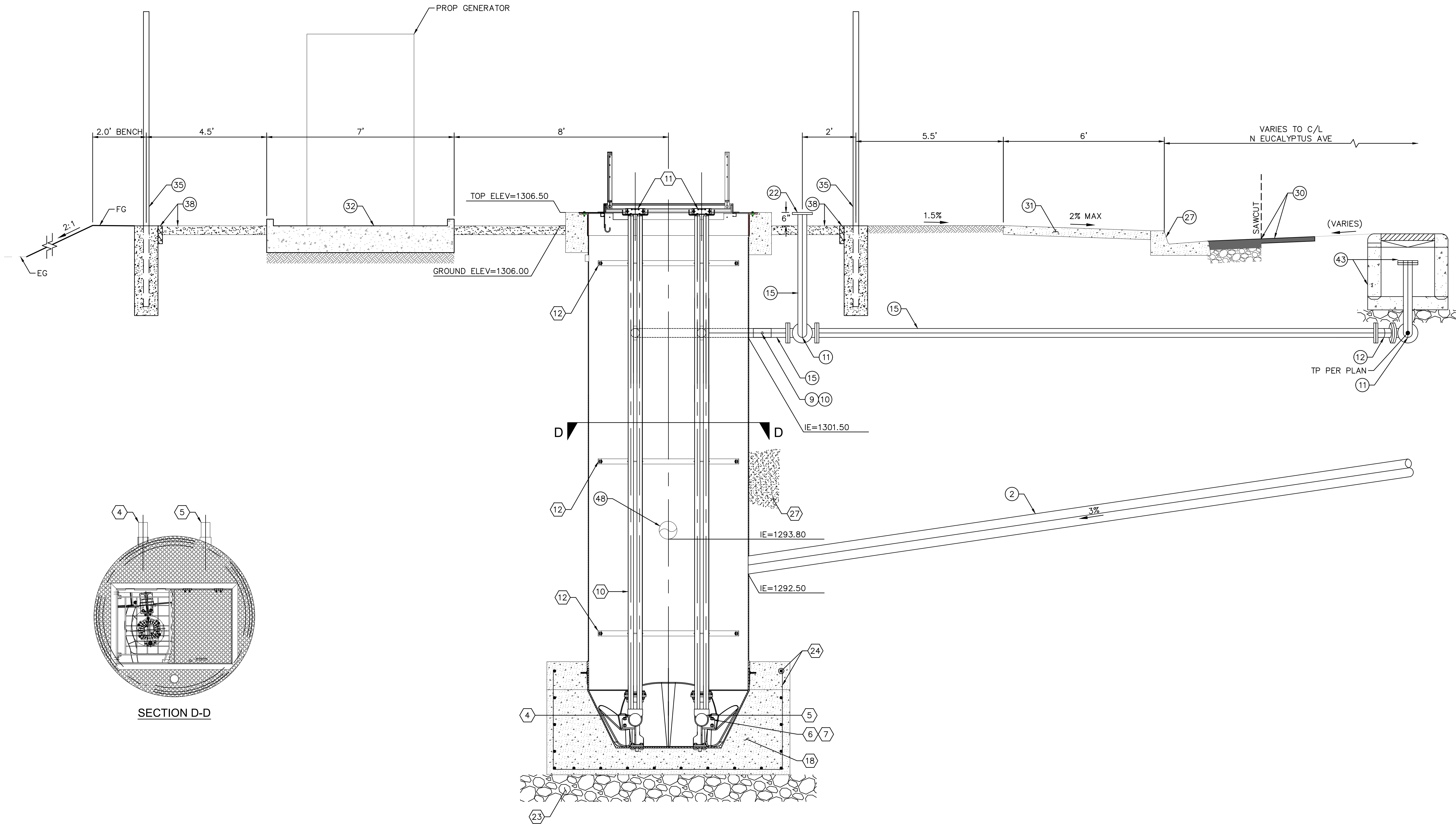
FOR:		
CITY OF RIALTO		PLAN No. _____

SEWER LIFT STATION NOTES

- 4 DISCHARGE CONNECTION, LEFT, 4"
5 DISCHARGE CONNECTION, RIGHT, 4"
6 NUT, 3/4-10, 316 SST
7 WASHER, 13/16 ID, 1 1/2 O.D., GENERAL PURPOSE, 316 SST
10 GUIDE BAR, 2", 316 SST
11 UPPER GUIDE BAR KIT, 2"
12 BRACING, DISCHARGE PIPE
18 CONCRETE FOUNDATION TO BE CLASS 560-C-3250. FOUNDATION PREP PER MFR RECOMMENDATIONS AND GEOTECH REPORT
23 12" DEPTH OF 3/4" CRUSHED ROCK BEDDING
24 #6 @ 12" O.C. EACH WAY
27 GRANULAR BACKFILL PER MFR RECOMMENDATIONS

CONSTRUCTION NOTES

- 2 CONSTRUCT 8" VCP SEWER PIPE WITH TRENCH AND BEDDING PER CITY OF RIALTO STD SC-231
9 INSTALL SADDLE TAP PER CITY OF RIALTO STD W-709
10 INSTALL 1" SEWER COMBINATION AIR RELEASE VALVE ON 2'x2'x12' CONCRETE PAD INSIDE GREEN HDPE AIR RELEASE VALVE ENCLOSURE
11 INSTALL 4" 90° DIP BEND
12 INSTALL 4" 45° DIP BEND
15 INSTALL 4" DIP
22 INSTALL 4" DIP BYPASS CONNECTION WITH 90° UPWARD BEND, THRUST BLOCK AND BLIND FLANGE
27 8" CURB AND GUTTER PER CITY OF RIALTO STD SC-200
30 SAWCUT WITH FULL DEPTH REMOVAL AND MILL AND OVERLAY. SEE DETAIL 06, SHEET 10
31 CONSTRUCT SIDEWALK PER CITY OF RIALTO STD SC-203
32 GENERATOR AND GENERATOR FOUNDATION. SEE DETAIL 1, SHEET 10
35 INSTALL 8' HIGH TUBULAR STEEL FENCE AND PILASTERS, SEE SHEET 12
38 4" DEPTH OF 3/4" CRUSHED ROCK OVER FILTER FABRIC TO COVER ENTIRE SITE. INSTALL 2"x8" REWOOD HEADER AROUND SITE PERIMETER STAKED AT 2' O.C.
43 FORCE MAIN CLEANOUT. SEE DETAIL 03, SHEET 11
48 INSTALL 8" DIP



Plotted By: Miller, Morgan, Sheet Set: CHECKERS - ONSITE PRECISE PLANS Layout: DT2 June 06, 2019 10:22:50am K:\SND WATER\095927008 Frisbie Park Lift Station\Design\PlanSheets\PLUMP DETAILS.dwg

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TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE
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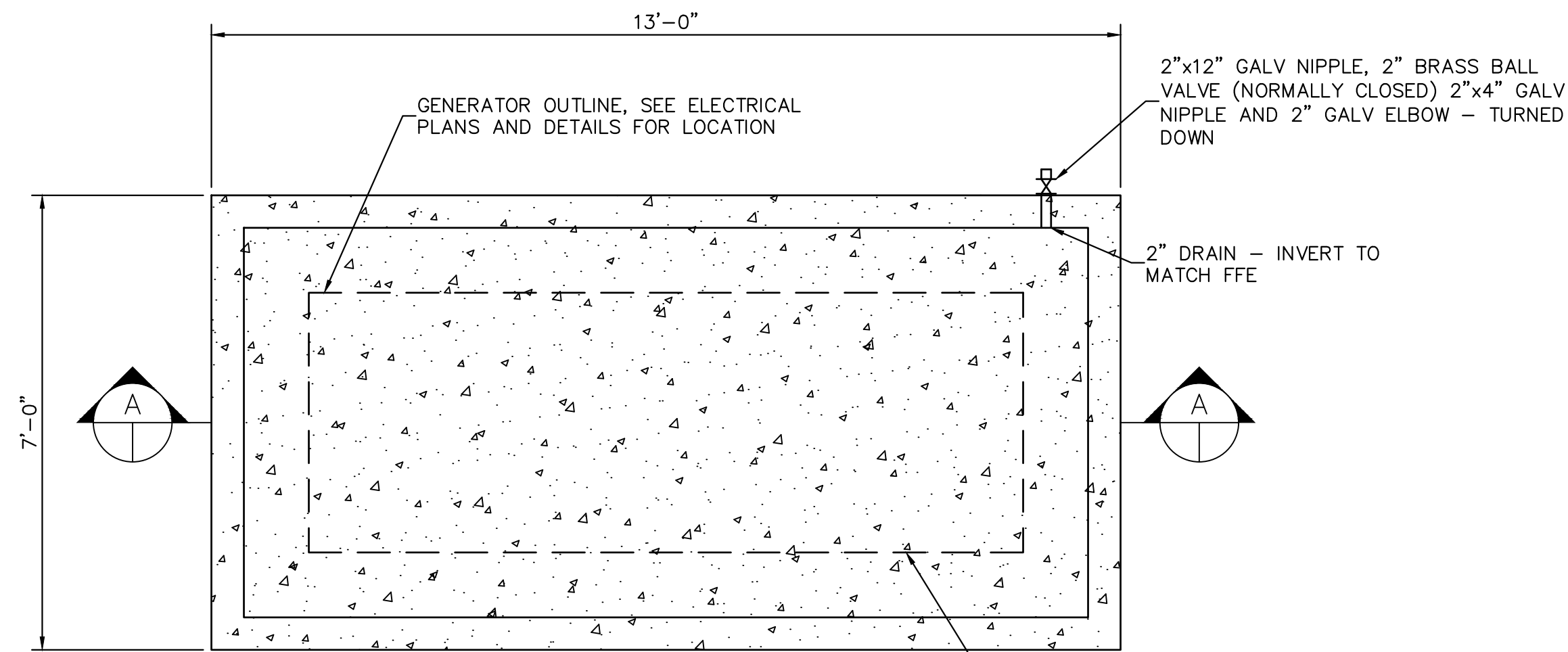
SEAL-DESIGN ENGINEER
REGISTERED PROFESSIONAL ENGINEER
SAM L. MCWHORTER
No. 61788
CIVIL
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:
SAMUEL LAKE MCWHORTER, RCE 61788
RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:
CARLETON W. LOCKWOOD, JR., RCE 45935
ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931

Kimley»Horn
401 B Street, Suite 600, San Diego, CA 92101
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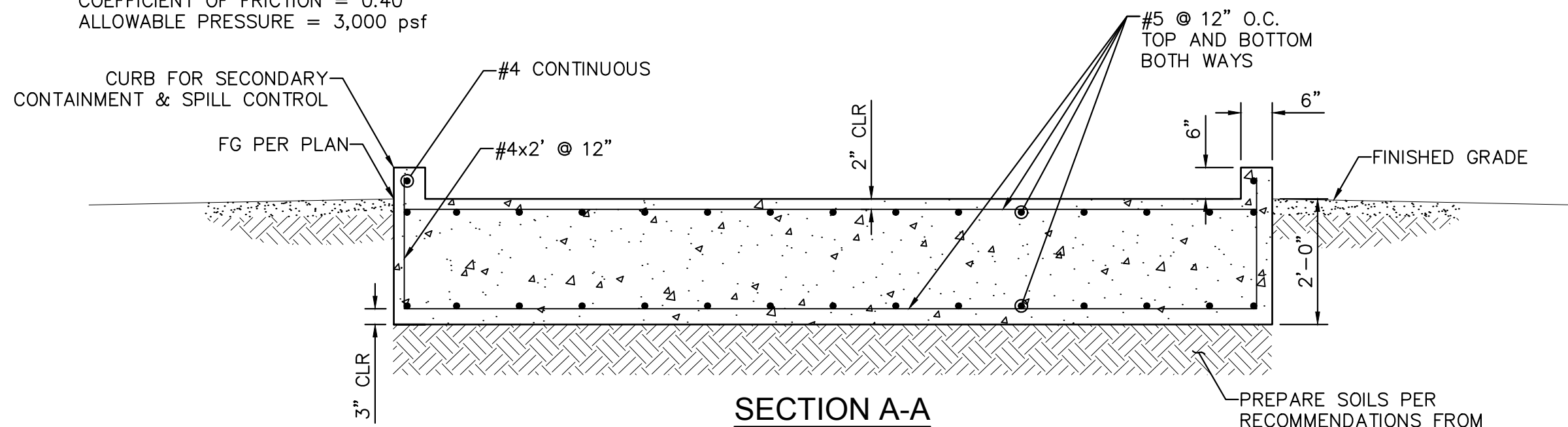
CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
SEWER LIFT STATION ELEVATION
FOR: CITY OF RIALTO
PLAN No. _____
9 OF 16 SHEETS

Plotted By: Miller, Morgan Sheet Set Checkers - Onsite Precise Plans Layout: DT1 June 06, 2019 10:19:41am K:\SND_WATER\095927008 Frisbie Park Lift Station\Design\Plan\sheet\DETAILS.dwg



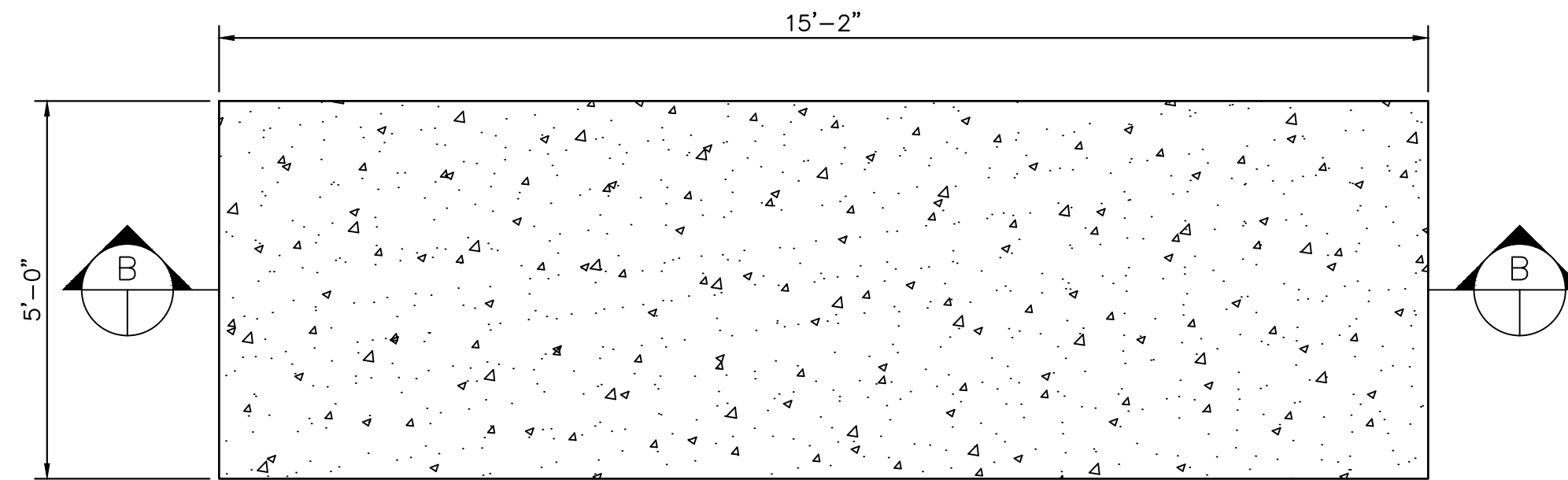
NOTE

- FOR GENERATOR ANCHORAGE TO FOUNDATION USE $\frac{3}{4}$ " \emptyset HILTI BOLT TZ EXPANSION ANCHORS WITH 4- $\frac{3}{4}$ " MINIMUM EMBEDMENT IN 5- $\frac{3}{4}$ " DEEP HOLES.
- FOLLOW MANUFACTURERS RECOMMENDATION FOR INSTALLATION.
- CONTRACTOR TO VERIFY GENERATOR WILL FIT WITHIN DIMENSIONS INDICATED WITHIN 12" MINIMUM CLEARANCE ON ALL SIDES. NOTIFY ENGINEER OF ANY CONFLICTS.
- DESIGN SPECIFICATIONS:
REINFORCED CONCRETE
F'c = 3,000 psi
Fy = 60,000 psi
SOIL
Kp = 350 psf/ft
COEFFICIENT OF FRICTION = 0.40
ALLOWABLE PRESSURE = 3,000 psf



GENERATOR FOUNDATION DETAIL
N.T.S.

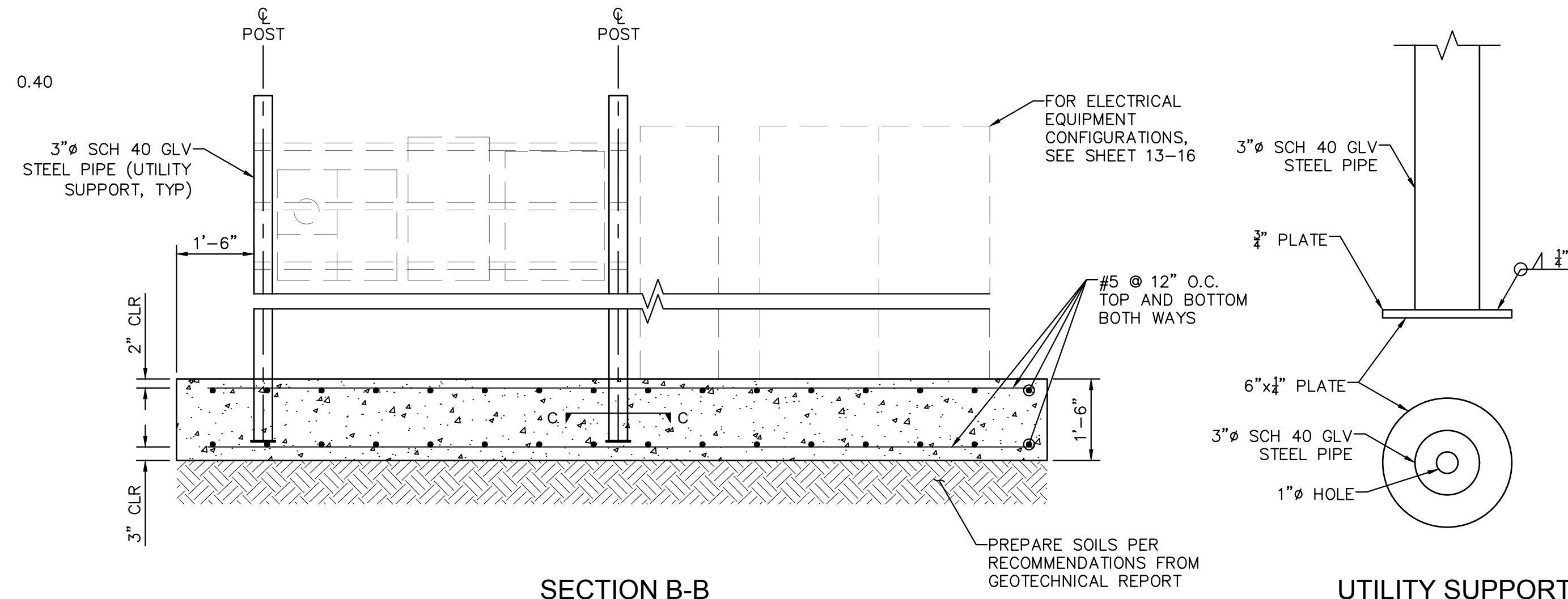
01 EQUIPMENT FOUNDATION DETAIL
N.T.S.



PLAN

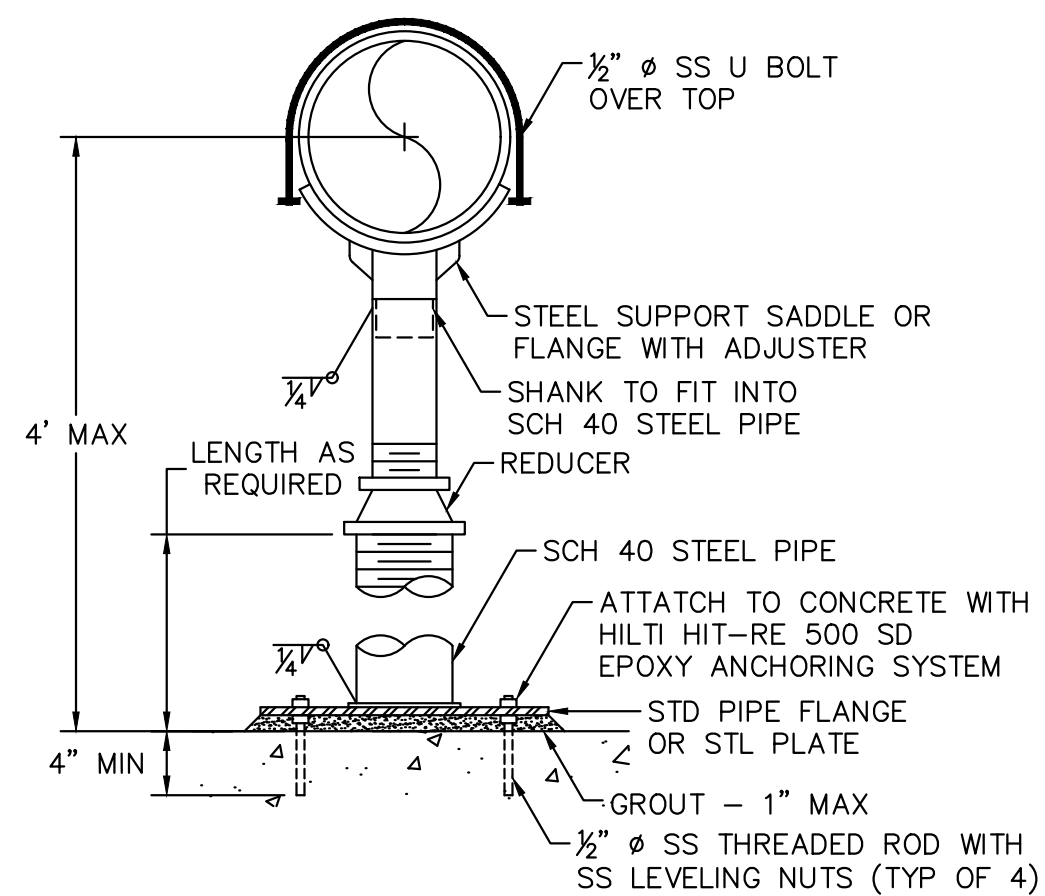
NOTE

- FOR CABINET ANCHORAGE TO FOUNDATION USE 4, $\frac{1}{2}$ " \emptyset HILTI BOLT TZ EXPANSION ANCHORS WITH 3- $\frac{1}{4}$ " MINIMUM EMBEDMENT AT EACH LOCATION.
- FOLLOW MANUFACTURERS RECOMMENDATION FOR INSTALLATION.
- DESIGN SPECIFICATIONS:
REINFORCED CONCRETE
F'c = 3,000 psi
Fy = 60,000 psi
SOIL
Kp = 350 psf/ft
COEFFICIENT OF FRICTION = 0.40
ALLOWABLE PRESSURE = 3,000 psf

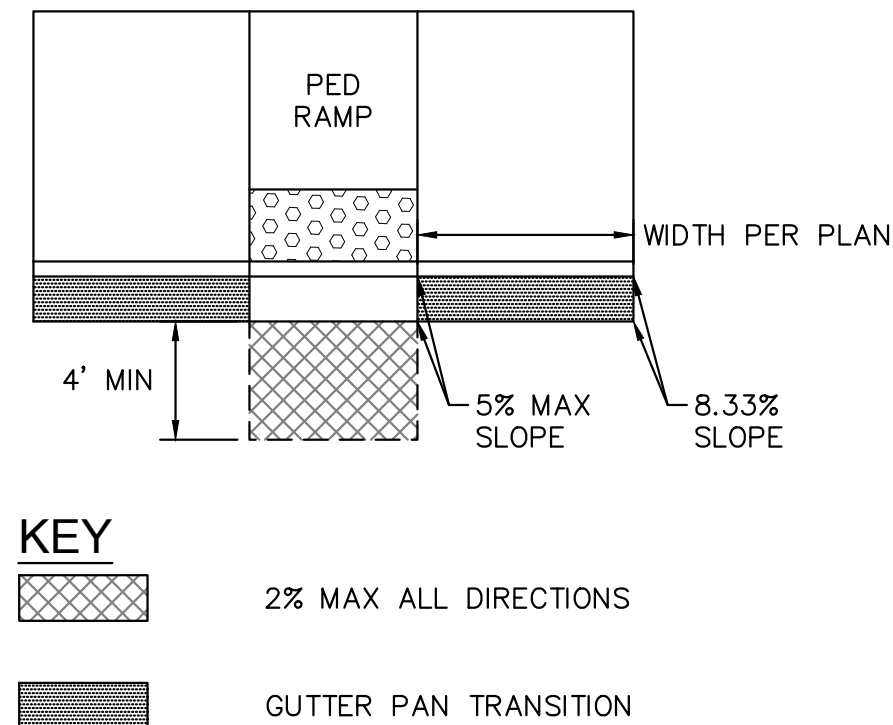


SECTION B-B

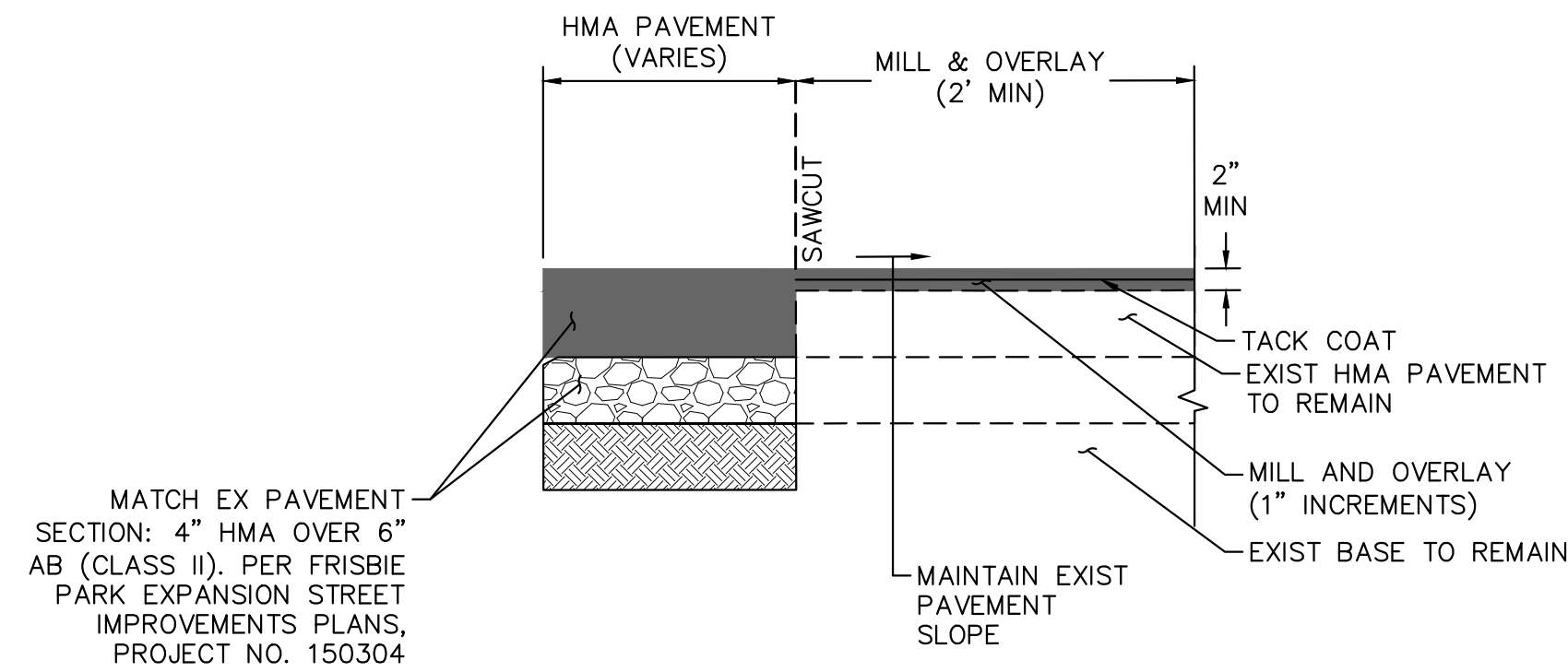
UTILITY SUPPORT
SECTION C-C



PIPE SUPPORT
N.T.S.



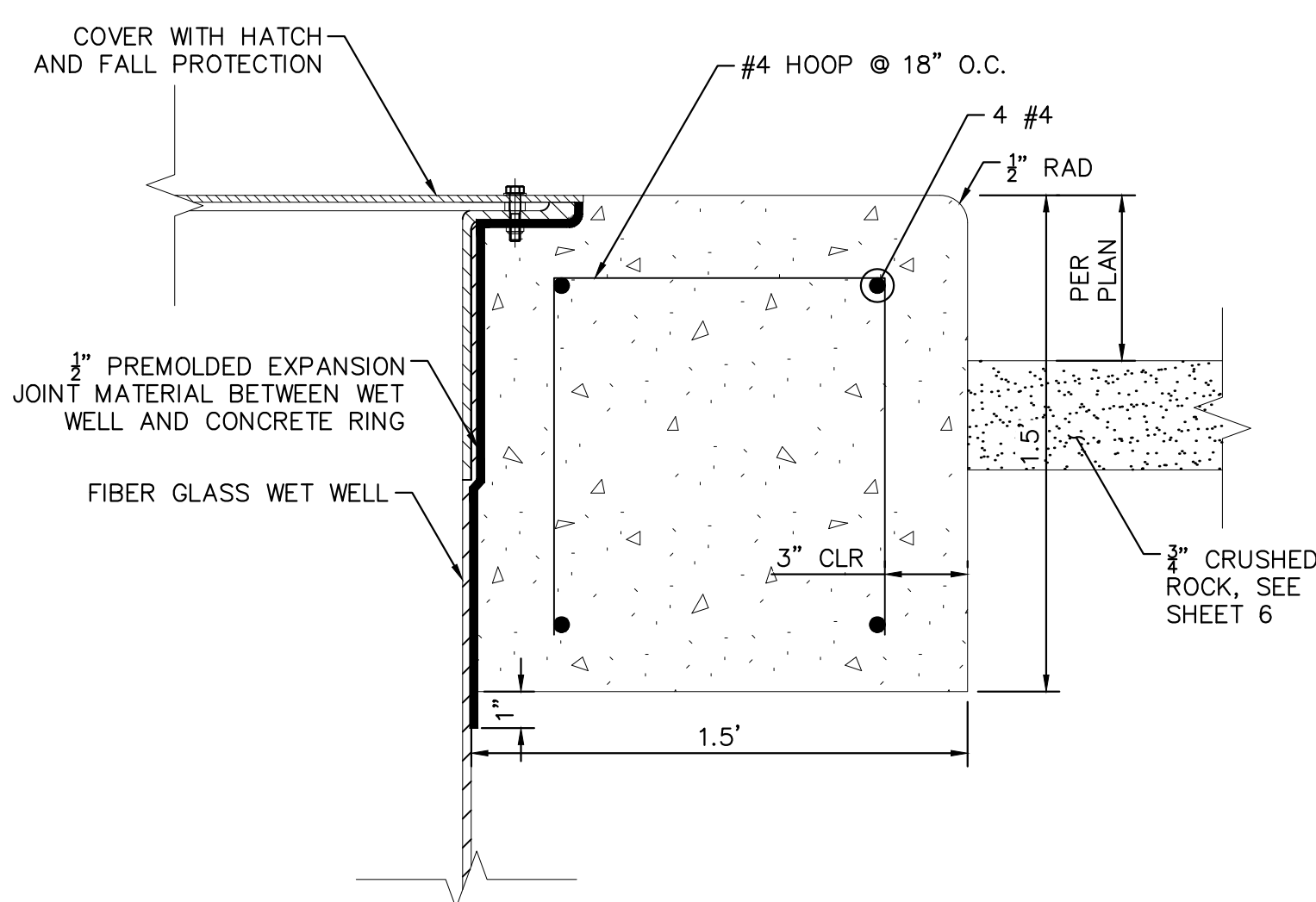
04 GUTTER PAN DETAIL
N.T.S.



NOTE

- MATCH EXISTING PAVEMENT ELEVATION AT LIMITS OF SAWCUT.

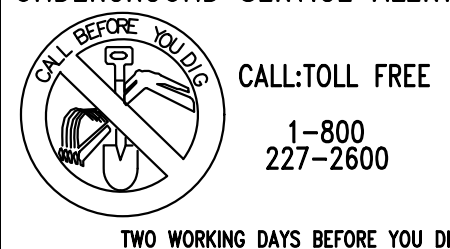
05 MILL AND OVERLAY
N.T.S.



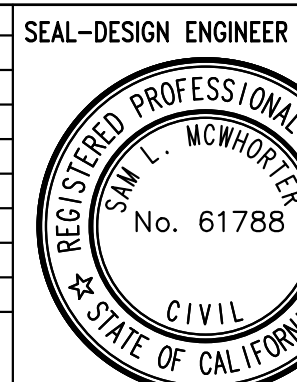
06 CONCRETE RING DETAIL
N.T.S.

07

UNDERGROUND SERVICE ALERT



MARK	REVISIONS	APPR.	DATE
DESIGNED BY: SM	DRAWN BY: MM	CHECKED BY: MA	



PREPARED UNDER THE SUPERVISION OF:

Samuel Lake McWhorter, RCE 61788

RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:

Carleton W. Lockwood, Jr., RCE 45935

Robert G. Eisenbeisz, Public Works Director/City Engineer, RCE 54931

6/4/19
DATE

DATE

DATE

Kimley»Horn

401 B Street, Suite 600, San Diego, CA 92101
Phone: (619) 234-9411
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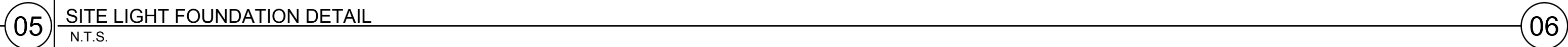
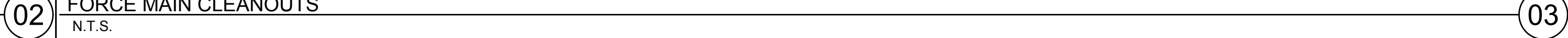
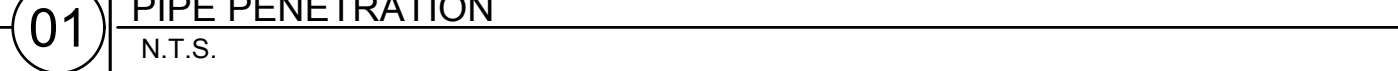
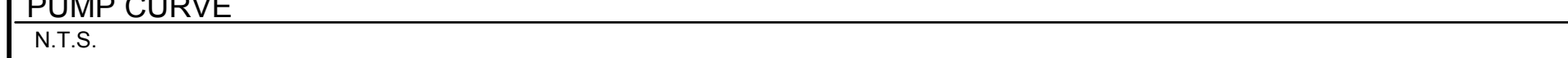
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CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
DETAILS

FOR: CITY OF RIALTO

PLAN No.

10
OF 16 SHEETS



SEAL-DESIGN ENGINEER

REGISTERED PROFESSIONAL ENGINEER
 SAM L. MCWHORTER
 No. 61788
 CIVIL
 STATE OF CALIFORNIA

FOR:		
CITY OF RIALTO		PLAN No.

DESIGN SPECIFICATIONS

DESIGN LOADS

ALLOWABLE SOIL BEARING PRESSURE = 3,000 psf

INTERNAL PRESSURE COEFFICIENT = 0 PSF

ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE PROCEDURE

WIRE: ASTM A82

- A. STEEL CONSTRUCTION (TABLE 1705.2.3)
- B. CONCRETE CONSTRUCTION (TABLE 1705.3)
- C. MASONRY CONSTRUCTION (SECTION 1705.4)
- D. SOILS (TABLE 1705.6)

ELEVATION

PLAN

SCALE: NTS

Sam McWhorter 6/4/19
SAMUEL LAKE MCWHORTER, RCE 61788 DATE
 RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:

 CARLETON W. LOCKWOOD, JR., RCE 45935 DATE

 ROBERT G. EISENREIS, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 549X1 DATE


























































































CITY OF RIALTO BENCH MARK: 061-88 ELEVATION=1466.77 FEET
DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.

SECTION X-X

(PER SEPARATE PERMIT)
SCALE: NTS

FOR: CITY OF RIALTO	PLAN No. _____
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ELECTRICAL SYMBOLS

SINGLE LINE DIAGRAMS	CONTROL WIRING DIAGRAMS	PLANS
 AMMETER  VOLTMETER  METER  KILOWATT HOUR METER  AMMETER SWITCH  VOLTMETER SWITCH  GROUND FAULT PROTECTION  CURRENT TRANSFORMER  POTENTIAL TRANSFORMER  POWER TRANSFORMER SEE NOTE 1.  CONTROL TRANSFORMER SEE NOTE 2.  DRAW OUT TYPE EQUIPMENT  DRAW OUT TYPE HIGH VOLTAGE MOTOR STARTER  PLUG-IN TYPE EQUIPMENT  CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE INDICATED  DISCONNECT SWITCH, 3 POLE UNLESS OTHERWISE INDICATED  OIL FUSE CUTOUTS  FUSE SEE NOTE 3.  TRANSFER SWITCH, AUTOMATIC  MAGNETIC MOTOR STARTER. "1" INDICATES SIZE 1. RV INDICATES REDUCED VOLTAGE. 2S INDICATES 2 SPEED. R INDICATES REVERSING.  MAGNETIC CONTACTOR  CONDUIT NUMBER 12. SEE CONDUIT AND WIRING SCHEDULE FOR SIZES AND QUANTITIES OF CONDUIT AND WIRES.  GROUND  KIRK KEY INTERLOCKING OF EQUIPMENT  EQUIPMENT FURNISHED, INSTALLED AND CONNECTED UNDER ANOTHER SECTION OF THE CONTRACT.  PHASE FAILURE RELAY  SURGE ARRESTER  EXISTING MOTOR (HP SHOWN)  NEW MOTOR (ESTIMATED HP SHOWN)  FUTURE MOTOR (ESTIMATED HP SHOWN)  MANHOLE  EYS SEAL	 NORMALLY OPEN  NORMALLY CLOSED  DEVICE  CONTACT  LIMIT SWITCH  LIMIT SWITCH HELD CLOSED  LIMIT SWITCH HELD OPEN  PRESSURE OR VACUUM SWITCH  LIQUID LEVEL SWITCH  TEMPERATURE ACTUATED SWITCH  FLOW SWITCH (AIR, WATER, ETC.)  PUSH BUTTON SINGLE CIRCUIT MOMENTARY CONTACT.  PUSH BUTTON SINGLE CIRCUIT LOCK-OUT(LOCATED AT MOTOR UNLESS OTHERWISE NOTED)  TIMED CONTACT- CONTACT ACTION RELAY ON ENERGIZATION.  TIMED CONTACT- CONTACT ACTION RELAY ON DE-ENERGIZATION.  ON-OFF SWITCH.  EMERGENCY STOP PUSH BUTTON (MAINTAINED CONTACT)  STOP -START PUSH-BUTTON STATION (MAINTAINED CONTACTS).  HAND-OFF-AUTO SELECTOR SWITCH SEE NOTE 3. (THREE POSITION).  TWO POSITION SELECTOR SWITCH SEE NOTE 3.  PILOT LIGHT, Y=YELLOW, R=RED, A=AMBER, SEE NOTE 3. B=BLUE, W=WHITE, G=GREEN.  BELL  HORN OR SIREN  CONTROL RELAY  STARTER COIL.  TIME DELAY RELAY. (0-30 SECONDS UNLESS OTHERWISE NOTED).  MOTOR STARTER OVERLOAD RELAY CONTACTS  CONTROL TRANSFORMER. SEE NOTES 2  MANUAL MOTOR STARTER  SOLENOID OPERATED CONTROL VALVE  120 VOLT, 1 PHASE, MOTOR (UNLESS OTHERWISE NOTED)  RUNNING TIME METER. (ELAPSED TIME METER)  SPACE HEATERS. (LOCATED AT MOTOR UNLESS OTHERWISE NOTED).  TERMINALS IN MOTOR CONTROL CENTER/MCP CONTACT OR DEVICE REMOTE FROM MOTOR CONTROL CENTER/MCP TERMINALS IN MOTOR CONTROL CENTER/MCP FOR CONNECTION TO REMOTE DEVICE/MCP DEVICE SIGNAL OUTPUT DEVICE SIGNAL INPUT	 CONDUIT RUN CONCEALED UNDER SLAB OR BELOW GRADE. (CONCEALED IN SLAB WHERE SO NOTED OR WHERE ALLOWED PER SPECIFICATIONS).  CONDUIT RUN EXPOSED UNLESS OTHERWISE NOTED  EXISTING CONDUIT RUN  GROUND WIRE  CONDUIT UP (OUT TOP OF EQUIPMENT)  CONDUIT DOWN (OUT BOTTOM OF EQUIPMENT)  CONDUIT STUBBED OUT AND CAPPED  LIGHTING FIXTURE MOUNTED ON POLE OR POST OR ABOVE PLATFORM  CEILING MOUNTED LIGHTING FIXTURE  BRACKET MOUNTED LIGHTING FIXTURE  FLOODLIGHT  FLUORESCENT LIGHTING FIXTURE  POLE MOUNTED LIGHT FIXTURE  EXIT LIGHT  RECESSED INCANDESCENT OR MERCURY VAPOR LIGHTING FIXTURE  LIGHTING FIXTURES CONNECTED TO EMERGENCY CIRCUITS  LIGHTING FIXTURE TYPE A, 100 WATTS, WITH 1 LAMP. SEE LIGHTING FIXTURE SCHEDULE  SINGLE POLE, SINGLE THROW TOGGLE SWITCH  DOUBLE POLE, SINGLE THROW TOGGLE SWITCH  THREE-WAY TOGGLE SWITCH  FOUR-WAY TOGGLE SWITCH  MANUAL MOTOR STARTER  OUTLETS SHOWN WITH SUBSCRIPT "a" ADJACENT TO THEM SHALL BE CONTROLLED BY S a

ABBREVIATIONS

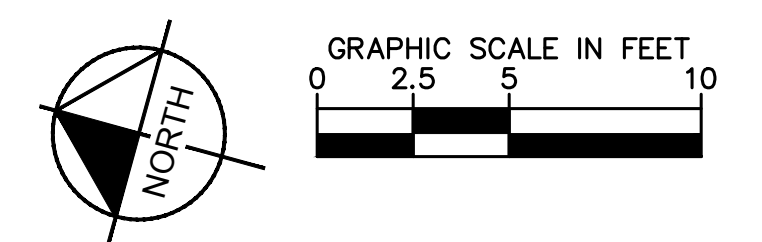
AMP AMPERE	GND GROUND	N.C. NORMALLY CLOSED
AL ALUMINUM	HP HORSEPOWER	NEC NATIONAL ELECTRICAL CODE
ATS AUTOMATIC TRANSFER SWITCH	HPS HIGH PRESSURE SODIUM	N.O. NORMALLY OPEN
AWG AMERICAN WIRE GAUGE	HZ HERTZ (CYCLES PER SECOND)	NO. NUMBER
BRK BREAKER	IC INTERRUPTING CAPACITY	PLC PROGRAMMABLE LOGIC CONTROLLER
CAT CATALOG	KV KILOVOLTS	PNL PANEL
CIRC. MIL CIRCULAR MILS (AWG)	LCL LONG CONTINUOUS LOAD	PR PAIR
C.O. CONDUIT ONLY	LTG LIGHTING	PVC POLYVINYL CHLORIDE
CKT CIRCUIT	MAX MAXIMUM	REC RECEPTACLE
CP CONTROL PANEL	MCC MOTOR CONTROL CENTER	RGS RIGID GALVANIZED STEEL
DIA DIAMETER	MCP MAIN CONTROL PANEL	SCE SOUTHERN CALIFORNIA EDISON
DWG DRAWING	MCM THOUSAND CIRCULAR MIL (AWG)	SCHED SCHEDULE
EA EACH	MFR MANUFACTURER	SES SERVICE ENTRANCE SECTION
ELECT ELECTRICAL	MIN MINIMUM	SPECS SPECIFICATIONS
ELEV ELEVATION	MIS MISCELLANEOUS	SSS SOLID STATE STARTER
EXIST EXISTING	MPZ MINI POWER ZONE	TEL TELEPHONE
FLA FULL LOAD AMPS	MTG MOUNTING	TDR TIME DELAY RELAY
FUT FUTURE	MV MERCURY VAPOR	TTB TELEPHONE TERMINAL BACKBOARD
GFCI GROUND FAULT CIRCUIT INTERRUPTER		TYP TYPICAL
		UCP UNIT CONTROL PANEL
		V VOLTS
		WP WEATHERPROOF
		XFMR TRANSFORMER

GENERAL ELECTRICAL REQUIREMENTS

1. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE ORDINANCES AND REGULATIONS. CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE, FINISHED AND SAFE MANNER, ACCORDING TO THE LATEST PUBLISHED N.E.C.A. STANDARDS OF INSTALLATION, UNDER COMPETENT SUPERVISION. INSTALL GROUNDING AS REQUIRED BY THE CODE(S).
2. VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND ALL OTHER FACTORS WHICH MAY AFFECT THE EXECUTION OF THIS WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
3. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, U.L. OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURER'S NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS AND BID PRICE. PROPOSED SUBSTITUTIONS SHALL BE SUBMITTED IN WRITING AND REVIEWED BY THE ENGINEER BEFORE ORDERING.
4. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED UNDER DIVISION 6 AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS OR ANY OTHER CAUSES. EQUIPMENT FOUND DAMAGED OR IN OTHER THAN NEW CONDITION WILL BE REJECTED AS DEFECTIVE.
5. LEAVE THE SITE CLEAN, REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS, LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK.
6. CIRCUIT CONDUCTORS #2 AWG OR SMALLER TO BE COPPER TYPE "XHHW" FOR BELOW GRADE INSTALLATION OR COPPER TYPE THHN/THWN FOR ABOVE GRADE INSTALLATIONS. #1 AWG OR LARGER SHALL BE COPPER TYPE "XHHW-2" STRANDED COPPER. MINIMUM CONDUCTOR SIZE TO BE #12 AWG WITH #12 GND.
7. UNDERGROUND CONDUITS TO BE SCHEDULE 40 PVC. MINIMUM DEPTH 30", MINIMUM SIZE 1", UNLESS OTHERWISE SHOWN ON THE PLANS. CONDUITS AS SHOWN ARE FOR INFORMATION ONLY. EXACT CONDUIT ROUTING SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR.
8. OUTDOOR CONDUITS EXPOSED TO BE GALVANIZED RIGID STEEL, MINIMUM SIZE 3/4", UNLESS OTHERWISE NOTED ON THE PLANS. GRS CONDUIT SHALL EXTEND BELOW GRADE TO THE FIRST ELBOW. ALL GRS CONDUIT EXPOSED TO EARTH SHALL BE HALF LAPPED WRAPPED IN SCOTCHRAP 50 10 MIL TAPE OR EQUAL. EXTEND WRAP TO A HEIGHT OF 12" ABOVE GRADE. INDOOR CONDUITS SHALL BE IMC OR EMT UNLESS OTHERWISE SHOWN ON PLAN.
9. ALL SAFETY SWITCHES AND OTHER DISTRIBUTION AND CONTROL ELECTRICAL EQUIPMENT SHALL BE U.L. LISTED AND RATED FOR HEAVY DUTY SERVICE.
10. ALL WIRING DEVICES SHALL BE SPECIFICATION GRADE.
11. ALL ELECTRICAL EQUIPMENT, CONDUIT, WIRING, BOXES, ETC. SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO ORDERING. THE SUBMITTALS SHALL BE NEATLY GROUPED AND ORGANIZED. PERTINENT INFORMATION SHALL BE HIGHLIGHTED, AND THE SPECIFIC PRODUCT SHALL BE IDENTIFIED. ALL SUBMITTALS SHALL BE COMPLETE, AND PRESENTED IN ONE PACKAGE. THE SUBMITTAL SHALL INCLUDE A COMPLETE LIST OF THE EQUIPMENT AND MATERIALS, INCLUDING THE MANUFACTURER'S NAME, PRODUCT SPECIFICATION, DESCRIPTIVE DATA, TECHNICAL LITERATURE, PERFORMANCE CHARTS, CATALOG CUTS, INSTALLATION INSTRUCTIONS, AND SPARE PART RECOMMENDATIONS FOR EACH DIFFERENT ITEM OF THE EQUIPMENT SPECIFIED.
12. IT IS THE OBLIGATION OF THE CONTRACTOR TO ORGANIZE HIS WORK, SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION, AND CONTROL SYSTEM FOR THE FACILITY WILL BE PROVIDED, AND WILL BE SUPPORTED BY ACCURATE SHOP AND RECORD DRAWINGS, AND O & M MANUALS.

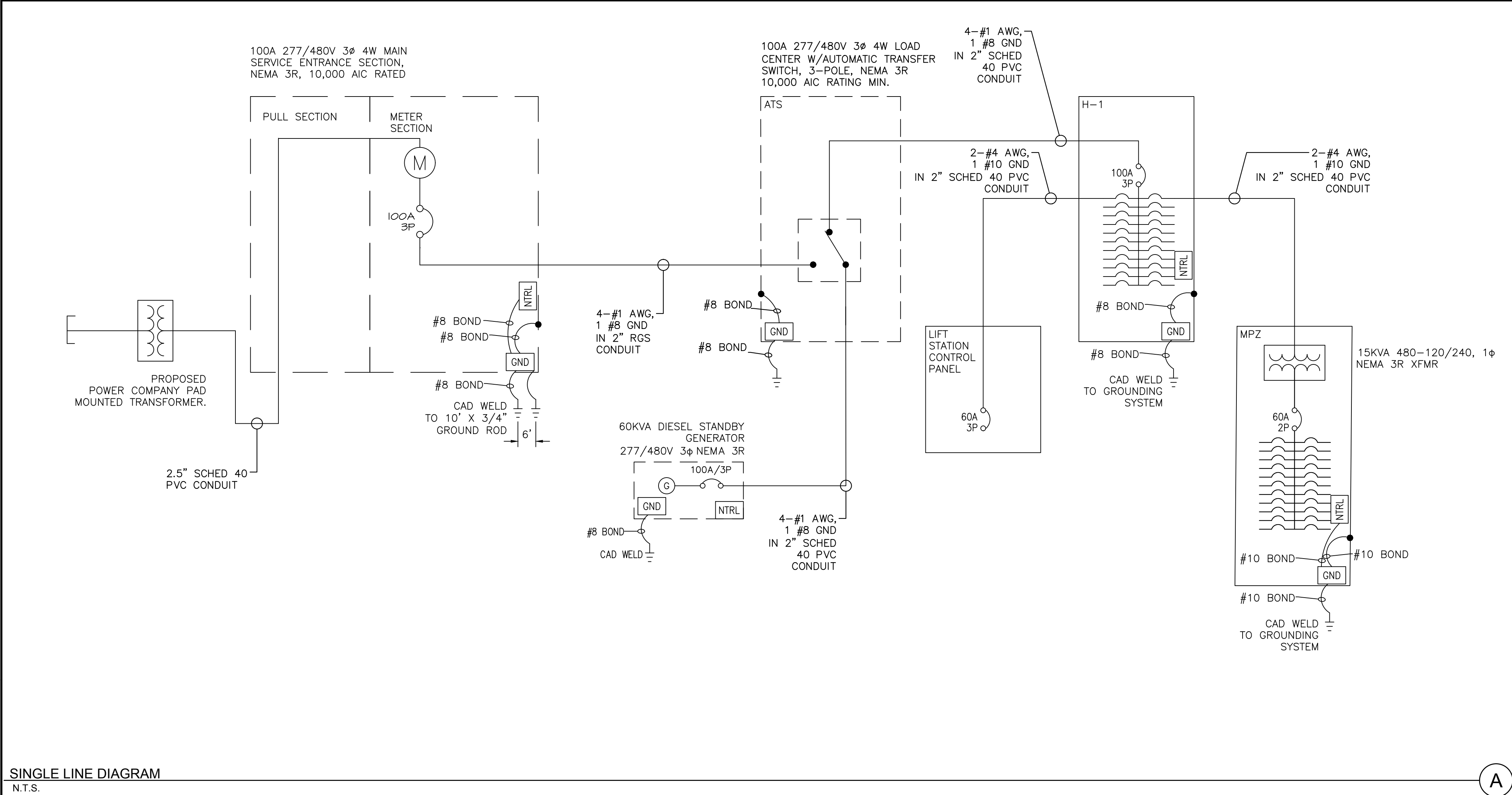
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- ① EXTEND POWER CONDUITS TO EACH PUMP MOTOR. SEND INDIVIDUAL POWER FEED TO EACH PUMP IN WELL.
- ② EXTEND COMMUNICATIONS CONDUIT TO JUNCTION BOX IN WELL. ROUTE 1 PAIR OF #16 AWG TO EACH LEVEL SWITCH IN WELL. KEEP SPARE IN JUNCTION BOX.
- ③ SEE SHEET EL-03 DETAIL A FOR ELECTRICAL EQUIPMENT RACK DETAILS.
- ④ SEE SHEET EL-03 FOR CONDUIT/CONDUCTOR INFORMATION OF ELECTRICAL RACK EQUIPMENT.
- ⑤ MAKE NEW SERVICE CONNECTION TO SCE POLE TOP TRANSFORMER.
- ⑥ PROVIDE 3/4" X 10' GROUND ROD SHOWN IN DETAIL C.
- ⑦ PER 2016 NFPA 820 TABLE 4.4.2 ROW A, THE WET WELL IS CLASS 1 DIV 1 GROUP D.
- ⑧ INSTALL LED LIGHT ON NEW POLE AND FOUNDATION PER DETAIL D ON SHEET 16.



FOR:		
CITY OF RIALTO		PLAN No.

Plotted By: Miller, Morgan; Sheet Set: Checkers - Onsite Precise Plans; Layout: ONE-LINE; June 04, 2019 04:57:51pm; K:\SND_WATER\0905927008 Frisbie Park Lift Station\Design\Plans\Sheet\Electrical.dwg

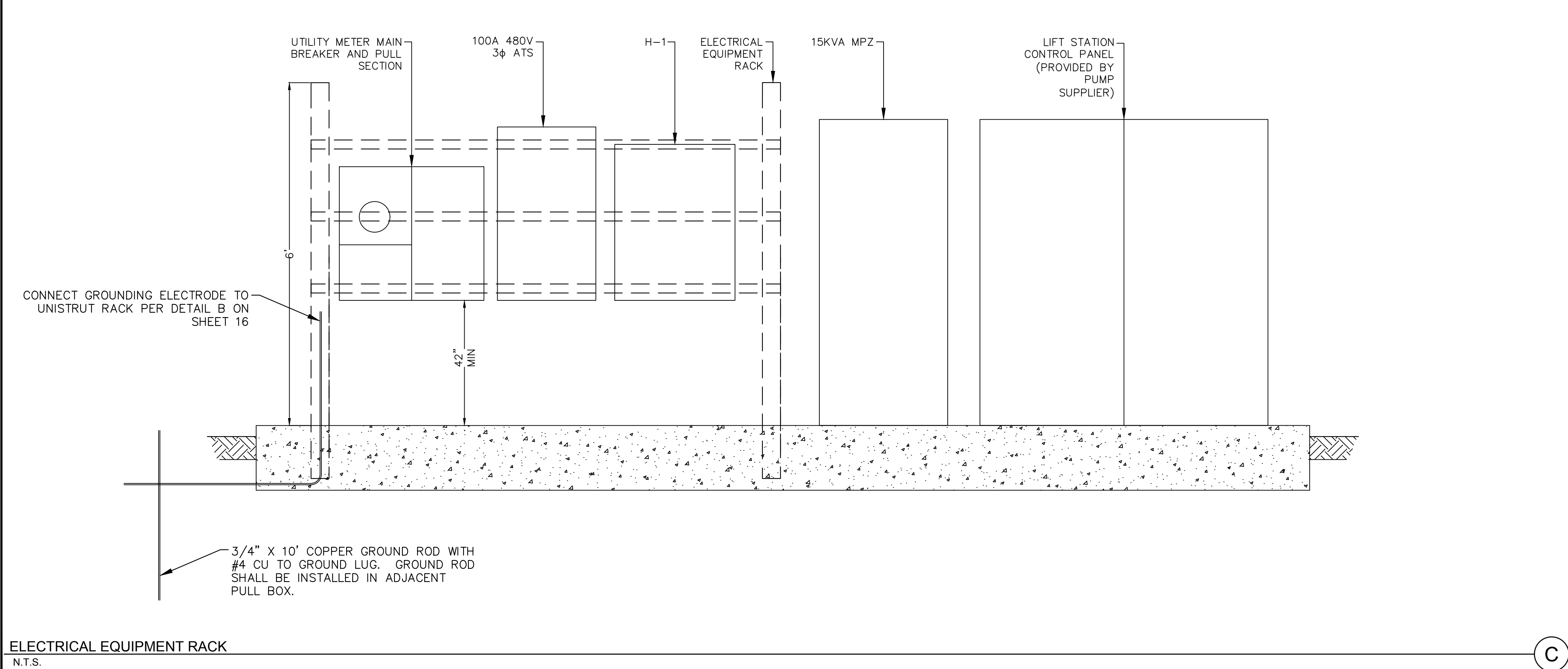


PANEL: H-1											
VOLTAGE: 277/480			PANEL BUS: 100		AMPS						
PHASE WIRES: 3ø, 4W			MAIN: 100		BREAKER						
SCCR (AMPS): 10,000											
SOURCE: UTILITY											
DESCRIPTION	KVA	CB	CKT	A	B	C	CKT	CB	KVA	DESCRIPTION	
LIFT STATION CONTROL PANEL (2 X 11 HP PUMPS)	6	60/3	1	23			2	60/2	0.44	MPZ	
	6		3		23		4		0.44		
	6		5			22	6				
SPACE			7	0			8			SPACE	
SPACE			9		0		10			SPACE	
SPACE			11			0	12			SPACE	
TOTALS			23.2	23.2	21.7	AMPS					
LOAD CALCULATIONS:											
			SUBTOTAL (KVA): 19								
			+25% PER NEC (KVA): 5								
			TOTAL (KVA): 24			@ 480V, 3ø = 28.4 AMPS					

PUMP CONTROL PANEL SCHEDULE

N.T.S.

B



PANEL: MPZ									
VOLTAGE: 120/240			PANEL BUS: 60 AMPS						
PHASE WIRES: 1ø, 3W			MAIN: 60A BREAKER						
SCCR (AMPS): 22,000									
SOURCE: UTILITY COMPANY									
DESCRIPTION	VA	CB	CKT	A	B	CKT	CB	VA	DESCRIPTION
RECEPTACLE	180	20/1	1	6.5		2	20	600	CONTROL PANEL RECEPTACLE
SITE LIGHT	100	20/1	3		2.5	4	20/1	200	BLOCK HEATER
BATTERY CHARGER	200	20/1	5	1.7		6			SPACE
SPACE			7		0.0	8			SPACE
SPACE			9	0.0		10			SPACE
SPACE			11		0.0	12			SPACE
SPACE			13	0.0		14			SPACE
SPACE			15		0.0	16			SPACE
SPACE			17	0.0		18			SPACE
SPACE			19		0.0	20			SPACE
SPACE			21	0.0		22			SPACE
SPACE			23		0.0	24			SPACE
TOTALS				8.2	2.5	AMPS			
LOAD CALCULATIONS:									
				SUBTOTAL (VA):		1280			
				+25% PER NEC (VA):		320			
				TOTAL (VA):		1600 @ 240V, 1Ø = 6.7 AMPS			

PUMP CONTROL PANEL SCHEDULE

N.T.S.

D

UNDERGROUND SERVICE ALERT

CALL BEFORE YOU DIG

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

MARK	REVISIONS	APPR.	DATE
DESIGNED BY: MAC	DRAWN BY: EG	CHECKED BY: PMS	

SEAL-DESIGN ENGINEER

MICHAEL ANTHONY COLOMBO

No. 19280

Exp: 09/30/2020

REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
STATE OF CALIFORNIA

PREPARED UNDER THE SUPERVISION OF:

MICHAEL ANTHONY COLOMBO, RCE 19280

6/4/19

DATE

RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:

CARLETON W. LOCKWOOD, JR., RCE 45935

DATE

ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931

DATE

Kimley»Horn

401 B Street, Suite 600, San Diego, CA 92101

Phone: (619) 234-9411

WWW.KIMLEY-HORN.COM

CITY OF RIALTO BENCH MARK: 061-88

ELEVATION=1466.77 FEET

DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.

CITY OF RIALTO

FRISBIE PARK SEWER LIFT STATION

CITY PROJECT #190501

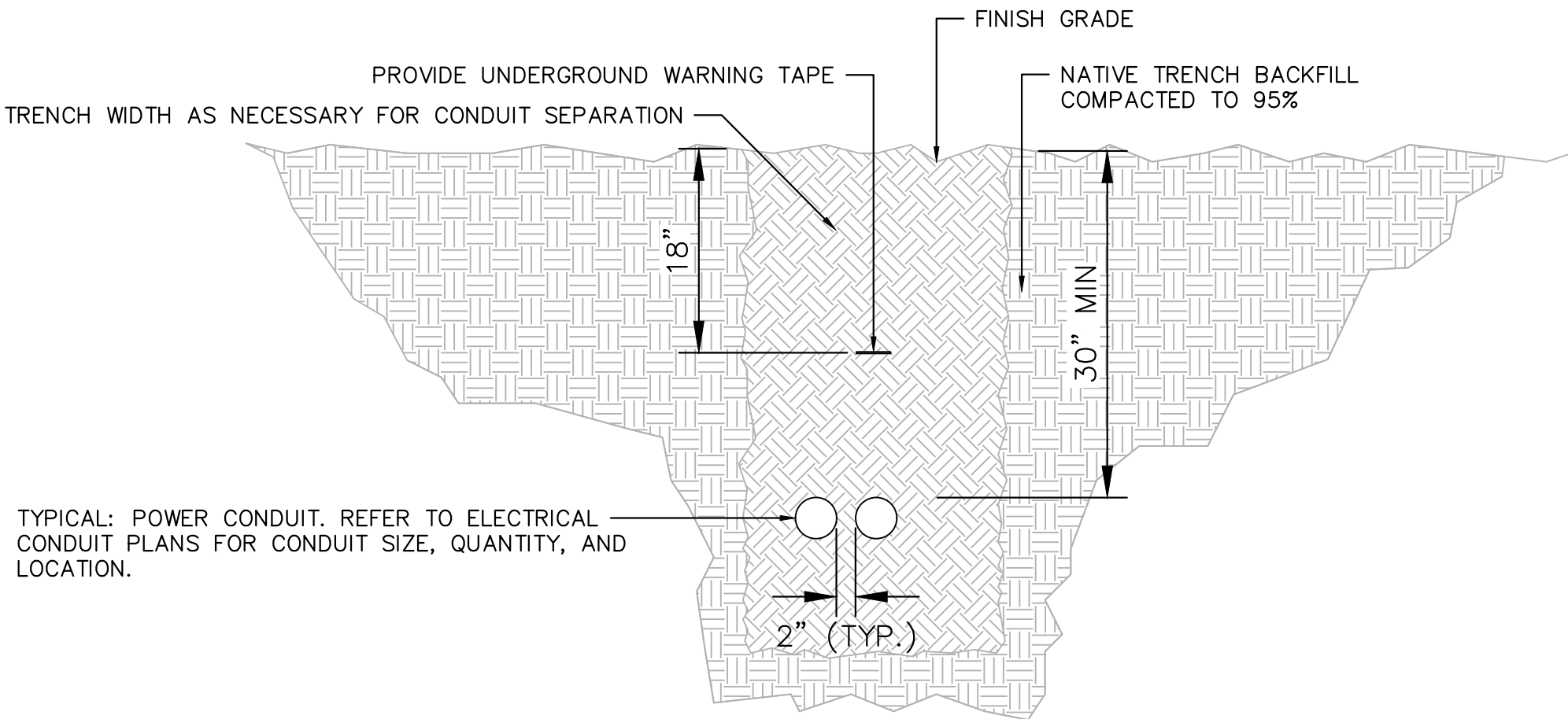
ELECTRICAL ONE-LINE

FOR: CITY OF RIALTO

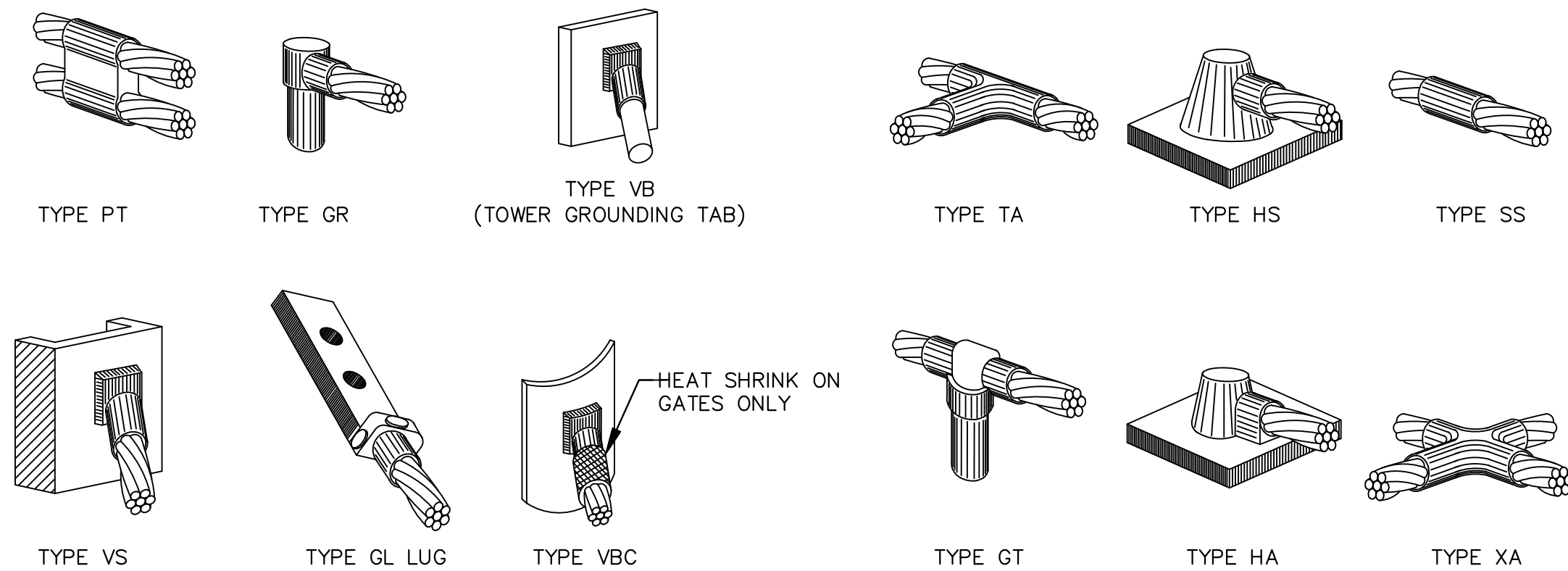
PLAN No. _____

15

OF 16 SHEETS

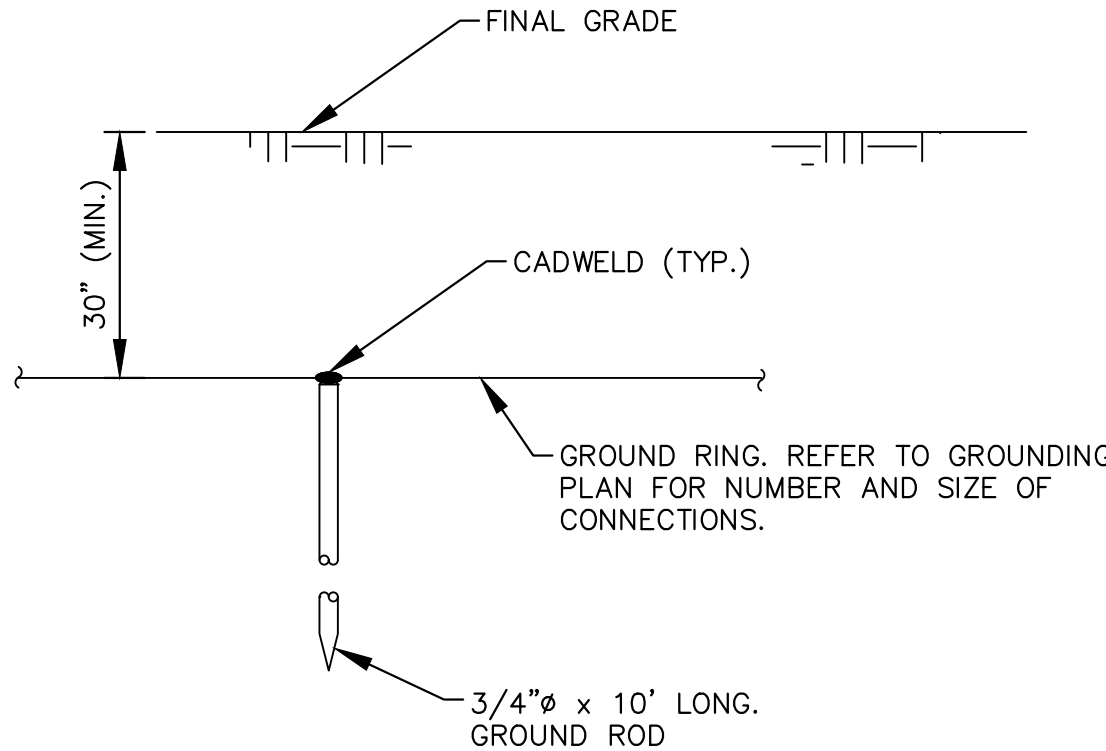


TRENCH DETAIL
N.T.S.



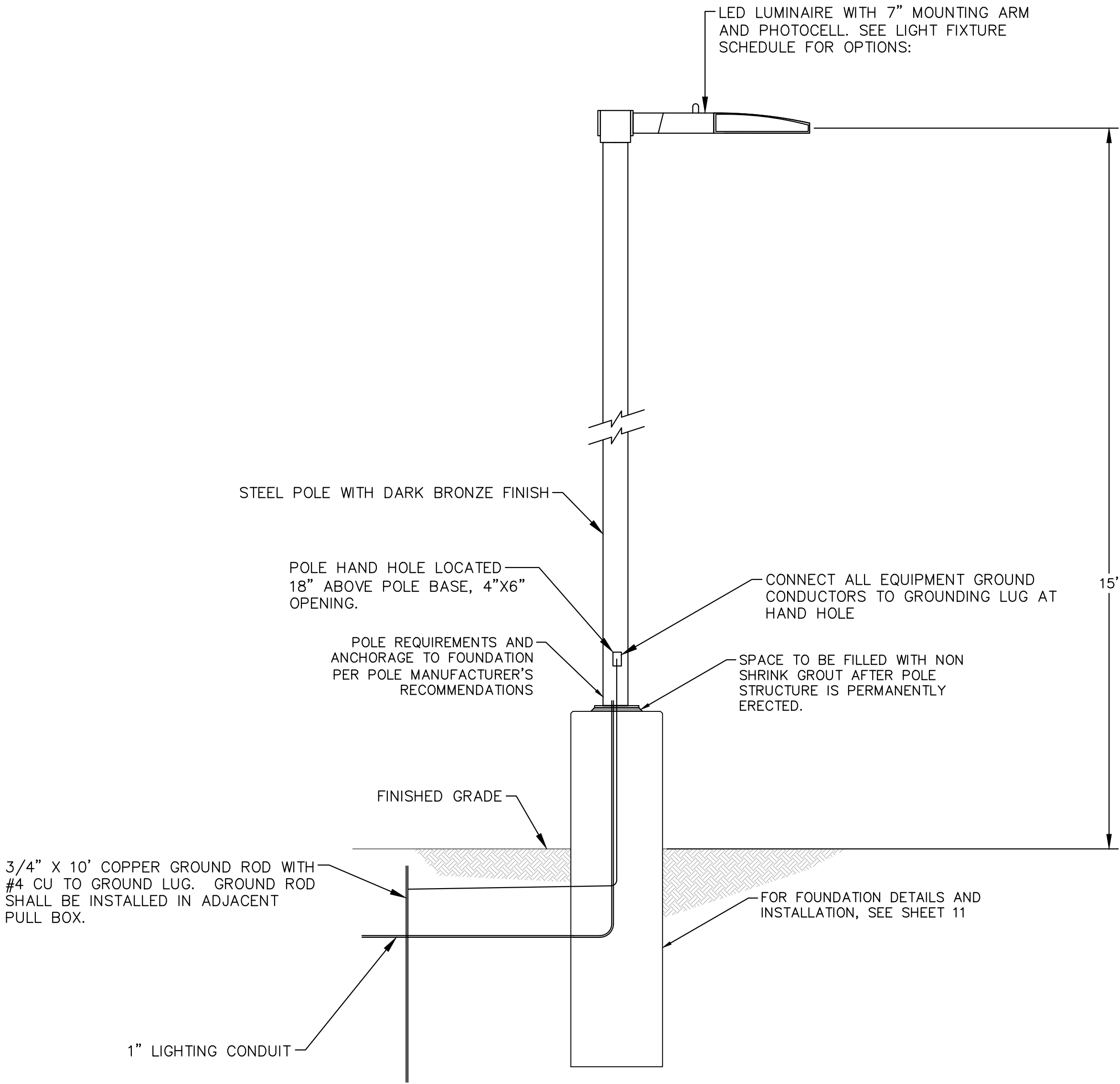
NOTES:
1. CADWELD "TYPES" SHOWN ABOVE ARE EXAMPLES. PROVIDE APPROPRIATE TYPES AS REQUIRED.

TYPICAL CAD WELDS
N.T.S.



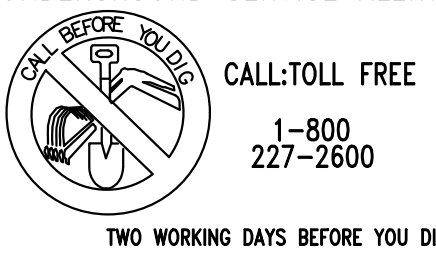
GROUND ROD DETAIL
N.T.S.

LIGHT FIXTURE SCHEDULE	
DESCRIPTION & MANUFACTURER	
	LED AREA LIGHT - TYPE IV FORWARD THROW DISTRIBUTION COOPER GLEON MODEL GLEON-AF-02-LED-E1-T4W-BZ-800mA WITH PHOTOCELL

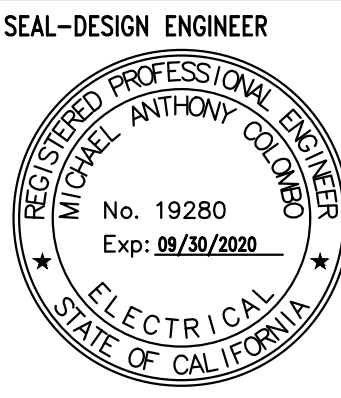


SITE LIGHT POLE DETAIL
N.T.S.

UNDERGROUND SERVICE ALERT



MARK	REVISIONS	APPR.	DATE
DESIGNED BY: MAC	DRAWN BY: EG	CHECKED BY: PMS	



PREPARED UNDER THE SUPERVISION OF:	
MICHAEL ANTHONY COLOMBO, RCE 19280	6/4/19
RECOMMENDED FOR APPROVAL BY LOCKWOOD ENGINEERING:	
CARLETON W. LOCKWOOD, JR., RCE 45935	DATE
ROBERT G. EISENBEISZ, PUBLIC WORKS DIRECTOR/CITY ENGINEER, RCE 54931	DATE

Kimley»Horn

401 B Street, Suite 600, San Diego, CA 92101
Phone: (619) 234-9411
WWW.KIMLEY-HORN.COM

CITY OF RIALTO BENCH MARK: 061-88 ELEVATION=1466.77 FEET
DESCRIPTION: THE BENCHMARK FOR THIS SURVEY IS CITY OF RIALTO BENCHMARK "061-88", CALTRANS BENCHMARK "19-C-88" BRASS DISK SET IN TOP OF CURB AT THE END OF NORTHWEST RETURN 32 FEET NORTH OF CENTERLINE OF CASMALIA STREET 67 FEET WEST OF CENTERLINE OF AYALA AVENUE.

CITY OF RIALTO
FRISBIE PARK SEWER LIFT STATION
CITY PROJECT #190501
ELECTRICAL DETAILS

FOR: CITY OF RIALTO
PLAN No. _____