PROJECT MANUAL Specifications for Construction

for

FOSTER CITY LEVEE IMPROVEMENTS PROJECT NO. CIP 301-657

at

FOSTER CITY, CALIFORNIA 94404

CITY OF FOSTER CITY PUBLIC WORKS DEPARTMENT



City of Foster City Public Works Department 610 Foster City Boulevard Foster City, California 94404

Release Date: May 5, 2020

Bid Open Date: Tuesday June 30, 2020

Contract Number: CIP 301-657

SECTION 00 0105 CERTIFICATIONS

SPECIFICATION SECTIONS: Divisions 01-48 unless otherwise noted.

PREPARED UNDER THE SUPERVISION OF:

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END OF SECTION

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SECTION 00 11 13 NOTICE INVITING BIDS

PART 1 INVITATION TO BID

1.01 NOTICE INVITING BIDS

A. City will receive sealed Bids at the Public Works Office, located at 610 Foster City Boulevard, Foster City, California 94404 until 2:00 p.m. on Tuesday June 30, 2020 for the following public work:

CITY OF FOSTER CITY

FOSTER CITY LEVEE IMPROVEMENTS CIP 301-657

FOSTER CITY, CALIFORNIA 94404

1.02 THE PROJECT

- A. The Project consists of construction of the Foster City Levee Improvement and any other items shown to be constructed on the Contract Plans or Specifications, including repair, and reconstruction of existing improvements affected by the Work, and incidentals for complete and usable facility.
- B. The Work to be done under this Contract includes the furnishing of all project management, labor, materials, tools, equipment and services necessary for and incidental to the construction of the Project as noted on the Plans and in the Specifications and all other Contract Documents including the General Conditions and General Requirements.
- C. The Project shall be completed within 1,200 calendar days from the date when contract time commences to run.

1.03 LOCATION OF PROJECT

- A. Work sites are in Foster City, California along the San Francisco Bay Trail.
- B. All Work takes place within the rights-of-way of the City of Foster City or Estero Municipal Improvement District, land leased from the State of California, land owned by the State of California under the authority of an encroachment permit, or on private property with permission from property owners secured by the City.

1.04 PROCURMENT OF BIDDING DOCUMENTS

A. Bidding Documents contain the full description of the Work. Bidders may download a complete set of the Bidding Documents and associated information at:

https://fostercity.sharepoint.com/:f:/g/publicworks/EkSSYwXOueROkvl3GtkryekBebio 9rLFh2zBYcp-J5Rw8Q?e=KIWvzk

- B. Bidders are free to print and disseminate bidding documents obtained from the referenced link as they see fit.
- C. Bidding documents need not be returned to City. Bidders are responsible for printing the Bid Documents for their convenience.

1.05 INSTRUCTIONS

- A. Bidders shall refer to Section 00 21 13 (Instructions to Bidders) for required documents and items to be submitted in a sealed envelope for deposit into the bid box in the City Clerk's Office, located at 610 Foster City Boulevard, Foster City, California 94404 no later than the time and date set forth in Paragraph 1.01A.
- B. Only pre-qualified bidders are eligible to submit a bid.

1.06 MANDATORY PRE-BID CONFERENCE AND SITE VISIT

- A. City will conduct a mandatory pre-bid conference at 10:00 a.m. on Wednesday May 20, 2020 using a pre-arranged web-based platform for the conference portion. The pre-bid conference is anticipated to last approximately one to two hours.
 - The web-based platform will be Zoom. A secure email link will be provided by the City to all prequalified bidders, using the contact information provided in their respective prequalification packages. The secure link can be forwarded internally as desired. Attendance at the pre-bid conference will be taken by voice roll call at the beginning and end of the meeting. Only those prequalified contractors in attendance at either roll call are eligible to submit a bid.
- B. Bidders shall conduct site visits unaccompanied by City staff and representatives. Comply with the requirements of the San Mateo County Shelter-in-Place Orders effective at the time when site visit(s) are made.
- C. Only pre-qualified bidders that attend the mandatory pre-bid conference and site visit are eligible to submit a bid.

1.07 BID PREPARATION COST

A. Bidders are solely responsible for the cost of preparing their bids.

1.08 RESERVATION OF RIGHTS

A. The City specifically reserves the right, in its sole discretion, to reject any or all bids, to re-bid, or to waive inconsequential defects in bidding not involving time, price or quality of the Work. The City may reject any and all bids and waive any minor irregularities in the bids.

PART 2 LEGAL REQUIREMENTS

2.01 REQUIRED LICENSES

- A. A California "A" contractor's license is required to bid this contract. Joint ventures must secure a joint venture license prior to award of this Contract.
- B. Specialty work may require a specialty contractor's license "C" held by bidder or a listed subcontractor.

2.02 REQUIRED CONTRACTOR AND SUBCONTRACTOR REGISTRATION

- A. City shall accept bids only from pre-qualified bidders that (along with all subcontractors listed in Document 00 43 30, Subcontractor List) are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.
- B. Subject to Labor Code Sections 1771.1(c) and (d), any bid not complying with Paragraph 2.02A shall be returned and not considered.
- C. Provided that bidder is a joint venture (Business & Professions Code Section 7029.1), City may accept a non-complying bid if bidder and all listed subcontractors are registered at the time of Contract award.
- D. The determination of lowest bid shall be based upon the base contract bid.

2.03 SUBSTITUTION OF SECURITIES

A. City will permit the successful bidder to substitute securities for any retention monies withheld to ensure performance of the contract, as set forth in Document 00 62 90, Escrow Agreement For Security Deposits In Lieu Of Retention, and incorporated herein in full by this reference, in accordance with Section 22300 of the California Public Contract Code.

2.04 PREVAILING WAGE LAWS

- A. The successful bidder shall comply with all prevailing wage laws applicable to the Project, and related requirements contained in the Contract Documents.
 - Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at the City's Public Works Department, may be obtained from the California Department of Industrial Relations website and are deemed included in the Bid Documents.
 - 2. The City will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rates on file as aforesaid. The possibility of a wage increase is one of the elements to be considered by the Bidder in determining their bid and will not be considered as the basis of a claim against the City.
 - 3. Upon request, City will make available copies to any interested party.

- 4. Also, the successful bidder shall post the applicable prevailing wage rates at the Project site.
- B. Prevailing Wage Monitoring: This Project is subject to prevailing wage compliance monitoring and enforcement by the Department of Industrial Relations.

5/5/2020 2:10:18 PM PDT Dated:	By: Morm Dorais FORCECENCENCE Norm Dorais, P.E. Director of Public Works/City Engineer City of Foster City Foster City, California 94404
N/A Published:	Priscilla Schaus Priscilla Schaus City Clerk City of Foster City Foster City, California 94404

END OF SECTION

SECTION 00 21 13 INSTRUCTIONS TO BIDDERS

PART 1 PROCEDURES FOR SUBMISSION OF BIDS

1.01 MANDATORY PRE-BID CONFERENCE AND SITE VISIT

- A. City will conduct a pre-bid conference and site visit at the date, time and location indicated in Section 00 11 13 (Notice Inviting Bids), to consider such matters as bidders may request and perform a site visit immediately following.
 - 1. Bidders must attend the pre-bid conference and site visit and sign an attendance roster as a condition to bid.
- B. The site visit may be the bidders' only opportunity to investigate conditions at the site in the presence of City representatives. Other pre-bid site visits may be scheduled at City's sole discretion, depending on staff availability.
 - 1. It is noted that the entirety of the Project Site is publicly accessible.
- C. City will issue minutes of the pre-bid conference, which shall constitute the sole and exclusive record and statement of the results of the pre-bid conference. The minutes issued by City are not part of the Contract Documents.

1.02 PRE-BID INVESTIGATIONS

- A. Prior to submission of bids, bidders are expected to have conducted a careful examination of bidding documents and understand the nature, extent, and location of Work to be performed.
 - 1. Refer to Section 00 72 00 (General Conditions) on required pre-bid investigations.
- B. Bidders may examine any available existing conditions information (e.g., record documents, specifications, studies, drawings of previous work), as well as applicable environmental assessment information regarding the Project.
 - 1. Documents will be made available digitally as a package for download to each pre-qualified bidder.

1.03 BIDDER QUESTIONS

A. Bidders must direct all questions about the meaning or intent of bidding documents to City in writing. Interpretations or clarifications considered necessary by City in response to such questions will be issued by written addenda mailed, faxed, or delivered to all parties recorded by City as having received bidding documents. City may not answer questions received less than ten days prior to the date for opening bids.

B. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and bidders shall not rely on oral statements.

1.04 ADDENDA

- A. Addenda may also be issued to modify the bidding documents as deemed advisable by City. Addenda shall be acknowledged by number in the Bid Form (Document 00 41 13) and shall be part of the Contract Documents.
- B. A complete listing of addenda may be secured from the City.

PART 2 RECEIPT OF BIDS

2.01 DATE AND TIME

- A. Sealed Bids will be received by the City until the date and time indicated in the Notice Inviting Bids (Section 00 11 13).
- B. All Bid envelopes will be time-stamped to reflect their submittal time.
- C. City shall reject all bids received after the specified time and will return such bids to their respective bidders unopened.

2.02 BID SUBMITTAL

- A. Bids shall be submitted in accordance with these Specifications.
- B. Only bids from pre-qualified contractors will be considered. Bids submitted by bidders that have not been pre-qualified will be returned to their respective bidders unopened.
- C. Bids shall be submitted in opaque sealed 10-inch x 13-inch envelopes, containing the required items described herein.
- D. Bidders shall mark their bid envelopes using the name, address, identifying information and contract number, indicated in Section 00 11 13 (Notice Inviting Bids).
- E. Required Contents of Bid Submittal Envelope
 - <u>Document 00 41 13 (Bid Form).</u> Bidders must submit bids on Document 00 41 13 (Bid Form) in accordance with the provisions of said document. Bidders must completely fill out all bid items and supply all information required by the bid documents and specifications.
 - Document 00 43 13 (Bond Accompanying Bid). Bidders must submit Document 00 43 13 (Bond Accompanying Bid) accompanied by a cashier's check, certified check (certified without qualification and drawn on a solvent bank of the State of California or a national bank doing business in the State of California) or completed form of Document 00 43 13 of not less than 10% of the base bid,

payable to City and completed in accordance with the provisions of Document 00 43 13.

- 3. <u>Document 00 43 14 (Bidder Registration Form).</u> Bidders must submit Document 00 43 14 (Bidder Registration Form), completed in accordance with the provisions of Document 00 43 14.
- 4. Document 00 43 30 (Subcontractors List). Bidders must submit Document 00 43 30 (Subcontractors List) completed in accordance with the provisions of Document 00 43 30. The Subcontractors List must include the names of all subcontractors for those subcontractors who will perform any portion of the Work, including labor, rendering of service, or specially fabricating and installing a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of the total bid amount. Any violation of this requirement may result in a bid being deemed non-responsive and not being considered.
- 5. <u>Document 00 45 19 (Non-Collusion Affidavit)</u>. Bidders must submit Document 00 45 19 (Non-Collusion Affidavit) completed in accordance with the provisions of Document 00 45 19.
- 6. <u>Document 00 45 46 (Bidder Certifications).</u> Bidders must submit Document 00 45 46 (Bidder Certification) completed in accordance with the provisions of Document 00 45 46.

PART 3 BID OPENING AND EVALUATION

3.01 DETERMINATION OF APPARENT LOW BIDDER

- A. City will open each bidders' envelope submittal at the time and place indicated in Section 00 11 13 (Notice Inviting Bids), initially evaluate them for responsiveness, and determine an Apparent Low Bidder as specified herein and in Section 00 11 13 (Notice Inviting Bids) and Document 00 41 13 (Bid Form).
- B. Apparent Low Bid will be determined solely on the total amount of all bid items based on terms contained in Section 00 11 13 (Notice Inviting Bids) and Document 00 41 13 (Bid Form). All bidders are required to submit bids on all bid items including any alternates.
- C. If Apparent Low Bidder is determined to be non-responsive or non-responsible, then City may proceed to the next Apparent Low Bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder.

3.02 EVALUATION OF BIDS

A. Bids must be full, complete, clearly written and using the required forms. Bidders shall make any change in the bid by crossing out the original entry, entering and initialing the new entry. Bidder's failure to submit all required documents strictly as required entitles City to reject the bid as non-responsive. All bidders must submit bids containing each of the fully executed Bid Documents.

- B. In evaluating bids, City will consider whether or not the bids comply with the prescribed requirements, unit prices, and other data, as may be requested in Document 00 41 13 (Bid Form) or prior to the Notice of Award.
- C. City shall have the right to communicate directly with bidders' sureties regarding bidders' bonds.
- D. Discrepancies between the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words.
- E. Bids shall be deemed to include the written responses of the bidder to any questions or requests for information of City made as part of bid evaluation process after submission of Bid.

3.03 RESERVATION OF RIGHTS

- A. City reserves the right to reject any or all nonconforming, non-responsive, unbalanced, or conditional bids, and to reject the bid of any bidder as non-responsive as a result of any error or omission in the bid, or if City believes that it would not be in the best interest of Project to make an award to that bidder, whether because the bid is not responsive or fails to meet any other pertinent standard or criteria established by City. For purposes of this paragraph, an "unbalanced bid" is one having nominal prices for some bid items and enhanced prices for other bid items.
- B. City may retain bid securities and bid bonds of other than the Apparent Low Bidder for a period of 90 Days after award or full execution of the Contract, whichever first occurs.
- C. City may reject any or all bids and waive any informalities or minor irregularities in the bids. City also reserves the right, in its discretion, to reject any or all bids and to re-bid the Project.
- D. City reserves the right to postpone the date and time for receiving bids and/or the opening of bids at any time prior to the date and time established in the Notice Inviting Sealed Bids. Postponement notices may be emailed to prequalified bidders of record in the form on an addendum.

3.04 REQUIRED CONTRACTOR AND SUBCONTRACTOR REGISTRATION

- A. City shall accept bids only from pre-qualified bidders that (along with all subcontractors listed in Document 00 43 30, Subcontractors List) are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5.
- B. Subject to Labor Code Sections 1771.1(c) and (d), any Bid not complying with paragraph 3.04.A, above, shall be returned and not considered; provided that if Bidder is a joint venture (Business & Professions Code Section 7029.1), City may

accept a non-complying bid provided that bidder and all listed subcontractors are registered at the time of Contract award.

PART 4 MANDATORY BID PROTEST PROCEDURES

4.01 SUBMISSION OF WRITTEN BID PROTEST

- A. Any bid protest in connection with the construction contract or work described in general in Section 00 11 13 (Notice Inviting Bids) must be submitted in writing to the City's/District's Authorized Representative, located at 610 Foster City Boulevard, Foster City, California 94404, before 3:30 p.m. of the fifth business day following the bid opening.
- B. The initial protest document must contain a complete statement of the basis for the protest.
- C. The protest must refer to the specific portion of the document that forms the basis for the protest.
- D. The protest must include the name, address, and telephone number of the person representing the protesting party.
- E. Only Bidders who the City otherwise determines are responsive and responsible are eligible to protest a bid; protests from any other bidder will not be considered.
 - 1. To determine whether a protesting bidder is responsive and responsible, City may evaluate all information contained in any protesting bidder's bid and conduct the same investigation and evaluation as City is entitled to take regarding an Apparent Low Bidder.
- F. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

4.02 EXCLUSIVE REMEDY

A. The procedure and time limits set forth in this paragraph are mandatory and are bidder's sole and exclusive remedy in the event of bid protest. Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings. A bidder may not rely on a protest submitted by another bidder but must timely pursue its own protest.

PART 5 AWARD AND EXECUTION OF CONTRACT

5.01 NOTICE OF AWARD AND SUBMITTAL OF EXECUTED CONTRACT DOCUMENTS

- A. If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. City will issue a Notice of Award (Document 00 51 00). Such Award, if made, will be made within sixty (60) days after the opening of the bid proposals, unless there is a bid protest, in which case the Notice of Award will be made within ninety (90) days after the day of bid opening.
- B. Successful bidder must execute and submit to City the "Required Contract Documents and Proof of Insurance" set forth below, by 5:00 p.m. of the 20th day following the Notice of Award.

5.02 Required Contract Documents and Proof of Insurance

- A. <u>Document 00 52 00 (Agreement)</u>, fully executed by successful bidder. Submit two originals, each bearing an original signature on the signature page and initials on each page.
- B. <u>Document 00 61 13.13 (Construction Performance Bond)</u>, fully executed by successful bidder and surety, in the amount set forth in Document 00 61 13.13. Submit one original.
- C. <u>Document 00 61 13.16 (Construction Labor and Material Payment Bond)</u>, fully executed by successful bidder and surety, in the amount set forth in Document 00 61 13.16. Submit one original.
- D. <u>Document 00 65 36 (Guaranty)</u>, fully executed by successful bidder. Submit one original, bearing an original signature on the signature page and initials on each page.
- E. Insurance certificates and endorsements required by Section 00 73 16 (Supplementary Conditions—Insurance): Submit one original set.
- F. Any other items identified by Owner in Document 00 51 00 (Notice of Award).

5.03 FAILURE TO EXECUTE AND DELIVER DOCUMENTS

A. If bidder to whom Contract is awarded, within the period described in this Section, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, City may, in its sole discretion, rescind the award, recover on bidder's surety bond, or deposit bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for bidder's failure to enter into the Contract. Bidder agrees that calculating the damages City may suffer as a result of bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of bidder's required bid security shall be the agreed and presumed amount of City's damages.

B. Upon such failure to timely deliver all required Contract Documents as set forth herein, City may determine the next Apparent Low Bidder and proceed accordingly. Such Award, if made, will be made within sixty (60) days after the opening of the bid proposals.

PART 6 GENERAL CONDITIONS AND REQUIREMENTS

6.01 MODIFICATION OF COMMENCEMENT OF WORK

- A. City expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. City accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.
- B. City shall have the right to communicate directly with Apparent Low Bidder's proposed performance bond surety, to confirm the performance bond. City may elect to extend the time to receive faithful performance and labor and material payment bonds.

6.02 CONFORMED PROJECT MANUAL

A. Following Award of Contract, City will prepare a conformed Project Manual reflecting addenda issued during bidding, which will, failing objection, constitute the approved Project Manual.

6.03 PAYMENT BOND

A. The successful Bidder must file a payment bond with and approved by City prior to entering upon the performance of the Work, in accordance with Civil Code Section 9550, *et seq*.

6.04 WAGE RATES

- A. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at the City's Public Works Department and may be obtained from the California Department of Industrial Relations website and are deemed included in the Bid Documents.
- B. The City will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rates on file as aforesaid.
- C. The possibility of a wage increase is one of the elements to be considered by the Bidder in determining their bid and will not be considered as the basis of a claim against the City.
- D. Upon request, City will make available copies to any interested party.
- E. Contractor shall post the applicable prevailing wage rates at the Site.

6.05 WITHDRAWAL OF BIDS

- A. Bidders may withdraw their bids at any time prior to the bid opening time fixed in this Notice Inviting Bids (Section 00 11 13), only by written request for the withdrawal of bid filed with City at the City Clerk's Office, located at 610 Foster City Boulevard, Foster City, California 94404
- B. Bidder or its duly authorized representative shall execute request to withdraw its bid.

6.06 INELIGIBLE CONTRACTORS AND SUBCONTRACTORS

- A. City shall not accept a bid from a bidder, regardless of prior pre-qualification, who is, at the time of bid opening, ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code section 1777.1 or 1777.7.
- B. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code Section 1777.1 or 1777.7. (See California Public Contract Code Section 6109.)
- C. The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at <u>www.dir.ca.gov/DLSE/debar.html</u>.

6.07 PUBLIC RECORDS ACT REQUESTS

- A. Per the Public Records Act, City will make available to the public all bid submissions opened in accordance with the procedures set forth herein, and all subsequent bid evaluation information.
- B. All submissions not opened will remain sealed and shall be returned to the submitter.
- C. Except as otherwise require by law, City will not disclose trade secrets or proprietary financial information submitted by bidders that have been designated as confidential by bidders. Any such trade secrets or proprietary financial information that bidder believes should be exempted from disclosure shall be specifically identified and marked as such. Blanket-type identification by designating whole pages or sections shall not be permitted and shall be invalid. The specific confidential information must be clearly identified as such.
- D. Upon a request for records regarding this bid, City will notify the bidder involved, within ten days from receipt of the request, when the records will be made available for inspection.
 - If the Bidder timely identifies any "proprietary, trade secret, or confidential commercial or financial" information that bidder determines is not subject to public disclosure, and requests that City refuse to comply with the records request, bidder shall take all appropriate legal action and defend City's refusal to produce the information in all forums; otherwise City will make such information available to the extent require by applicable law, without restriction.
- E. Information disclosed in the Bid Documents and the attendant submissions are the property of City unless bidders make specific reference to data that are considered

proprietary. Subject to the requirements in the Public Records Act, reasonable efforts will be made to prevent the disclosure of information except on a need-to-know basis during the evaluation process.

6.08 SUBSTITUTIONS

- A. Bidders must base their bids on products and systems specified in Contract Documents or listed by name in Addenda. The City will not recognize any claims for additional compensation due to failure of the Bidder to base its Bid on products and systems specified in the Contract Documents.
- B. City will consider substitution requests only for "or equal items."
- C. Bidders wanting to use "or equal" item(s) may submit Document 00 63 25 (Substitution Request Form) no later than 35 Days after Notice of Award.
- D. As a limitation on Bidder's privilege to request substitution of "or equal" items, City has found that certain items are designated as City standards and certain items are designated to match existing items in use on a particular public improvement either completed or in the course of completion or are available from one source. As to such items, Owner will not permit substitution. Such items (if any) are described in Section 00 11 13 (Notice Inviting Bids).

6.09 DEFINITIONS

A. All abbreviations and definitions of terms used in this Section are set forth in Section 01 42 00 (References and Definitions) and Section 00 72 00 (General Conditions).

END OF SECTION

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DOCUMENT 00 21 20

SITE VISIT AFFIDAVIT TO BE EXECUTED BY BIDDER, NOTARIZED AND SUBMITTED WITH BID

(To Accompany Bid)

State of California)	
)	SS
County of)	

_____, being first duly sworn, deposes and says that he or she is (Contractor's Authorized Representative

(Title of Representative)

of _____ (Contractor's Legal Name)

the party making the foregoing Bid, has visited the Project site as described in the Contract Documents and has examined and familiarized themselves with the existing conditions as well as all other conditions relating to the construction which will be performed. The submitting of a Bid shall be considered an acknowledgment on the part of the Bidder of familiarity with conditions at the site of the Work and that the site examination has provided adequate and sufficient information related to existing conditions which may affect cost, progress or performance of the Work.

Signature of Authorized Representative

Type/Print Name of Bidder

Type/Print Representative's Name

Type/Print Title

Date

(Certificate of Acknowledgment to be executed by Notary on following page)

Name of Bidder_____

CERTIFICATE OF ACKNOWLEDGEMENT

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

State of California }	SS	
County of }		
On	before me,	
a Notary Public, persona	Ily appeared Name(s) of Signer(s)	
who proved to me on basis of satisfactory evidence to be the person(s) whose names(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies) and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.		
I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.		
WITNESS my hand and	official seal.	
Signature of Notary	Place Notary Seal Above	

END OF DOCUMENT

SECTION 00 31 32 GEOTECHNICAL DATA AND EXISTING CONDITIONS

PART 1 REPORTS AND INFORMATION ON EXISTING CONDITIONS

1.01 INSPECTION OF REPORTS

- A. City, its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, record drawings, utility drawings, information regarding underground facilities, and hazardous material surveys or information (collectively, **Existing Conditions Data**.)
- B. Bidders may inspect geotechnical and existing conditions data. These documents are listed in Section 01 10 00 (Summary of Work) and are available for review at the address identified therein. Copies may be obtained for the cost of reproduction and handling upon bidder's payment for the costs.
- C. Existing conditions data is for information only and does not describe labor, materials or equipment furnished by Contractor, but rather, information regarding conditions of the Work. Such existing conditions data is not a Contract Document.

PART 2 USE OF EXISTING CONDITIONS DATA

2.01 ABOVE-GROUND EXISTING CONDITIONS

- A. City makes no warranty or representation of existing above-ground conditions, asbuilt conditions, or other above-ground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by bidders through the performance of their own independent investigations that bidders must perform prior to bidding, and Bidders are not allowed to rely on the information supplied by City regarding existing conditions.
- B. Bidder represents and agrees that in submitting its bid, it is not relying on any information regarding above-ground existing conditions supplied by City.

2.02 UNDERGROUND FACILITIES

- A. Information supplied regarding existing underground facilities at or contiguous to the Site is based on information furnished to City by others (e.g., the owners of such underground facilities or others), or through City's own efforts at locating underground facilities.
- B. City assumes responsibility for only the general accuracy, completeness or thoroughness of information regarding underground facilities that are owned by City. This express assumption of responsibility applies only if bidder has conducted the

independent investigation required of it under Section 00 72 00 (General Conditions) and discrepancies are not apparent.

C. Bidder is solely responsible for any interpretation or conclusion drawn from this information. City is not responsible for information regarding underground facilities that are owned by others.

2.03 HAZARDOUS MATERIALS SURVEYS

- A. Bidders may rely on this data and information for general accuracy regarding the locations of potentially hazardous materials subject of the Work. City does not warrant and makes no representation regarding the completeness or thoroughness of any data or information regarding existing conditions or hazardous materials including, but not limited to, quantities, characteristics, volumes, or associated structural features. Bidder represents and agrees that in submitting a bid it is not relying on any such data, information or deductions.
- B. Regulatory agency databases maintained by the State Water Resources Control Board and Department of Toxic Substances Control were reviewed to evaluate whether hazardous materials releases in the vicinity of the project site could result in impacts to the proposed project.
 - 1. No environmental investigations have been conducted for the existing levee portion of the site because the levee's use as a pedestrian path does not involve hazardous materials use or storage to warrant such an investigation.
 - 2. In addition, no environmental investigations have been performed for the proposed staging areas of the project site, except for the staging area located in the City of Foster City's Corporation Yard, as described herein.
- C. Review of the California Department of Toxic Substances Control (DTSC) EnviroStor database identified no hazardous materials release sites near the project site.
- D. Review of the State Water Resources Control Board (State Water Board) GeoTracker database revealed that hazardous materials releases from leaking underground storage tanks (LUSTs) have occurred at:
 - 1. The City's Corporation Yard, located at 3470 East 3rd Avenue
 - 2. A property located at 1455 Beach Park Boulevard immediately west across Beach Park Boulevard from the existing levee.
 - 3. A hazardous materials release Cleanup Program site at 850 Lincoln Center Drive immediately south across 3rd Avenue from the existing levee.

All three of these cases – both LUST sites and the Cleanup Program site – are closed cases, indicating that further investigation or cleanup are not required by regulatory agencies. The use of the City's Corporation Yard as a staging area would not involve subsurface excavations; therefore, potential residual contamination in the subsurface would not impact the proposed project.

E. GeoTracker does not list any other hazardous materials release sites within proximity to the project site.

- F. A visual reconnaissance of the project site was conducted by BASELINE Environmental Consulting in May 2016. No signs of hazardous materials use, storage, or disposal were observed in the vicinity of the project site, except for:
 - 1. A shed located within a California Department of Transportation (Caltrans) yard south of the base of the San Mateo Bridge/SR 92 (this shed appears to be storing hazardous materials, based on the presence of a National Fire Protection Association placard on the shed).
 - 2. A vehicle fueling station located northeast of the proposed staging area within the City's Corporation Yard.

No indications of hazardous materials releases were observed at these locations.

- G. The source and quality of much of the fill materials used to construct the existing levees cannot not be identified; therefore, while there is no suspicion of contamination, fill materials impacted with hazardous materials could be present within the existing levees.
- H. Soil near the San Mateo Bridge/SR 92 (including in the vicinity of the old San Mateo Bridge/SR 92) could be impacted with aerially deposited lead from historic vehicle emissions.
- I. The upland area surrounding the Sea Cloud Phase II sedimentation basin consists of fill material overlying Bay Mud. The source and quality of this fill material could not be identified; therefore, fill materials impacted with hazardous materials could be present within the upland area surrounding the Sea Cloud Phase II sedimentation basin.

2.04 GEOTECHNICAL DATA

- A. Bidder may rely upon the general accuracy of the "technical data" contained in the geotechnical reports and drawings identified in these Specifications, but only insofar as it relates to subsurface conditions.
- B. The term "technical data" shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface explorations. The term "technical data" does not include, and bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures. The term "technical data" shall not include the location of underground facilities.
- C. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder is solely responsible for any interpretation or conclusion drawn from any "technical data" or any other data, interpretations, opinions, or information contained in supplied geotechnical data.
- D. Except as expressly set forth in this Section, City does not warrant, and makes no representation regarding, the accuracy or thoroughness of geotechnical data.
- E. Bidder represents and agrees that in submitting its bid, it is not relying on any geotechnical data supplied by City, except as specifically set forth herein.

PART 3 INVESTIGATIONS

- A. Before submitting a bid, each bidder shall be responsible to obtain such additional or supplementary examinations, above-surface explorations, and available data concerning observable conditions (surface, overhead utilities, adjacent properties and improvements, etc.) at or contiguous to the Site or otherwise, which may affect cost, progress, performance or furnishing of work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by bidder and safety precautions and programs incident thereto or which bidder deems necessary to determine its bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of Contract Documents.
- B. Bidders shall advise City in writing during the bid period of any questions, suppositions, inferences or deductions bidders may have for City's review and response.
- C. City has provided time in the period prior to bidding for bidder to perform these investigations.

3.02 Access to Site for Investigations:

- A. During the Pre-Bid Site Visit(s), City will provide each bidder access to the Site to conduct such examinations, and investigations as each bidder deems necessary for submission of a bid.
 - 1. Bidders are free to conduct as many examinations and non-destructive and noninvasive investigations along the public rights-of-way as they wish, unaccompanied by City staff or its contracted engineers.
 - 2. Bidders shall sign an affidavit that they have investigated site conditions to their satisfaction (Document 00 21 20), and no compensation will be made for claims made on the basis of conditions that could have been foreseen through a competent site investigation at the time of bidding.
- B. Requests for invasive testing will not be accepted.

END OF SECTION

DOCUMENT 00 41 13 BID FORM

TO THE CITY OF FOSTER CITY

THIS BID IS SUBMITTED BY:

(Firm/Company Name)

Levee Improvement Project, CIP 301-657

- 1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the **CITY OF FOSTER CITY** in the form included in the Contract Documents, Document 00 52 00 (Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.
- 2. Bidder accepts the terms and conditions of the Contract Documents, Section 00 11 13 (Notice Inviting Bids), and Section 00 21 13 (Instructions to Bidders) including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for 60 Days after the day of Bid opening, unless there is a bid protest, then 90 days after the day of bid opening.
- 3. In submitting this Bid, Bidder represents that Bidder has examined the Contract Documents, performed necessary Pre-Bid investigations, attended the mandatory Pre-Bid Meeting, received the Pre-Bid Meeting minutes (if any), and received the following Addenda:

Addendum Number	Addendum Date	Signature of Bidder

4. Based on the foregoing, Bidder proposes and agrees to fully perform the Work within the time stated and in strict accordance with the Contract Documents for the following sums of money listed in the following Schedule of Bid Prices:

Re:

SCHEDULE OF BID PRICES

All Bid items shall be recorded on a lump sum bases in the Schedule of Bid Prices. Bid items are described in Section 01 29 73 (Schedule of Values). Quote in figures only, unless words are specifically requested.

ITEM	DESCRIPTION	BID ITEM TOTAL	
1.	Mobilization	\$	
2.	Bonds and Insurance	\$	
3.	Pedestrian and Traffic Control	\$	
4.	Work Planning and Submittals	\$	
5.	Erosion Control and SWPP Measures	\$	
6.	Temporary Shoring and Excavation Protection	\$	
7.	Coffer Dams and Dewatering	\$	
8.	Site Preparation, Clearing and Demolition	\$	
9.	Steel Sheet Pile Flood Walls with Concrete Cap (Control Line 1 STA 49+25 to STA 98+25)	\$	
10.	Steel Sheet Pile Flood Walls with Concrete Cap (Control Line 1 STA 102+59 to STA 188+00)	\$	
11.	Steel Sheet Pile Flood Walls with Concrete Cap (Control Line 1 STA 202+21 to STA 228+42)	\$	
12.	Steel Sheet Pile Flood Walls with Concrete Cap (Control Line 1 STA 252+58 to STA 306+13)	\$	
13.	Steel Sheet Pile Flood Walls with Concrete Cap (Control Line 1 STA 331+21 to STA 342+91)	\$	
14.	Corrosion Protection Stations	\$	
15.	Concrete Flood Walls (Control Line 1 STA 9+29 to STA 14+23)	\$	
16.	Concrete Flood Walls (Control Line 1 STA 44+18 to STA 102+59)	\$	
17.	Concrete Flood Walls (Control Line 1 STA 102+59 to STA 188+00)	\$	
18.	Concrete Flood Walls (Control Line 1 STA 202+21 to STA 228+42)	\$	
19.	Concrete Flood Walls (Control Line 1 STA 252+28 to STA 306+13)	\$	
20.	Concrete Flood Walls (Control Line 1 STA 306+23 to STA 331+09)	\$	
21.	Concrete Flood Walls (Control Line 1 STA 331+27 to STA 342+63)	\$	
22.	Public Shoreline Access Ramps, Stairs, Paths, and Associated Structures and Recreational Spaces	\$	
23.	Compacted Earthen Backfill and Levee Fill	\$	

ITEM	DESCRIPTION		BID ITEM TOTAL	
24.	Rock Slope Protection			\$
25.	Miscellaneous Concrete Walls and Structures not in Other Bid Items			\$
26.	Flood Break Structures			\$
27.	Mechanically Stabilized Earth Walls			\$
28.	Lightweight Concrete Fill			\$
29.	Bay Trail Access Ramps, Stairs, Paths, and Associated Structures			\$
30.	Interior Landscaping			\$
31.	Mitigation Planting			\$
32.	Irrigation Systems			\$
33.	Utility Relocation and Reconstruction			\$
34.	Precast Decorative Panels			\$
35.	Asphalt Concrete Trail Paving and Trail Markings			\$
36.	Trail Shoulders			\$
37.	Design-Build Vehicular Bridges			\$
38	Design-Build Pedestrian Bridge			\$
39.	Guardrails and Handrails			\$
40.	Directive Signs and Wayfinding Elements			\$
41.	Outdoor Furniture and Recreational Elements			\$
42.	Streetlight Replacement			\$
43.	Restoration of Beach Park Boulevard			\$
44.	Restoration of Improvements Damaged during Construction			\$
45.	Plant Maintenance		\$	
46.	All Work of Contract Documents other than Work Separately Provided for under Other Bid Items		\$	
47.	Daily Rate for Compensable Delay	\$	x 60 days =	\$
<u>TOTAL</u>	. ,			\$

Total Bid Price:

(Indicate Bid Price in Words)

- 5. The undersigned acknowledges that the Apparent Low Bidder will be determined as provided in Section 00 11 13 (Notice to Bidders) and Section 00 21 13 (Instruction to Bidders).
- 6. Failure to fill in a dollar figure for the daily rate for compensable delay renders a Bid nonresponsive. The City will determine the apparent low Bidder based on the Total Bid Price, which includes the daily rate for compensable delay bid, multiplied by 60 days. In the event of a tie, preference will be given to the Bidder with the lowest proposed Contract Sum minus the compensable delay item.
- 7. Subcontractors for the Work are listed on Document 00 43 30 (Subcontractors List), submitted herewith.
- 8. The undersigned Bidder understands that City reserves the right to reject this Bid.
- 9. If written notice of the acceptance of this Bid, hereinafter referred to as Notice of Award, is mailed or delivered to the undersigned Bidder within the time described in Paragraph 2 of this Document or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by Section 00 21 13 (Instructions to Bidders) within the times specified therein.
- 10. Notice of Award or request for additional information may be addressed to the undersigned Bidder at the address set forth below.
- 11. The undersigned Bidder herewith encloses cash, a cashier's check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety authorized to do a surety business in the State of California, in form specified in Section 00 21 13 (Instructions to Bidders), in the amount of ten percent (10%) of the Total Bid Price and made payable to the **CITY OF FOSTER CITY**.
- 12. The undersigned agrees that, in case of its default in executing the Contract and providing the necessary bonds and insurance after award and due notice thereof, the said check or bond and the money payable thereon shall become and remain the property of the City as liquidated damages without proof of loss within ten (10) days of notice of such default by the City. At its discretion, the City may request that a certified copy of the Certificate of Authority of the Surety issued by the Insurance Commissioner of the State of California be submitted by the Surety to the City. Likewise, the City may also require the Surety to provide copies of its most recent annual statement and quarterly statement filed with the Department of Insurance pursuant to Article 10 (commencing with Section 900) of Chapter 1 of Part 2 of Division 1 of the California Insurance Code. The Bond and the corporate Surety will be reviewed and subject to the approval of City's legal counsel.
- 13. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in Section 00 72 00 (General Conditions) and to complete all Work within the time specified in Document 00 52 00 (Agreement).
- 14. The undersigned Bidder agrees that, in accordance with Section 00 72 00 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in Document 00 52 00 (Agreement) shall be as set forth in Document 00 52 00.
- 15. The names of all persons interested in the foregoing Bid as principals are:
- **IMPORTANT NOTICE**: If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of the firm and names of all individual co-partners composing the firm; if Bidder or other interested person is an individual, give first and last names in full.
NAME OF BIDDER:

licensed in accordance with an act for the registration of Contractors, and with license number:_____ Expiration: _____

(Place of Incorporation, if Applicable)

(Principal)

(Principal)

(Principal)

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

(Signature of Bidder)

NOTE: If Bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If Bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Business Address:

Contractor's Representative(s):

(Name/Title)

(Name/Title)

(Name/Title)

Officers Authorized to Sign Contracts

(Name/Title)

(Name/Title)

(Name/Title)

Telephone Number(s):		
	(Area Code)	(Number)
	(Area Code)	(Number)
Fax Number(s):		
	(Area Code)	(Number)
	(Area Code)	(Number)
Date of Bid:		

DOCUMENT 00 43 13 BID BOND

KNOW ALL BY THESE PRESENTS:

That the undersigned

(Name of Contractor)

as Principal and the undersigned as Surety are held and firmly bound unto Owner, **CITY OF FOSTER CITY, a California municipal corporation**, as obligee, in the penal sum of <u>Ten Percent (10%) of Total Bid in</u> Dollars (<u>\$ 10% of Bid</u>) lawful money of the United States of America being at least ten percent (10%) of the aggregate amount of said Principal's Base Bid, for the payment of which, well and truly to be made, we bind ourselves, our successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal is submitting a Bid for Foster City Levee Improvement Project (CIP 301-657).

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Bid submitted by the said Principal be accepted and the Contract be awarded to said Principal and said Principal shall within the required periods enter into the Contract so awarded and provide the required Construction Performance Bond, Construction Labor and Material Payment Bond, insurance certificates, Guaranty, and all other endorsements, forms, and documents required under Section 00 21 13 (Instructions to Bidders), then this obligation shall be void, otherwise to remain in full force and effect.

The Principal and Surety will pay unto the Owner the difference in money between the total amount of the Proposal of the Principal and the amount for which the Owner legally contracts with another party to fulfill the Contract if the latter amount exceeds the former, but in no event shall the Surety's liability exceed the penal sum hereof.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable under this obligation as Principal, and that nothing of any kind or nature whatsoever that will not discharge the Principal shall operate as a discharge or a release of liability of the Surety.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the Principal, the Surety, and the Owner (City) and their respective heirs, executors, administrators, successors, and assigns.

The undersigned agrees that, in case of its default in executing the Contract and providing the necessary bonds and insurance after award and due notice thereof, the said check or bond and the money payable thereon shall become and remain the property of the City as liquidated damages without proof of loss within ten (10) days of notice of such default by the City.

At its discretion, the City may request that a certified copy of the Certificate of Authority of the Surety issued by the Insurance Commissioner of the State of California be submitted by the Surety to the City. Likewise, the City may also require the Surety to provide copies of its most recent annual statement and quarterly statement filed with the Department of Insurance pursuant to Article 10 (commencing with Section 900) of Chapter 1 of Part 2 of Division 1 of the California Insurance Code. The Bond and the corporate Surety will be reviewed and subject to the approval of Owner's legal counsel.

IN WITNESS this day of	WHEREOF, the	above bounden parties have executed this instrument . 20
,	(Month)	
(Corporate Seal)	Ву	Principal
	Ву	Surety
(Corporate Seal)	By	Attorney in Fact
	EN	ID OF DOCUMENT

DOCUMENT 00 43 14 BIDDER REGISTRATION FORM

INDEPENDENT CONTRACTOR REGISTRATION

Contractor's License #		
Date:	Fed I.D. #	
Full Corporate Name of Compar	ıy:	
Street Address:		
Mailing Address:		
Phone:	Email:	
Name of Principal Contact:		
Type of Business:	Sole Proprietor Non-Profit 501(c)(3) other (please explain:	Partnership Corporation)
INSURANCE		
Workers' Compensation:		
Carrier:		
Address:		
Phone and Email:		
Policy Number:		
General Liability:		
Carrier:		
Address:		
Phone and Email:		
Policy Number: Policy Limits: \$		
A.M. Best Rating:		

Automobile Liability:
Carrier:
Address:
Phone and Email:
Policy Number:
Policy Limits: \$
A.M. Best Rating:
All-risk Course of Construction (if applicable, as required by Section 00 73 16 – Insurance and Indemnification):
Carrier:
Address:
Phone and Email:
Policy Number:
Policy Limits: \$
A.M. Best Rating:
Professional Liability (if applicable, as required by Section 00 73 16 – Insurance and Indemnification):
Carrier:
Address:
Phone and Email:
Policy Number:
Policy Limits: \$
A.M. Best Rating:

Pollution Legal Liability I	nsurance (if appl	licable, as require	ed by Section 00 73	<u> 3 16 – Insurance</u>
and Indemnification):				
Carrier:				

Address:		

Phone and Email: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating:

BIDDER CERTIFIES, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND AUTHORIZES OWNER, AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

SIGNATURE

DATE

SAFETY EXPERIENCE

The following statements as to the Bidder's safety experience are submitted with the Bid, as part thereof, and the Bidder guarantees the truthfulness and accuracy of all information.

1. List Bidder's interstate Experience Modification Rate for the last three years.

[20_] ____ [20_] ____ [20_] ____

2. Use Bidder's last year's Cal/OSHA 301 log to fill in the following number of injuries and illnesses:

- a. Number of lost workday cases
- b. Number of medical treatment cases
- c. Number of fatalities
- 3. Employee hours worked last year
- 4. State the name of Bidder's safety engineer/manager:

Attach a resume or outline of this individual's safety and health qualifications and experience.

I CERTIFY, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND I AUTHORIZE OWNER, AND ITS AGENTS AND REPRE-SENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

Bv [.]	
Dy	Signature
	eignatare
Its:	
	Title

Date

BIDDER:

DOCUMENT 00 43 30 SUBCONTRACTORS LIST

The Subcontractors List must include the names of all subcontractors for those subcontractors who will perform any portion of Work, including labor, rendering of service, or specially fabricating and installing a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of the total Bid amount.

Name of Subcontractor and Location of Place of Business	Description of Work	Percentage of Prime Bid	Subcontractor's License No.	DIR Registration Number*

(Bidder to attach additional sheets if necessary)

* Pursuant to Division 2, Part 7, Chapter 1 (commencing with section 1720) of the California Labor Code.

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DOCUMENT 00 45 19 NON-COLLUSION AFFIDAVIT

PUBLIC CONTRACT CODE §7106

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

STATE OF CALIFORNIA

COUNTY OF

(Name of Principal of Bidder)

) ss.

deposes and says that he or she is

(Office of Affiant)

_____, being first duly sworn,

_____, the party

of _____(Name of Bidder)

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

Executed under penalty of perjury under the laws of the State of California:

	(Name of Bidder)		
	(Signature of Principal)		
Subscribed and sworn before me			
This day of	, 20		
Notary Public of the State of			
In and for the County of			
My Commission expires (Seal)			

- **NOTE:** If Bidder is a partnership or a joint venture, this affidavit must be signed and sworn to by every member of the partnership or venture.
- **NOTE:** If Bidder [including any partner or venturer of a partnership or joint venture] is a corporation, this affidavit must be signed by the Chairman, President, or Vice President and by the Secretary, Assistant Secretary, Chief Financial Officer, or Assistant Treasurer.
- **NOTE:** If Bidder's affidavit on this form is made outside the State of California, the official position of the person taking such affidavit shall be certified according to law.
- **NOTE:** 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.

DOCUMENT 00 45 46 BIDDER CERTIFICATIONS

TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

The undersigned Bidder certifies to City as set forth in sections 1 through 8 below.

1. STATEMENT OF CONVICTIONS

By my signature hereunder, I hereby swear, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal Court has been issued against Bidder within the past two years because of failure to comply with an order of a Federal Court or to comply with an order of the National Labor Relations Board.

2. CERTIFICATION OF WORKER'S COMPENSATION INSURANCE

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Labor Code Section 3700 that require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the Work of this Contract.

3. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Labor Code Section 1773 that requires the payment of prevailing wage on public projects. Contractor and any subcontractors under the Contractor shall comply with Labor Code Section 1776 regarding wage records, and with Labor Code Section 1777.5 regarding the employment and training of apprentices. Contractor is responsible to ensure compliance by any and all subcontractors performing Work under this Contract.

4. CERTIFICATION OF COMPLIANCE WITH PUBLIC WORKS CHAPTER OF LABOR CODE

By my signature hereunder, as the Contractor, I certify that I am aware of Labor Code Sections 1777.1 and 1777.7 and Contractor and Subcontractors are eligible to bid and work on public works projects.

5. CERTIFICATION OF COMPLIANCE WITH SAFETY REGULATIONS

By my signature hereunder, as the Contractor, I certify that I am aware of Cal/OSHA Title 8 regulations in the California Code of Regulations (T8 CCR), and the California Labor Code, and Contractor and Subcontractors agree to comply with all Construction Safety Orders.

6. CERTIFICATION OF NON-DISCRIMINATION

By my signature hereunder, as the Contractor, I certify that there will be no discrimination in employment with regard to race, color, religion, gender, sexual orientation, age or national origin; that all federal, state, and local directives and executive orders regarding non-discrimination in employment will be complied with; and that the principal of equal opportunity in employment will be demonstrated positively and aggressively.

7. CERTIFICATION OF NON-DISQUALIFICATION

By my signature hereunder, as the Contractor, I swear, under penalty of perjury, that the below indicated Bidder, any officer of Bidder, or any employee of Bidder who has a proprietary interest in such Bidder, has never been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or safety regulation, except as indicated on the separate sheet attached hereto titled "Previous

Disqualifications." If a statement of "Previous Disqualifications" is attached, please explain the circumstances.

8. CERTIFICATION OF ADEQUACY OF CONTRACT AMOUNT

By my signature hereunder, as the Contractor, pursuant to Labor Code Section 2810(a), I certify that, if awarded the Contract based on the undersigned's Bid, the Contract will include funds sufficient to allow the Contractor to comply with all applicable local, state, and federal laws or regulations governing the labor or services to be provided. I understand that Owner will be relying on this certification if it awards the Contract to the undersigned.

9. CERTIFICATION OF BIDDER:

	(Name of Bidder)
Date:, 2020	By:(Signature)
	Name:(Print Name)
	Its:(Title)

DOCUMENT 00 51 00 NOTICE OF AWARD

Dated _		
TO:		
ADDRE	ESS:	
CONTF	RACT N	0.:
CONTF	RACT FO	OR: CITY OF FOSTER CITY FOSTER CITY LEVEE IMPROVEMENTS CIP 301-657
The Co	ntract S	oum of your contract is
Dollars	(\$	(Amount in Words)
1.	Two co Award.	opies of the proposed Contract Documents listed below accompany this Notice of
2.	You m followir	nust comply with the following conditions precedent by 5:00 p.m. of the 20th Day ng the date of this Notice of Award, that is, by [Day of the Week, Date] .
	a.	Deliver to City two fully executed counterparts of Document 00 52 00 (Agreement). Each copy of Document 00 52 00 (Agreement) must bear your original signature on the signature page and your initials on each page.
	b.	Deliver to City one original of Document 00 6113.13 (Construction Performance Bond), executed by you and your surety.
	C.	Deliver to City one original of Document 00 61 13.16 (Construction Labor and Material Payment Bond), executed by you and your surety.
	d.	Deliver to City one original set of the insurance certificates with endorsements required under Document 00 73 16 (Supplementary Conditions – Insurance).
	e.	Deliver to City one fully executed Document 00 65 36 (Guaranty), bearing your original signature on the signature page and your initials on each page.
3.	Failure your Bi	to comply with these conditions within the time specified will entitle City to consider id abandoned, to annul this Notice of Award, and to declare your Bid security forfeited.
4.	Within will ret copy o Drawin	21 Days after you comply with the conditions in Paragraph 2 of this Document, Owner urn to you one fully signed counterpart of Document 00 52 00 (Agreement) with one f the Project Manual (including Specifications and Drawings) and one set of full-size gs.

5. Before you may start any Work at the Site, you must attend a pre-construction conference. The pre-construction conference may be arranged through [______ (__) _____] Questions regarding bonds and insurance may be directed to [_____] at the same number. All other inquiries regarding the Project should be directed to [____]. 6. Upon commencement of the Work, you and each of your Subcontractors shall certify and provide City copies of payroll records in accordance with Labor Code Section 1776.

CITY OF FOSTER CITY

Ву: _____

(Signature)

(Print Name)

(Title)

ATTEST: ______ Secretary

(Print Name)

AUTHORIZED BY CITY RESOLUTION:

NO: _____

ADOPTED: _____, 2020

[Copy of Resolution Attached]

DOCUMENT 00 52 00 AGREEMENT

THIS AGREEMENT, dated this [date] day of [Month], [Year], by and between [Enter Name of Contractor] whose place of business is located at [Address of Contractor] (Contractor), and CITY OF FOSTER CITY, a California municipal corporation (Owner), acting under and by virtue of the authority vested in Owner by the laws of the State of California.

WHEREAS, Owner, by its Resolution No. [Insert Number] adopted on the [date] day of [Month, Year] awarded to Contractor the following Contract:

CONTRACT NUMBER CIP 301-657

LEVEE IMPROVEMENTS at FOSTER CITY, CALIFORNIA 94404

NOW, THEREFORE, in consideration of the mutual covenants hereinafter set forth, Contractor and Owner agree as follows:

ARTICLE 1 – SCOPE OF WORK OF THE CONTRACT

1.01 Work of the Contract

A. Contractor shall complete all Work specified in the Contract Documents, in accordance with the Specifications, Plans and all other terms and conditions of the Contract Documents (**Work**).

1.02 **Price for Completion of the Work**

- A. Owner shall pay Contractor the following Contract Sum (**Contract Sum**) for completion of Work in accordance with Contract Documents as set forth in Contractor's Bid, attached hereto.
- B. The Contract Sum includes all allowances (if any).

[ATTACH COPY OF BID]

1.03 Commencement of Work

- A. Contractor shall commence Work on the date established in the Notice to Proceed (**Commencement Date**).
- B. Owner reserves the right to modify or alter the Commencement Date.

1.04 Completion of Work

A. Contractor shall achieve Substantial Completion of the entire Work within 1,100 calendar Days from the Commencement Date.

- B. Contractor shall achieve Final Completion of the entire Work 1,200 calendar Days from the Commencement Date.
- C. Contractor shall furnish escrow in lieu of retention for the one-year maintenance period that begins at Final Completion.

ARTICLE 2 – PROJECT REPRESENTATIVES

2.01 Owner's Project Manager

- A. Owner has designated Tanner Pacific, Inc. as its Project Manager to act as Owner's representative in all matters relating to the Contract Documents. If Project Manager is an employee of Owner, Project Manager is the beneficiary of all Contractor obligations to Owner including, without limitation, all releases and indemnities.
- B. Project Manager shall have final authority over all matters pertaining to the Contract Documents and shall have sole authority to modify the Contract Documents on behalf of Owner, to accept Work, and to make decisions or actions binding on Owner, and shall have sole signature authority on behalf of Owner.
- C. Owner may assign all or part of the Project Manager's rights, responsibilities and duties to a Construction Manager, or other Owner representative.

2.02 Contractor's Project Manager and Other Key Personnel

- A. Contractor has designated [____] as its project manager to act as Contractor's Representative in all matters relating to the Contract Documents.
- B. Contractor has designated the following other Key Personnel for the Project:

<u>Name</u>	Position
	Superintendent [See §00 72 00 Para. 8.01.B]

2.03 Engineer

- A. **Schaaf &** Wheeler **Consulting Civil Engineers** furnished the Plans and Specifications and shall have the rights assigned to Engineer in the Contract Documents.
- B. Engineer has designated **Charles D. Anderson, P.E.** as its project manager, to act as its representative for receiving and making communications authorized under the Contract Documents.

ARTICLE 3 – Liquidated Damages FOR DELAY IN COMPLETION OF WORK

3.01 Liquidated Damage Amounts

- A. As liquidated damages for delay Contractor shall pay Owner five thousand dollars (\$5,000.00) for each day that expires after the time specified herein for Contractor to achieve Substantial Completion of the entire Work, until achieved.
- B. As liquidated damages for delay Contractor shall pay Owner one thousand five hundred dollars (\$1,500.00) for each say that expires after the time specified herein for Contractor to achieve Final Completion of the entire Work, until achieved.

3.02 Scope of Liquidated Damages

- A. Measures of liquidated damages shall apply cumulatively.
- B. Limitations and stipulations regarding liquidated damages are set forth in Document 00 7200 (General Conditions).

ARTICLE 4 – NOT USED

ARTICLE 5 – DOCUMENTS

5.01 Contract Documents

A. Contract documents consist of the following documents, including all changes, Addenda, and Modifications thereto:

Document 00 51 00	Notice of Intent to Award for Construction
Document 00 52 00	Agreement
Document 00 55 00	Notice to Proceed
Document 00 61 13.13	Construction Performance Bond
Document 00 61 13.16	Construction Labor and Material Payment Bond
Document 00 62 90	Escrow Agreement for Security Deposits
Document 00 63 25	Substitution Request Form
Document 00 65 30	Release of Claims
Document 00 65 36	Guaranty
Section 00 72 00	General Conditions
Section 00 73 01	Supplementary Conditions
Section 00 73 16	Supplementary Conditions – Insurance and Indemnification
Document 00 73 49	Labor Stabilization Agreement
Document 00 73 80	Apprenticeship Program
Document 00 91 13	Addenda
Specifications	Divisions 01 through 35
Section 01 14 00	Regulatory Requirements
Drawings listed in Drawing No.	301-657
City/District Standard Specificat	ions and Standard Details

B. There are no Contract Documents other than those listed above. The Contract Documents may only be amended, modified or supplemented as provided in Section 00 72 00 (General Conditions).

ARTICLE 6 – MISCELLANEOUS

6.01 Terms and Abbreviations

A. Terms and abbreviations used in this Agreement are defined in Section 00 72 00 (General Conditions) and Section 01 42 00 (References and Definitions) and elsewhere in the text of the Contract Documents and will have the meaning indicated therein.

6.02 Owner's Liability

- A. It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of Owner or acting as an employee, agent, or representative of Owner, liable on this Agreement or any of the Contract Documents, or upon any warranty of authority, or otherwise.
- B. It is further understood and agreed that liability of Owner is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.

6.03 Contractor Responsibilities

- A. Pursuant to Labor Code Section 1771(a), Contractor represents that it and all of its Subcontractors are currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. Contractor covenants that any additional or substitute Subcontractors will be similarly registered and qualified.
- B. In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. §15) or under the Cartwright Act (Chapter 2 (commencing with §16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time Owner tenders final payment to Contractor, without further acknowledgment by the parties.
- C. Contractor is solely responsible for the payment of prevailing rates of per diem wages. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at the City's Public Works Department, may be California Department Industrial Relations obtained from the of website [http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm] and are deemed included in the Contract Documents, and shall be made available to any interested party on request. Pursuant to Labor Code Sections 1860 and 1861, in accordance with Labor Code Section 3700, every contractor will be required to secure the payment of compensation to his employees. Contractor represents that it is aware of the provisions of Labor Code Section 3700 that require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor shall comply with such provisions before commencing the performance of the Work of the Contract Documents.

6.04 Location and Venue

A. This Agreement and the Contract Documents shall be deemed to have been entered into in the County in which the Project is located, State of California, and governed in all respects by California law (excluding choice of law rules). The exclusive venue for all disputes or litigation hereunder shall be in the Superior Court for San Mateo County.

IN WITNESS WHEREOF the parties have executed this Agreement in duplicate the day and year first above written.

CONTRACTOR: [CONTRACTOR'S NAME]

By: _____(Signature)

Its:

Title (If Corporation: Chairman, President or Vice President)

By: _____(Signature)

Its:

Title (If Corporation: Secretary, Assistant Secretary, Chief Financial Officer or Assistant Treasurer)

OWNER: CITY OF FOSTER CITY

Ву:_____

(Signature)

(Print Name)

(Title)

Attest:

Secretary

(Print Name)

APPROVED AS TO FORM AND LEGALITY THIS DAY OF , 2020

By:

Attorney for Owner

(Print Name)

RESOLUTION NO.

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DOCUMENT 00 55 00 NOTICE TO PROCEED

Dated:		, 2020
То:		
		(Contractor)
Addres	s:	
CONT	RACT FOR:	CITY OF FOSTER CITY FOSTER CITY LEVEE IMPROVEMENTS
CONTR	RACT NO:	CIP 301-657
obligati Article Comple	You are notified ons with respec 2 of Document etion for the Before you ma	 d that the Contract Time under the above Contract will commence to run on 2020. On that date, you are to start performing your to Work at the Site under the Contract Documents. In accordance with 00 52 00 (Agreement), the dates of Substantial Completion and Final entire Work are, 20 and, 20, respectively (calendar days from Month Day, Year). y start any Work at the Site, you must:
1.	Submit certified	Safety Program and related information
2.	Submit copies c	of applicable Contractor-obtained permits
3.	Submit an initial	construction schedule
OWNE	R: CITY OF FOS	STER CITY
By:		(City Staff Signature)
lts:		(Name and Title)
		END OF DOCUMENT

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DOCUMENT 00 61 13.13 CONSTRUCTION PERFORMANCE BOND

THIS CONSTRUCTION PERFORMANCE BOND (**Bond**) is dated *[Month, Day]*, 202_ is in the amount of *Insert Amount I* (**Penal Sum**), which is 100% of the Contract Sum and is entered into by and between the parties listed below to ensure the faithful performance of the Contract identified below. This Bond consists of this page and the Bond Terms and Conditions, Paragraphs 1 through 14 attached to this page. Any singular reference to *[Insert name of Contractor]* (Contractor), *[Insert name of Surety]* (Surety), City of Foster City/Estero Municipal Improvement District (Owner), or other party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

[Insert name of Surety]

Address

Principal Place of Business

City/State/Zip

Agreement for the *Levee Improvement Project*, located at Foster City, California, dated *[Month, Day]*, 202_, in the amount of *[_____Insert Amount_____]*).

City/State/Zip

CONTRACTOR AS PRINCIPAL

CONSTRUCTION CONTRACT:

SURETY

Company: (Corp. Seal)

Company: (Corp. Seal)

Signature:_____

Name:

Title: _____

Signature: _____

Name: _____

Title:

BOND TERMS AND CONDITIONS

- 1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Owner and the State of California for the complete and proper performance of the Construction Contract, which is incorporated herein by reference.
- 2. If Contractor completely and properly performs all its obligations under the Construction Contract, Surety and Contractor shall have no obligation under this Bond.
- 3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 3.1. Owner provides Surety with written notice that Owner has declared a Contractor Default under the Construction Contract pursuant to the terms of the Construction Contract; and
 - 3.2. Owner has agreed to pay the Balance of the Contract Sum:
 - 3.2.1. To Surety in accordance with the terms of this Bond and the Construction Contract; or
 - 3.2.2. To a Contractor selected to perform the Construction Contract in accordance with the terms of this Bond and the Construction Contract.
- 4. When Owner has satisfied the conditions of Paragraph 3 above, Surety shall promptly (within 40 Days) and at Surety's expense elect to take one of the following actions:
 - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Construction Contract (but Owner may withhold consent, in which case the Surety must elect an option described in Paragraphs 4.2, 4.3 or 4.4 below); or
 - 4.2. Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors or Construction entities; provided, that Surety may not select Contractor as its agent or independent contractor or Contractor without Owner's consent; or
 - 4.3. Undertake to perform and complete the Construction Contract by obtaining bids from qualified contractors or Construction entities acceptable to Owner for a contract for performance and completion of the Construction Contract and, upon determination by Owner of the lowest responsive and responsible Bidder, arrange for a contract to be prepared for execution by Owner and the contractor or Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract; and, if Surety's obligations defined in Paragraph 6 below, exceed the Balance of the Contract Sum, then Surety shall pay to Owner the amount of such excess; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor or Contractor, and with reasonable promptness under the circumstances and, after investigation and consultation with Owner, determine in good faith its monetary obligation to Owner under Paragraph 6 below, for the performance and completion of the Construction Contract and, as soon as practicable after the amount is determined, tender payment therefor to Owner with full explanation of the payment's calculation. If Owner accepts Surety's tender under this Paragraph 4.4, Owner may still hold Surety liable for future damages then unknown or unliquidated resulting from the Contractor Default, as agreed by Owner and Surety at the time of tender. If Owner disputes the amount of Surety's tender under this Paragraph 4.4, Owner may exercise all remedies available to it at law to enforce Surety's liability under Paragraphs 6 and 7 below.
- 5. At all times Owner shall be entitled to enforce any remedy available to Owner at law or under the Construction Contract including, without limitation, and by way of example only, rights to perform Work, protect Work, mitigate damages, advance critical Work to mitigate schedule delay, and coordinate Work with other consultants or contractors.

- 6. If Surety elects to act under Paragraphs 4.1, 4.2 or 4.3, above, within the time period provided in Paragraph 4, above, and complies with its obligations under this Bond, Surety's obligations under this Bond are commensurate with Contractor's Construction Contract obligations. Surety's obligations include, but are not limited to:
 - 6.1. Contractor's obligations to complete the Construction Contract and correct Defective Work;
 - 6.2. Contractor's obligations to pay liquidated damages; and
 - 6.3. To the extent otherwise required of Contractor under the Construction Contract, Contractor's obligations to pay additional legal, design professional, and other costs not included within liquidated damages resulting from Contractor Default (but excluding attorney's fees incurred to enforce this Bond).
- 7. If Surety does not elect to act under Paragraphs 4.1, 4.2, 4.3, or 4.4, above, within the time period provided in Paragraph 4, above, or comply with its obligations under this Bond, then Surety shall be deemed to be in default on this Bond ten Days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond. Such Surety default shall be independent of the Contractor Default. To the extent Surety's independent default causes Owner to suffer damages including, but not limited to, delay damages, which are different from, or in addition to (but not duplicative of) damages which Owner is entitled to receive under the Construction Contract, Surety shall also be liable for such damages. In the event any Surety obligation following its independent default is inconsistent or conflicts with California Civil Code Section 2809, or any other law which either prohibits, restricts, limits or modifies in any way any obligation of a surety which is larger in amount or in any other respect more burdensome than that of the principal, Surety hereby waives the provisions of such laws to that extent.
- 8. If Surety elects to act under Paragraphs 4.1, 4.3 or 4.4, above, within the time period provided in Paragraph 4, above, and complies with all obligations under this Bond, Surety's monetary obligation under this Bond is limited to the Penal Sum.
- 9. No right of action shall accrue on this Bond to any person or entity other than Owner or its successors or assigns.
- 10. Surety hereby waives notice of any change, alteration or addition to the Construction Contract or to related subcontracts, design agreements, purchase orders and other obligations, including changes of time, and of any Owner action in accordance with Paragraph 5 above. Surety consents to all terms of the Construction Contract, including provisions on changes to the Contract. No extension of time, change, alteration, Modification, deletion, or addition to the Contract Documents, or of the Work (including services) required thereunder, or any Owner action in accordance with Paragraph 5 above shall release or exonerate Surety on this Bond or in any way affect the obligations of Surety on this Bond, unless such action is an Owner Default.
- 11. Any proceeding, legal or equitable, under this Bond shall be instituted in any court of competent jurisdiction where a proceeding is pending between Owner and Contractor regarding the Construction Contract, or in the courts of the County of San Mateo. Communications from Owner to Surety under Paragraph 3.1 above shall be deemed to include the necessary agreements under Paragraph 3.2 above unless expressly stated otherwise.
- 12. All notices to Surety or Contractor shall be mailed or delivered (at the address set forth on the signature page of this Bond), and all notices to Owner shall be mailed or delivered as provided in Document 00 52 00 (Agreement). Actual receipt of notice by Surety, Owner or Contractor, however accomplished, shall be sufficient compliance as of the date received at the foregoing addresses.
- 13. Any provision in this Bond conflicting with any statutory or regulatory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein.

14. Definitions

- 14.1. Balance of the Contract Sum: The total amount payable by Owner to Contractor pursuant to the terms of the Construction Contract after all proper adjustments have been made under the Construction Contract, for example, deductions for progress payments made, and increases/decreases for approved Modifications to the Construction Contract.
- 14.2. Construction Contract: The agreement between Owner and Contractor identified on the signature page of this Bond, including all Contract Documents and changes thereto.
- 14.3. Contractor Default: Material failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract, limited to "default" or any other condition allowing a termination for cause as provided in Section 00 72 00 (General Conditions).
- 14.4. Owner Default: Material failure of Owner, which has neither been remedied nor waived, to pay Contractor progress payments due under the Construction Contract or to perform other material terms of the Construction Contract, if such failure is the cause of the asserted Contractor Default and is sufficient to justify Contractor termination of the Construction Contract.

DOCUMENT 00 61 13.16 CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1.01 THAT WHEREAS, <u>CITY OF FOSTER CITY</u> (Owner) has awarded to (Name of Contractor) as Principal, Contract Number <u>301-657</u> dated the day of ______, 20___ (the Contract), titled THE FOSTER CITY LEVEE IMPROVEMENTS PROJECT in the amount of \$______, which Contract is by this reference made a part hereof, for the Work of the following Contract:

Construction of levee improvements including related earthwork, floodwall construction, structure construction, landscaping improvements, paving, traffic control and all other Work as shown on the Plans and specified herein.

- **1.02** AND WHEREAS, Principal is required to furnish a bond in connection with the Contract to secure the payment of claims of laborers, mechanics, material suppliers, and other persons as provided by law;
- **1.03** NOW, THEREFORE, we, the undersigned Principal and <u>(Name of Surety)</u>, as Surety, are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT PRICE <u>(\$)</u>, for which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.
- **1.04** THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its executors, administrators, successors, or assigns approved by Owner, or its subcontractors shall fail to pay any of the persons named in California Civil Code Section 9100, or amounts due under the State of California Unemployment Insurance Code with respect to Work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department from the wages of employees of Principal and subcontractors pursuant to Section 13020 of the State of California Unemployment Insurance Code with respect to such Work and labor, that Surety will pay for the same in an amount not exceeding the sum specified in this bond, plus reasonable attorneys' fees, otherwise the above obligation shall become and be null and void.
- **1.05** This bond shall inure to the benefit of any of the persons named in California Civil Code Section 9100, as to give a right of action to such persons or their assigns in any suit brought upon this bond. The intent of this bond is to comply with the California Mechanic's Lien Law.
- **1.06** Surety, for value received, hereby expressly agrees that no extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the Work to be performed thereunder, shall in any way affect the obligation of this bond; and it does hereby waive notice of any such extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the Work to be performed thereunder.
- **1.07** Surety's obligations hereunder are independent of the obligations of any other surety for the payment of claims of laborers, mechanics, material suppliers, and other persons in connection with Contract; and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing Owner's rights against the other.

1.08	Correspondence or claims relating to this bond shall be sent to Surety at the address set forth
	below.

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

CONTRACTOR AS PRINCIPAL		SURETY	
Company: (Corp. Seal)		Company:	(Corp. Seal)
Signature		Signature	
Name		Name	
Title		Title	
Street Address		Street Address	
City, State, Zip Coo	de	City, State, Zip C	ode

DOCUMENT 00 62 90 ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

California Public Contract Code Section 22300

THIS	ESCROW A	GREEME	NT ("Esc	row Agr	eemen	nt") is	made a	ind ente	red int	to this _	
day of		_, 202,	by and	between	<u>CITY</u>	OF F	OSTER	<u>CITY</u> ,	(" <mark>Own</mark>	er "), wh	iose
address is <u>6</u>	10 Foster	City Bo	ulevard,	Foster	City,	CA	94404 ,	(<u>Name</u>	of	Contrac	:tor)
("Con	tractor"), w	hose princ	ipal place	e of busin	ess is l	ocate	d at <u>(Co</u>	ntractor	's Ad	dress)	
	-	-			, and	[]	Owner, a	as escro	w age	nt [OR]	[]
(Name of Ban	k)				_, a s	state	or federa	ally char	tered	bank in	the
State of Califor	nia, whose	place of b	usiness is	s located a	at [Adc	lress]	("Escro	w Ager	nt").		

For the consideration hereinafter set forth, Owner, Contractor and Escrow Agent agree as follows:

- Pursuant to California Public Contract Code Section 22300, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to Contract Number CIP 301-657 entered into between Owner and Contractor for THE FOSTER CITY LEVEE IMPROVMENTS PROJECT in the amount of \$______ dated ______, 202__ (the "Contract"). Alternatively, on written request of Contractor, Owner shall make payments of the retention earnings directly to Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, Escrow Agent shall notify Owner within ten days of the deposit. The market value of the securities at the time of substitution shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between Owner and Contractor. Securities shall be held in name of ______ and shall designate Contractor as the beneficial owner.
- 2. Owner shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified in Paragraph 1 of this Document 00 6290.
- 3. When Owner makes payment(s) of retention earned directly to Escrow Agent, Escrow Agent shall hold said payment(s) for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when Owner pays Escrow Agent directly.
- 4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of Owner. Such expenses and payment terms shall be determined by Owner, Contractor, and Escrow Agent.
- 5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to Owner.
- 6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to Escrow Agent that Owner consents to withdrawal of amount sought to be withdrawn by Contractor.
- 7. Owner shall have the right to draw upon the securities in event of default by Contractor. Upon seven Days written notice to Escrow Agent from Owner of the default, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by Owner.

- Upon receipt of written notification from Owner certifying that the Contract is final and 8. complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.
- 9. Escrow Agent shall rely on written notifications from Owner and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Document 00 6290 and Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth.
- 10. Names of persons who are authorized to give written notice or to receive written notice on behalf of Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

ON BEHALF OF OWNER:	ON BEHALF OF CONTRACTOR:
Title	Title
Name	Name
Signature	Signature
Address	Address
City/State/Zip Code	City/State/Zip Code
ON BEHALF OF ESCROW AGENT:	
Title	
Name	_
Signature	
Address	
City/State/Zip Code	
IN WITNESS WHEREOF, the parties have officers on the date first set forth above.	e executed this Escrow Agreement by their proper
OWNER:	CONTRACTOR
CITY OF FOSTER CITY	
Title	Title

Name

Name

5	iai	าล	tu	re
0	''y'	iu	u	

Signature

ATTEST	
Signature	
Print Name	
Secretary	
ESCROW AGENT	
Title	
Print Name	
Signature	
REVIEWED AS TO FORM:	
Counsel for Owner	
Print Name	

Date

At the time the Escrow Account is opened, Owner and Contractor shall deliver to Escrow Agent a fully executed counterpart of this Document 00 62 90.

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DOCUMENT 00 63 25 SUBSTITUTION REQUEST FORM

To: CITY OF FOSTER CITY, Owner

PROJECT: Levee Improvements Project	Contractor:
Owner Project No: CIP 301-657	

Substitution	Firm [.]
Cubbilitation	1 1111.
Request By:	

Transmittal Record	Attn:	Firm:	Date Sent:	Date Rec'd:	Date Due:
Contractor to Owner					
Contractor to Engineer					
Owner / Engineer to Consultant					
Engineer to Owner Representative					
Owner Representative to Contractor					

We hereby submit for your consideration the following product instead of the specified item for the Project:

Section / Drawing	Article	Specified Item	
Proposed Substitution:			

We have (a) attached manufacturer's literature, including complete technical data and laboratory test results, if applicable, (b) attached an explanation of why proposed substitution is a true equivalent to specified item, (c) included complete information on changes to Contract Documents that the proposed substitution will require for its proper installation, and (d) filled in the blanks below:

Contractor to complete questions that follow and certifies to the accuracy of all answers:

A.	Does the substitution affect dimensions shown on Drawings? Yes / No If Yes, please explain proposed mitigation and why substitution is equivalent to originally specified item:										
В.	Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes / No If No, please state reasons explain why substitution is equivalent to originally specified item:										
C.	What effect does the substitution have on other trades? No effect:/ Some effect If substitution will affect other trades, please explain the effect and why substitution is equivalent to originally specified item:										
D.	Will substitution cause change to Project Schedule, or to critical delivery dates? Add? Shorten? If the substitution will add to schedule dates or affect critical activities, please explain why substitution is equivalent to originally specified item:										
E.	Please explain and identify any and all differences between the originally specified item and proposed substitution. Please explain why substitution is equivalent to originally specified item:										
F.	What is the Cost Differential to Contractor in original specified item and proposed substitution including all mark-ups? [If substitution requested during bid period, skip this question.]										
G.	Are Manufacturer's guarantees for the proposed item the same as for item specified?										
----	-------------------------------------------------------------------------------------	-----------------	--------	--------	---------	-----	--------------	----	------------	----	------------
	Yes	; No d item:	If No,	please	explain	why	substitution	is	equivalent	to	originally

Η.	Does the Contractor accept full responsibility for delays caused by redesign of other items
	of the Work necessitated by substitution? Yes / No If No, please state reasons and
	explain why substitution is equivalent to originally specified item:

I. Does the Contractor state that the function, appearance and quality are equivalent or superior to the specified item? Yes __ / No __. If No, please explain why substitution is equivalent to originally specified item:

We certify that the function, appearance, and quality of the proposed substitution are equivalent or superior to those of the specified item, except as we may specifically state otherwise in this request.

Submitted by:	Signature:
Firm:	Date:
Address:	Phone/ Fax:
Remarks:	

Consultant	Owner Representative
Response:	Response:
o Accepted	o Accepted
o Not Accepted	o Not Accepted
o Accepted As Noted	o Accepted As Noted
o Received Too Late	o Received Too Late
Remarks:	Remarks:

END OF DOCUMENT

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DOCUMENT 00 65 30 AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

Public Contract Code Section 7100

THIS AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS (Agreement and Release), made and entered into this [date] day of [Month], [202], by and between CITY OF FOSTER CITY/ESTERO MUNICIPAL IMPROVEMENT DISTRICT (Owner), and [Enter Name of Contractor] (Contractor), whose place of business is at [Enter Address of Contractor].

RECITALS

- A. Owner and Contractor entered into Contract Number CIP 301-657 (the "Contract") for construction of Owner's Foster City Levee Improvements Project.
- B. The Work under the Contract has been completed.

AGREEMENT

NOW THEREFORE, it is mutually agreed between Owner and Contractor as follows:

1. Contractor will not be assessed liquidated damages except as detailed below:

Original Contract Sum	\$
Modified Contract Sum	\$
Payment to Date	\$
Liquidated Damages	\$
Payment Due Contractor	\$

- 3. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against Owner arising from the Contract, except for the claims described in Paragraph 4 of this Document 00 6530. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against Owner, and all if its agents, employees, consultants, inspectors, representatives, assignees and transferees, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 6530. Nothing in this Agreement and Release shall limit or modify Contractor's continuing obligations described in Paragraph 6 of this Document 00 6530.
- The following claims submitted under Document 00 7200 (General Conditions), Article 12, are disputed (**Disputed Claims**) and are specifically excluded from the operation of this Agreement and Release.

CLAIM NO.	DATE SUBMITTED	DESCRIPTION OF CLAIM	AMOUNT OF CLAIM

[Insert information in Chart below, affix attachment if necessary]

- 5. Consistent with California Public Contract Code Section 7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 of this Document 00 6530, Contractor hereby releases and forever discharges Owner, and all of its agents, employees, consultants, inspectors, assignees and transferees from any and all liability, claims, demands, actions or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.
- 6. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, shall remain in full force and effect as specified in the Contract Documents.
- 7. Contractor shall immediately defend, indemnify and hold harmless Owner, any of the Owner's Representatives, Project Manager, and all of their agents, employees, consultants, inspectors, assignees and transferees, from any and all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities that may be asserted against them by any of Contractor's suppliers and/or Subcontractors of any tier and/or any suppliers to them for any and all labor, materials, supplies and equipment used, or contemplated to be used in the performance of the Contract, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 6530.
- 8. Contractor hereby waives the provisions of California Civil Code Section 1542, which provide as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER, MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.

- 9. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable, and if any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal or other law, ruling, or regulation, then such provision, or part thereof shall remain in force and effect only to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.
- 10. Contractor represents and warrants that it is the true and lawful owner of all claims and other matters released pursuant to this Agreement and Release, and that it has full right, title and authority to enter into this instrument. Each party represents and warrants that it has been represented by counsel of its own choosing in connection with this Agreement and Release.

11. All rights of Owner shall survive completion of the Work or termination of the Contract, and execution of this Agreement and Release.

*** CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING ***

OWNER: CITY OF FOSTER CITY

By:	
,	Signature
Name:	Print
	1 1014
Its [.]	
	Title
ATTEST:	
	Constant
	Secretary
	Print
[CONTRACTOR]	
Ву:	
	Signature
Nama	
Name:	Print
Its:	
	Title
REVIEWED AS TO F	ORM:
Dated:	, [202]
Ву:	
	Counsel for Owner
Name:	
	Print

END OF DOCUMENT

DOCUMENT 00 65 36 GUARANTEE

TO: The **CITY OF FOSTER CITY** (**Owner**), for construction of the FOSTER CITY LEVEE IMPROVEMENTS PROJECT.

The undersigned guarantees all construction performed on this Project and guarantees all material and equipment incorporated therein.

- **1.01** Contractor hereby grants to Owner for a period of one year following the date of Final Acceptance of the Work completed, or such longer period specified in the Contract Documents, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work.
- **1.02** Neither final payment nor use nor occupancy of the Work performed by the Contractor shall constitute an acceptance of Work not done in accordance with this Guaranty or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom, which shall appear within one year, or longer if specified, from the date of Final Acceptance of the Work completed.
- **1.03** If within one year after the date of Final Acceptance, or such other period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents or any extended warranty or guaranty, any Work is found to be Defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, correct such Defective Work. Contractor shall remove any Defective Work rejected by Owner and replace it with Work that is not Defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to comply promptly with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, Owner shall have all rights and remedies granted by law.
- **1.04** Observation and inspection of the Work shall not relieve Contractor of any of its obligations under the Contract Documents. Even though equipment, materials, or Work required to be provided under the Contract Documents have been inspected, accepted, and estimated for payment, Contractor shall, at its own expense, replace or repair any such equipment, material, or Work found to be Defective or otherwise not to comply with the requirements of the Contract Documents up to the end of the guaranty period.
- **1.05** This Guaranty is in addition to any other Contractor warranties contained in the Contract Documents, and not in lieu of, any and all other Contractor liability imposed under the Contract Documents or at law. In the event of any conflict or inconsistency between the terms of this Guaranty and any Contractor warranty or obligation Contractor under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the greater protection to Owner.

Date: _____, 20___

Contractor's name

By: _____ Signature

Print Name

Title

Street Address

City, State, Zip code

END OF DOCUMENT

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SECTION 00 72 00 GENERAL CONDITIONS

ARTICLE 1 – INTERPRETATION OF CONTRACT DOCUMENTS

1.01 Interpretation of Documents

- A. Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- B. Individual Contract Documents subdivide at the first level into Articles or Parts, and then into paragraphs.

1.02 Order of Precedence of Documents

- A. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:
 - 1. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying.
 - 2. Agreement Forms (Document 00 52 00 and other 5000 and 6000 series Documents), and terms and conditions referenced therein.
 - 3. Permits and Regulatory Authorizations
 - 4. Plans and Technical Specifications (Division 02 and above).
 - 5. Division 01 Special Provisions.
 - 6. Supplemental Conditions (Section 00 73 16).
 - 7. General Conditions (Section 00 72 00).
 - 8. Written words over figures, unless obviously incorrect.
 - 9. Detailed plan drawings
 - 10. Reference and standard specifications
 - 11. Reference and standard plans
 - 12. Figured dimensions over scaled dimensions.
 - 13. Large-scale drawings over small-scale drawings.
- B. Any conflict between Plans and Technical Specifications (Division 2 and above) will be resolved in favor of the document of the latest date (i.e., the most recent document), and if the dates are the same or not determinable, then in favor of Specifications.
- C. Any conflict between a bill or list of materials shown in the Contract Documents and the actual quantities required to complete Work required by Contract Documents, will be resolved in favor of the actual quantities.
- D. All Technical Specifications included in the Project Manual shall be included within the Contract Documents unless identified otherwise.

ARTICLE 2 – PRE-BID INVESTIGATIONS

2.01 **Pre-Bid Investigations Required**

- A. Prior to and as a condition of submitting a bid and executing Document 00 52 00 (Agreement), Contractor shall make reasonable efforts to investigate fully the Work of the Contract. Contractor shall visit the site, examine thoroughly and understand fully the nature and extent of the Contract Documents, Work, site, locality, actual conditions and as-built conditions.
- B. Contractor's investigation shall include, without limitation, requesting and thoroughly examining of all reports of exploration and tests of subsurface conditions, as-built drawings, drawings, product specification(s) or reports, made available by City for contracting purposes or during Contractor's pre-bid investigations, of existing above ground and (to the extent applicable) below ground conditions (together, **Existing Conditions Data**), including, as applicable, underground facilities, geotechnical data, as-built data, utility surveys, record documents of all types, hazardous materials surveys, or similar materials which may appear or be referenced in the Project Manual or the in the Contract Documents, and all local conditions, and federal, state and local laws and regulations that in any manner may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Contractor and safety precautions and programs incident thereto.
- C. Contractor's investigations shall consider fully the fact that Existing Conditions Data is in many cases based on information furnished to City by others (e.g. utility companies), and that due to their age or their chain of custody since preparation, may not meet current industry standards for accuracy. Contractor shall also:
 - 1. Provide City with prompt written notice of all conflicts, errors, ambiguities, or discrepancies of any type, that it discovered in or among the Contract Documents and the Existing Conditions Data.
 - 2. Subject to City's approval, conduct any such additional or supplementary examinations, investigations, explorations, tests, studies and data compilations, concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise, which Contractor may deem necessary in order to perform and furnish the Work in accordance with the terms and conditions of Contract Documents.
- D. During performance of the Contract, Contractor will be charged with knowledge of all information that it should have learned in performing these pre-bid investigations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that Contractor should have known as a part of this Work. Contractor shall be responsible for the resultant losses, including, without limitation, the cost of correcting defective Work.

2.02 Limited Reliance Permitted on City's Existing Conditions Data

A. Regarding aboveground and as-built conditions shown on the Contract Documents or supplied by City, such information has been compiled in good faith. However, City does not expressly or impliedly warrant or represent that such information is correctly shown or indicated, or otherwise complete for construction purposes. Contractor must independently verify such information as part of its pre-bid investigations, and where conditions are not reasonably verifiable or discrepancies are identified, bring such matters to City's attention through written question issued during the bid period. In executing Document 00 52 00 (Agreement), Contractor shall rely on the results of its own independent investigation and shall not rely on City-supplied information regarding aboveground conditions and as-built conditions, and Contractor shall accept full responsibility for its verification work sufficient to complete the Work as intended.

B. Regarding subsurface conditions other than underground facilities shown on the Contract Documents or otherwise supplied by City, Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the Contract Documents. City is not responsible for the completeness of any subsurface condition information, Contractor's conclusions or opinions drawn from any subsurface condition information, or subsurface conditions that are not specifically shown. (For example, City is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

2.03 **Pre-Bid Investigation Requirements for Excavation**

- A. As part of its pre-bid investigation, Contractor shall make reasonable efforts to verify information regarding underground facilities, including but not limited to, requesting additional information or verification of information as necessary.
- B. Because of the nature and location of the Project, the existence of underground facilities is deemed inherent in the Work of the Contract, as is the fact that underground facilities are not always accurately shown or completely shown on asbuilt records, both as to their depth and location. Contractor shall, therefore, take care to note the existence and potential existence of underground facilities, above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities.
 - Contractor shall carefully consider all supplied information, request additional information Contractor may deem necessary, and visually inspect the site for above ground indications of underground facilities (such as, for example not by way of limitation, the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the site).
 - 2. Contractor shall also consider local underground conditions and typical practices for underground facilities, either through its own direct knowledge or through its subcontractors, and fully consider this knowledge in assessing the existing information and the reasonableness of its reliance.

ARTICLE 3 – SUBCONTRACTORS

3.01 Subcontractor Listing Law

- A. Contractor shall comply with the Subcontractor Listing law, Public Contract Code Section 4101, et seq. Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the bid except as may be allowed by law.
- B. Subcontractors shall not assign or transfer their subcontracts or permit them to be performed by any other contractor without City's written approval. At City's request, Contractor shall provide City with a complete copy of all executed subcontracts or final commercial agreements with Subcontractors and/or suppliers.

3.02 Subcontracts

- A. Subcontract agreements shall preserve and protect the rights of City under the Contract Documents so that subcontracting will not prejudice such rights. To the extent of the Work to be performed by a Subcontractor, Contractor shall require the Subcontractor's written agreement:
 - 1. To be bound to the terms of Contract Documents.
 - 2. To assume vis-à-vis Contractor all the obligations and responsibilities that Contractor assumes toward City under the Contract Documents. (These agreements include for example, and not by way of limitation, all warranties, claims procedures and rules governing submittals of all types to which Contractor is subject under the Contract Documents.)
- B. Contractor shall provide for the assignment to City of all rights any Subcontractor (of any tier) may have against any manufacturer, supplier, or distributor for breach of warranties and guarantees relating to the Work performed by the Subcontractor under the Contract Documents. Subcontracts shall provide and acknowledge City as an intended third-party beneficiary of each subcontract and supply contract (of any tier).

ARTICLE 4 – PLANS AND SPECIFICATIONS

4.01 Intent of Plans and Specifications

- A. Contractor shall interpret words or phrases used to describe work (including services), materials, or equipment that have well-known technical or construction industry or trade meaning in accordance with that meaning. Plans' intent specifically includes the intent to depict construction that complies with all applicable laws, codes and standards.
- B. As part of the "Work," Contractor shall provide all labor, materials, equipment, machinery, tools, facilities, services, employee training and testing, hoisting facilities, Shop Drawings, storage, testing, security, transportation, disposal, the securing of all necessary or required field dimensions, the cutting or patching of existing materials, notices, permits, documents, reports, agreements and any other items required or necessary to timely and fully complete work described and the results intended by Contract Documents and, in particular, Plans and Specifications.

- C. Divisions and Specification Sections and the identification on any Plans shall not control Contractor in dividing work among Subcontractors or suppliers or delineating the Work to be performed by any specific trade.
- D. Contractor shall perform reasonably implied parts of the Work as "incidental work" although absent from Plans and Specifications. Incidental work includes any work not shown on Plans or described in Specifications that is necessary or normally or customarily required as a part of the Work shown on Plans or described in Specifications. Incidental work includes any work necessary or required to make each installation satisfactory, legally operable, functional, and consistent with the intent of Drawings and Specifications or the requirements of Contract Documents. Contractor shall perform incidental work without extra cost to City. Incidental work shall be treated as if fully described in Specifications and shown on Plans, and the expense of incidental work shall be included in price bid and contract sum.

4.02 Checking Plans and Specifications

A. Before undertaking each part of Work, Contractor shall carefully study and compare Contract Documents and check and verify pertinent figures shown in the Contract Documents and all applicable field measurements. Contractor shall be responsible for any errors that might have been avoided by such comparison. Figures shown on Plans shall be followed; Contractor shall not scale measurements. Contractor shall promptly report to City, in writing, any conflict, error, ambiguity or discrepancy that Contractor may discover. Contractor shall obtain a written interpretation or clarification from City before proceeding with any Work affected thereby. Contractor shall provide City with a follow-up correspondence every ten days until it receives a satisfactory interpretation or clarification.

4.03 Interpretation of Plans and Specifications

- A. A typical or representative detail on Plans shall constitute the standard for workmanship and material throughout corresponding parts of the Work. Where necessary, and where reasonably inferable from Plans, Contractor shall adapt such representative detail for application to such corresponding parts of Work. The details of such adaptation shall be subject to prior approval by City. Repetitive features shown in outline on Plans shall be in exact accordance with corresponding features completely shown.
- B. Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Plans and Specifications, or should Contractor have any questions or requests relating to Plans or Specifications, Contractor shall refer the matter to City, in writing, with a copy to the Engineer.
 - 1. City will issue with reasonable promptness written responses, clarifications or interpretations as City may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents.
 - 2. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the contract sum or contract time, Contractor shall give City prompt written notice.

- 3. If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the work in conformance with City's response, clarification, or interpretation and may make a written claim for the adjustment as provided in Article 12.
- C. The following general specifications shall apply wherever in the Specifications, or in any directions given by City in accordance with or supplementing specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do Work for which no detailed specifications are shown. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation. If not ordinarily carried in stock, the materials or manufactured articles shall conform to industry standards for first class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work shall conform to the usual standards or codes, such as those cited herein, for first class work of the kind required.
 - 1. Contractor shall specify in writing to City, at least 10 business days prior to furnishing such materials or performing such work, the materials to be used or Work to be performed under this Paragraph.

4.04 Use of Plans and Specifications.

A. Drawings, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of City. Any unauthorized use of Contract Documents is prohibited and at the sole liability of the user.

ARTICLE 5 – COMMENCEMENT OF THE WORK

5.01 Submission of Required Schedules

- A. At least ten (10) working days prior to the preconstruction conference, Contractor shall submit to City in draft for review and discussion at the preconstruction conference, and in final prior to the first payment application, the following schedules:
 - 1. Schedule of Values
 - 2. Progress Schedule, and
 - 3. Schedule of Submittals.
- B. No progress payment shall be due or owing to Contractor until such schedules are submitted to and acceptable to City and/or Engineer as meeting the requirements of the Contract Documents. In City's sole discretion, City may elect to instead withhold a portion of any progress payment for unacceptable compliance with contract requirements for such schedules.
- C. City's acceptance of Contractor's schedules will not create any duty of care or impose on City any responsibility for the sequencing, scheduling or progress of work nor will it interfere with or relieve Contractor from Contractor's full responsibility, therefore.

5.02 Commencement Date of Contract Time

- A. The contract time will commence to run on the 60th day after the issuance of the Notice of Award or, if a Notice to Proceed is given, on the date indicated in the Notice to Proceed, whichever is earlier.
- B. City may give a Notice to Proceed at any time within 60 Days after the Notice of Award. Contractor shall not do any work at the site prior to the date on which the contract time commences to run.

ARTICLE 6 – CONTRACTOR'S ORGANIZATION AND EQUIPMENT

6.01 Contractor's Legal Address

A. Address and facsimile number or email address given in Contractor's bid are hereby designated as Contractor's legal address and facsimile number or email address. Contractor may change its legal address, facsimile number, or email address by notice in writing, delivered to City, which in conspicuous language advises City of a change in legal address or facsimile number, and which City accepts in writing. Delivery to Contractor's legal address or depositing in any post office or post office box regularly maintained by the United States Postal Service, in a wrapper with postage affixed, directed to Contractor at Contractor's legal address, or of any drawings, notice, letter or other communication, shall be deemed legal and sufficient service thereof upon Contractor. Facsimile to Contractor's designated facsimile number of any letter, memorandum, or other communication on standard or legal sized paper, with proof of facsimile transmission, shall be deemed legal and sufficient service thereof upon Contractor.

6.02 Contractor's Superintendents or Forepersons

A. Contractor shall at all times be represented on Site by one or more superintendents or forepersons authorized and competent to receive and carry out any instructions that City may give, and shall be liable for faithful observance of instructions delivered to Contractor or to authorized representative or representatives on Site.

6.03 **Proficiency in English**

A. Supervisors, security guards, safety personnel and employees who have unescorted access to the Site shall possess proficiency in the English language in order to understand, receive and carry out oral and written communications or instructions relating to their job functions, including safety and security requirements.

6.04 Contractor's and Subcontractors' Employees

A. Contractor shall employ, and shall permit its Subcontractors to employ, only competent and skillful personnel to do work. If City notifies Contractor that any of its employees, or any of its Subcontractors' employees on work is incompetent, unfaithful, disorderly or profane, or fails to observe customary standards of conduct or refuses to carry out any provision of the Contract Documents, or uses threatening or abusive language to any person on work representing City, or violates sanitary rules, or is otherwise unsatisfactory, and if City requests that such person be

discharged from work, then Contractor or its Subcontractor shall immediately discharge such person from work and the discharged person shall not be reemployed on the work except with consent of City.

6.05 Contractor's Use of the Site

- A. Contractor shall not make any arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the work, for any purpose whatsoever, either with or without compensation, in conflict with any agreement between City and any owner, former owner or tenant of such land, structure or buildings.
- B. Contractor may not occupy owner-owned property outside the limit of the work as indicated on the Plans unless it obtains prior approval from the property owner.

6.06 Contractor's Site Office

A. Unless expressly provided otherwise in the Contract Documents, Contractor shall provide a site office staffed by a resident project manager or job superintendent.

ARTICLE 7 – CITY'S ADMINISTRATION OF WORK

7.01 City's Representative(s)

- A. City's Representative(s) will have limited authority to act on behalf of City as set forth in the Contract Documents.
- B. Except as otherwise provided in these Contract Documents or subsequently identified in writing by City, City will issue all communications to Contractor through City's Representative, and Contractor shall issue all communications to City through City's Representative in a written document delivered to City.
- C. Should any direct communications between Contractor and City's consultants, architects or engineers not identified in Article 2 of Document 00 52 00 (Agreement) occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to City.

7.02 City's Observation of the Work

- A. Work shall be performed under City's general observation and administration. Contractor shall comply with City's directions and instructions in accordance with the terms of Contract Documents, but nothing contained in these General Conditions shall be taken to relieve Contractor of any obligations or liabilities under the Contract Documents. City's failure to review or, upon review, failure to object to any aspect of Work reviewed, shall not be deemed a waiver or approval of any non-conforming aspect of Work.
- B. Subject to those rights specifically reserved in the Contract Documents, City will not supervise, or direct, or have control over, or be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, or the safety

precautions and programs incident thereto, or Contractor's failure to comply with laws and regulations applicable to the furnishing or performance of work.

1. City will not be responsible for Contractor's failure to perform or furnish the Work in accordance with Contract Documents.

7.03 Consultants' Observation of Work

- A. City may engage one or more of the following to assist in administering the Work: an Engineer, Project Manager, Construction Manager, Landscape Architect, Biologist, or any other independent consultant (collectively for purposes of this Article 7, "Consultant").
 - 1. If so engaged, Consultant will advise and consult with City, but will have authority to act on behalf of City only to extent provided in the Contract Documents or as set forth in writing by City.
 - 2. Consultant will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with work.
 - 3. Consultant will not be responsible for or have control over the acts or omissions of Contractor, Subcontractors or their agents or employees, or any other persons performing work.
- B. Consultant may review Contractor's submittals, such as shop drawings, product data, and samples; but only for conformance with design concept of the Work and with information given in the Contract Documents.
- C. Consultant may visit the site at intervals appropriate to stage of construction to become familiar generally with the progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. Based on its observations, Consultant may recommend to City that it disapproves or rejects Work that Consultant believes to be defective or will not produce a complete Project that conforms to Contract Documents, or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by Contract Documents. Consultant may also recommend to City special inspection or testing of Work, whether or not the Work is fabricated, installed, or completed.
- D. Consultant may conduct observations or inspections to recommend to City the dates that Contractor has achieved Substantial Completion and Final Completion and will receive and forward to City for review written warranties and related documents required by Contract Documents.

7.04 City's and Consultant's Exercise of Contract Responsibilities

A. City, Consultant, and all City's representatives, in performing their duties and responsibilities under the Contract Documents, accept no duties, responsibilities or duty of care, nor may the same be implied or inferred, towards Contractor, any Subcontractor, sub-Subcontractor or supplier, except those set forth expressly in the Contract Documents.

7.05 City's Right of Access to the Work

A. During performance of work, City, Consultant, and all City's representatives may at any time enter upon work, shops or studios where any part of the Work may be in preparation, or factories where any materials for use in Work are being or are to be manufactured, and Contractor shall provide proper and safe facilities for this purpose, and shall make arrangements with manufacturers to facilitate inspection of their processes and products to such extent as City's interests may require. Other contractors performing work for City may also enter upon the Work sites for all purposes required by their respective contracts. Subject to the rights reserved in the Contract Documents, Contractor shall have sole care, custody, and control of the site and its work areas.

7.06 City's Right of Separate Construction

- A. City may perform with its own forces, construction or operations related to the Project, or the site during Contractor's operations. City may also award separate contracts in connection with other portions of the Project or other construction or operations, on the site or areas contiguous to the site, under conditions similar to these Contract Documents, or may have utility owners perform other work.
- B. Contractor shall adjust its schedule and fully coordinate with and shall afford all other contractors, utility districts and City (if City is performing work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others' work, do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work, and shall cooperate with them to facilitate the progress of the Work.
- C. To the extent that any part of Contractor's Work is to interface with work performed or installed by other contractors or utility owners, Contractor shall inspect and measure the in-place Work. Contractor shall promptly report to City in writing any defect in in-place Work that will impede or increase the cost of Contractor's interface unless corrected.

ARTICLE 8 – CONTRACTOR'S PROSECUTION AND PROGRESS OF THE WORK

8.01 Contractor to Supervise the Work

- A. Subject to those rights specifically reserved in the Contract Documents, Contractor shall supervise, direct, have control over, and be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, safety precautions and programs incident thereto, and compliance with laws and regulations applicable to the furnishing or performance of Work.
- B. Contractor shall keep on the site at all times during work progress a competent resident Superintendent, who shall not be replaced without City's express written consent and, if applicable, payment of liquidated damages as required by Document 00 52 00 (Agreement). The Superintendent shall be Contractor's representative at

the Site and shall have complete authority to act on behalf of Contractor. All communications to and from the Superintendent shall be as binding as if given to or by Contractor.

- C. Contractor shall supervise, inspect, and direct work competently and efficiently, devoting the attention and applying such personal skills and expertise as may be required and necessary to perform work in accordance with Contract Documents. Contractor shall be solely responsible for and have control and charge of construction means, methods, techniques, sequences and procedures, safety precautions and programs in connection with the Work. Contractor shall be responsible to see that the completed work complies accurately with Contract Documents.
- D. Contractor is fully responsible for Contractor's own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect contract with Contractor.
- E. Contractor shall conduct monthly contractor safety meetings, and weekly "tailgate" safety talks.

8.02 Contractor to Maintain Cost Data

- A. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in form of certified payrolls, the cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and the amount of each class of materials used in each subdivision of work. Contractor shall provide City with monthly summaries of this information. If Contractor maintains or is capable of generating summaries or reports comparing actual Project costs with bid estimates or budgets, Contractor shall provide City with a copy of such report upon City's request.
- B. Contractor shall maintain daily job reports recording all significant activity on the job, including the number of workers on site, work activities, problems encountered and delays. Contractor shall provide City with copies for each day Contractor works on the Project, to be delivered to City either the same day or the following morning before starting work at the site. Contractor shall take pre-construction and monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.
- C. City shall have the right to audit and copy Contractor's books and records of any type, nature or description relating to the Project (including, without limitation, financial records reflecting in any way costs claimed on the Project), and to inspect the site, including Contractor's trailer, or other job site office, and this requirement shall be contained in the subcontracts of Subcontractors working on site. By way of example, City shall have the right to inspect and obtain copies of all Contract Documents, planning and design documents, bid proposal and negotiation documents, cost records and job cost variance reports, design modification proposals, value engineering or other cost reduction proposals, revisions made to

the original design, job progress reports, photographs, and as-built drawings maintained by Contractor. City and any other applicable governmental entity shall have the right to inspect all information and documents maintained hereunder at any time during the Project and for a period of five years following Final Completion, in accordance with the provisions of the Government Code Section 8546.7.

1. This right of inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. This right of inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

8.03 Contractor to Supply Sufficient Workers and Materials

- A. Unless otherwise required by City under the terms of Contract Documents, Contractor shall at all times keep on the site materials and employ qualified workers sufficient to prosecute work at a rate and in a sequence and manner necessary to complete Work within the contract time. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.
- Β. At any time during progress of Work should Contractor directly or indirectly (through Subcontractors) refuse, neglect, or be unable to supply sufficient materials or employ gualified workers to prosecute the Work as required, then City may require Contractor to accelerate the Work and/or furnish additional gualified workers or materials as City may consider necessary, at no cost to City. If Contractor does not comply with the notice within three business days of date of service thereof, City shall have the right (but not a duty) to provide materials and qualified workers to finish the Work or any affected portion of Work, as City may elect. City may, at its discretion, exclude Contractor from the site, or portions of the site or separate Work elements during the time period that City exercises this right. City will deduct from moneys due or which may thereafter become due under the Contract Documents, the sums necessary to meet expenses thereby incurred and paid to persons supplying materials and doing work. City will deduct from funds or appropriations set aside for purposes of Contract Documents the amount of such payments and charge them to Contractor as if paid to Contractor. Contractor shall remain liable for resulting delay, including liquidated damages and indemnification of City from claims of others.
- C. Exercise by City of the rights conferred upon City in this subparagraph is entirely discretionary on the part of City. City shall have no duty or obligation to exercise the rights referred to in this subparagraph and its failure to exercise such rights shall not be deemed an approval of existing Work progress or a waiver or limitation of City's right to exercise such rights in other concurrent or future similar circumstances. (The rights conferred upon City under this subparagraph are, like all other such rights, cumulative to City's other rights under any provision of the Contract Documents.)

8.04 Contractor to Maintain Project Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Contract Modifications, Change Orders, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all as-built changes made during construction. These Project Record Documents, together with all approved Samples and a counterpart of all approved Shop Drawings, shall be maintained and available to City for reference. Upon completion of the work, Contractor shall deliver to City, the Project Record Documents, Samples and Shop Drawings and as-built drawings.

B. Throughout Contractor's performance of the Work of the Project, Contractor shall maintain construction records to include: shop drawings; product data/material data sheets; samples; submittal; purchases; materials; equipment; inspections; applicable handbooks; applicable codes and standards; maintenance and operating manuals and instructions; RFI Log; Submittal Log; other related documents and revisions which arise out of the Contract. Contractor shall maintain records of principal building layout lines, elevations for the bottom of footings, floor levels, and key site elevations (certified by a qualified surveyor or professional engineer). Contractor shall make all records available to City. At the completion of the Project, Contractor shall deliver all such records to the City to have a complete set of record drawings.

8.05 Contractor to Not Disrupt City Operation

A. Contractor shall schedule and execute all of its work in a manner that does not interfere with or disrupt City operations including, without limitation, parking, utilities (electricity, gas, water), noise, access by employees and administration, access by vendors, physicians, patients and any other person or entity using City facilities or doing business with City. Contractor shall produce and supply coordination plans and requests to City, following City procedures, for all necessary interference of construction with City, which City will reasonably cooperate with.

8.06 Contractor to Provide Temporary Facilities and Controls

- A. Unless expressly provided otherwise in the Contract Documents, Contractor shall provide all temporary utilities (including without limitation electricity, water, natural gas), lighting, heating, cooling and ventilating devices, telephone, sanitary facilities, barriers, fences and enclosures, tree and plant protection, fire protection, pollution, erosion, Storm Water Pollution Prevention controls, noise and traffic control, and any other necessary services required for construction, testing or completion of the Work. Per Foster City Municipal Code Chapter 17.68.110 Screening of Construction Materials and Equipment.
 - 1. Temporary construction fence consisting of a six-foot tall chain link fence with a dark green vinyl or canvas liner placed on the exterior of the fence, shall be provided around the land-side perimeter of the project site adjacent to private and public properties.

ARTICLE 9 – WARRANTY, GUARANTY, AND INSPECTION OF WORK

9.01 Warranty and Guaranty

A. General Representations and Warranties: Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every phase of the Work and to complete Work in accordance with the terms of Contract Documents. Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction

practices and all requirements of Contract Documents. Contractor warrants that Work including, without limitation, each item of materials and equipment incorporated therein, shall be new, of suitable grade of its respective kind for its intended use, and free from defects in design, engineering, materials, construction and workmanship. Contractor warrants that Work shall conform in all respects with all applicable requirements of federal, state and local laws, applicable construction codes and standards, licenses, and permits, Plans and Specifications and all descriptions set forth therein, and all other requirements of Contract Documents.

- 1. Contractor shall not be responsible, however, for the negligence of others in the specification of specific equipment, materials, design parameters and means or methods of construction where that is specifically shown and expressly required by Contract Documents.
- B. **Extended Warranties:** Any warranty exceeding one year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials and shall supply City with all warranty and guarantee documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.
- C. **Environmental and Toxics Warranty:** The covenants, warranties and representations contained in this Paragraph are effective continuously during Contractor's work on the Project and following cessation of labor for any reason including, without limitation, Project completion. Contractor covenants, warrants and represents to City that:
 - 1. To Contractor's knowledge after due inquiry, no lead or asbestos-containing materials were installed or discovered in the Project at any time during Contractor's construction thereof. If any lead or asbestos-containing materials were discovered, Contractor made immediate written disclosure to City.
 - 2. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor's construction thereof.
 - 3. To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to City.
 - 4. Contractor's operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide City with copies thereof.

9.02 Inspection of Work

- A. Work and materials, and manufacture and preparation of materials, from beginning of construction until Final Completion and acceptance of Work, shall be subject to inspection and rejection by City, its agents, representatives or independent contractors retained by City to perform inspection services, or governmental agencies with jurisdictional interests. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's site safety procedures and program so that they may comply therewith as applicable. Upon request or where specified, City shall be afforded access for inspection at the source of supply, manufacture or assembly of any item of material or equipment, with reasonable accommodations supplied for making such inspections.
- B. Contractor shall furnish, in such quantities and sizes as may be required for proper examination and tests, samples or test specimens of all materials to be used or offered for use in connection with work. Contractor shall prepare Samples or test specimens at its expense and furnish them to City. Contractor shall submit all Samples in ample time to enable City to make any necessary tests, examinations, or analyses before the time it is desired to incorporate the material into the Work.
- C. Contractor shall give City timely notice of readiness of Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- D. If applicable laws or regulations of any public body having jurisdiction require any work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, and furnish City with the required certificates of inspection, or approval. City will pay the cost of initial testing and Contractor shall also be responsible for arranging and obtaining and obtaining and be responsible for arranging and obtaining and shall pay all costs in connections, tests or approvals required for the acceptance of materials or equipment to be incorporated in the work, or of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.
- E. If Contractor covers any Work, or the work of others, prior to any required inspection, test or approval without written approval of City, Contractor shall uncover the Work at City's request. Contractor shall bear the expense of uncovering Work and replacing Work. In any case where Contractor covers work contrary to City's request, Contractor shall uncover Work for City's observation or inspection at City's request. Contractor shall bear the cost of uncovering Work.
- F. Whenever required by City, Contractor shall furnish tools, labor and materials necessary to make examination of Work that may be completed or in progress, even to extent of uncovering or taking down portions of finished Work. Should Work be found unsatisfactory, cost of making examination and of reconstruction shall be borne by Contractor. If Work is found to be satisfactory, City, in manner herein prescribed for paying for alterations, modifications, and extra work, except as otherwise herein specified, will pay for examination.

- G. Inspection of the Work by or on behalf of City, or City's failure to do so, shall not under any circumstances be deemed a waiver or approval of any non-conforming aspect of the Work. Contractor shall have an absolute duty, in the absence of a written Change Order signed by City, to perform Work in conformance with the Contract Documents and to immediately correct defective Work immediately upon Contractor's knowledge.
- H. Any inspection, evaluation, or test performed by or on behalf of City relating to the Work is solely for the benefit of City and shall not be relied upon by Contractor. Contractor shall not be relieved of the obligation to perform Work in accordance with the Contract Documents, nor relieved of any guaranty, warranty, or other obligation, as a result of any inspections, evaluations, or tests performed by City, whether or not such inspections, evaluations, or tests are permitted or required under the Contract Documents. Contractor shall be solely responsible for testing and inspecting Work already performed to determine whether such Work is in proper condition to receive later Work.
- I. COSTS FOR TESTING: The cost of all testing will be borne by the City, except in the following instances:
 - 1. The specifications for a specific project provide for Contractor furnished testing (i.e., up to the stated number of tests)
 - 2. The Contractor shall assume all costs of retesting materials which fail to meet Contract requirements. Any costs due from the Contractor for testing will be charged against the Contract and deducted from monies due, or to become due, to the Contractor.
- J. TESTING BY CONTRACTOR
 - 1. Where these specifications require the Contractor to furnish test results, they shall be performed by an independent testing laboratory approved by the City.
 - 2. Laboratory test reports shall cite the contract requirements, the test of analysis procedures used, the actual test results, and include a statement that the item tested conforms or fails to conform to the specification requirements.
 - 3. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports.
 - 4. Original copies of test reports shall be mailed directly to the City from the approved testing laboratory.
- K. COST OF OVERTIME CONSTRUCTION INSPECTION: Overtime construction work performed at the option of, or for the convenience of, the Contractor will be inspected by the City/District at the expense of the Contractor. Overtime work is prohibited without the prior written consent of the City. For any such overtime beyond the regular 8-hour day and for any time worked on Sunday, or holidays, the charges for City personnel will be as shown in the currently adopted rate schedule, available at the Public Works office. There will be no charges for the inspection of overtime work ordered by the Engineer.

9.03 Correction of Defective Work

- A. City may direct Contractor to correct any defective Work or remove it from the site and replace it with Work that is not defective and satisfactorily correct or remove and replace any damage to other work or the work of others resulting from the correction or removal. Also, if Contractor fails to supply sufficient skilled workers, suitable materials or equipment, or to furnish or perform the Work in such a way that the completed Work will conform to Contract Documents, City may direct Contractor to perform the Work in accordance with the Contract Documents, correct or replace any such defective Work, or stop any portion of Work.
- B. City may correct and remedy the defective Work or perform any other work, corrective or otherwise, if, after five days' written notice to Contractor, Contractor fails to correct defective Work or to remove and replace rejected Work; or provide a plan for correction of defective Work acceptable to City; or perform Work in accordance with Contract Documents. In connection with such corrective and remedial action, City may exclude Contractor from all or part of the site; take possession of all or part of Work and suspend Contractor's Work related thereto; take possession of all or part of Contractor's tools, appliances, construction equipment and machinery at the site; and incorporate in Work any materials and equipment stored at the site or for which City has paid Contractor but which are stored elsewhere. Contractor shall allow City, its representatives, agents, employees, and other contractors and consultants' access to the site to enable City to exercise the rights and remedies under this Paragraph.
- C. Contractor shall be responsible for all claims, costs, losses, damages, expenses and liabilities incurred or sustained by City in exercising rights and remedies under this Paragraph. Contractor shall be responsible for any and all claims, costs, losses and damages caused by or resulting from such correction or removal. A Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the contract sum. If the parties are unable to agree to the amount of an appropriate decrease in the contract sum, City may decide the proper amount or, in its discretion may elect to leave the contract sum unchanged and deduct from monies due Contractor, all such claims, costs, losses and damages caused by or resulting from exercising its rights and remedies. If Contractor disagrees with City's calculations, it may make a claim as provided in Article 12 of this Section.
- D. These City rights and remedies are entirely discretionary on the part of City and shall not give rise to any duty on the part of City to exercise the rights for the benefit of Contractor or any other party. City's rights under this Paragraph shall be in addition to any other rights it may have under the Contract Documents or by law.

9.04 Acceptance of Defective Work

A. City may in its sole discretion elect to accept defective Work. Contractor shall pay all claims, costs, losses and damages attributable to City's evaluation of and determination to accept such defective Work. If City accepts any defective Work prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the contract sum. If the parties are unable to agree to the amount of an appropriate decrease in the

contract sum, City may deduct from monies due Contractor, all claims, costs, losses, damages, expenses and liabilities attributable to the defective Work. If Contractor disagrees with City's calculations, Contractor may make a claim as provided in Article 12 of this Section. If City accepts any defective Work after final payment, Contractor shall pay to City, an appropriate amount as determined by City.

9.05 Rights upon Inspection, Correction or Acceptance

- A. Contractor shall not be allowed an extension of contract time because of any delay in the performance of Work attributable to the exercise by City of its rights and remedies under this Article. Where City exercises its rights under this Article, it retains and may still exercise all other rights it has by law or under the Contract Documents including, without limitation, the right to terminate Contractor's right to proceed with the Work under the Contract Documents for cause and/or make a claim or back charge where a Change Order cannot be agreed upon.
- B. Observation or inspection by City or its authorized agents or representatives shall not relieve Contractor of its obligation to have furnished material and workmanship in accordance with Contract Documents. Payment for Work completed through periodic progress payments, final payment or otherwise shall not operate to waive City's right to require full compliance with Contract Documents and shall in no way be deemed as acceptance of any defective Work paid therefor. Contractor's obligation to complete the Work in accordance with Contract Documents shall be absolute, unless City agrees otherwise in writing.

9.06 Proof of Compliance with Contract Provisions

- A. In order that City may determine whether Contractor has complied or is complying with requirements of Contract Documents not readily enforceable through inspection and tests of work and materials, Contractor shall at any time, when requested, submit to City properly authenticated documents or other satisfactory proofs of compliance with all applicable requirements.
- B. Before commencing any portion of Work, Contractor shall inform City in writing as to time and place at which Contractor wishes to commence Work, and nature of Work to be done, in order that proper provision for inspection of Work may occur, and to assure measurements necessary for record and payment. Information shall be given to City a reasonable time in advance of time at which Contractor proposes to begin Work, so that City may complete necessary preliminary work without inconvenience or delay to Contractor.

9.07 Correction Period and Project Warranty Period:

A. If within one year after the date of Final Acceptance, or such longer period of time as may be prescribed by laws, regulations or by the terms of Contract Documents or any extended warranty or guaranty, any Work (completed or incomplete) is found to be defective, Contractor shall promptly without cost to City and in accordance with City's written instructions, correct such defective Work. Contractor shall remove any defective Work rejected by City and replace it with Work that is not defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of

such instructions, or in an emergency where delay would cause serious risk of loss or damage, City may have the defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct defective Work, or defects are discovered outside the correction period, City shall have all rights and remedies granted by law.

- B. In special circumstances where a part of the Work is occupied or a particular item of equipment is placed in continuous service before Final Acceptance of all the Work, the correction period for that part of Work or that item may start to run from an earlier date if so provided by Change Order.
- C. Where defective Work or rejected Work (and damage to other Work resulting therefrom) has been corrected, removed, or replaced under this Paragraph after the commencement of the correction period, the correction period hereunder with respect to such Work shall be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

9.08 No Waiver

- A. Neither recordation of Final Acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by City shall constitute acceptance of work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.
- B. If, after installation, operation, or use of materials or equipment to be provided under Contract proves to be unsatisfactory to City, City shall have right to operate and use materials or equipment until said materials and equipment can, without damage to City, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.
- C. Nothing in the Contract Documents shall be construed to limit, relieve, or release Contractor's, Subcontractors', and equipment suppliers' liability to City for damages sustained as result of latent defects in materials or equipment caused by negligence of Contractor, its agents, suppliers, employees, or Subcontractors.

ARTICLE 10 – MODIFICATIONS OF CONTRACT DOCUMENTS

10.01 City's Right to Direct Changed Work

A. City may, without notice to the sureties and without invalidating the Contract, make changes in the Work (**Changed Work**) including, without limitation: alterations, deviations, additions to, or deletions from Contract Documents; increase or decrease the quantity of any item or portion of the Work; expand, reduce or otherwise change the contract time; delete any item or portion of the Work; and require extra Work. Contractor shall perform such Work under applicable provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered. In the case of any ordered extra Work, City reserves the right to furnish all or

portions of associated labor, material, and equipment, which Contractor shall accept and use without payment for costs, markup, profit, or otherwise for such Cityfurnished labor, materials, and equipment.

B. If Changed Work is of such a nature as to increase or decrease the time or cost of any part of Work, price fixed in Contract shall be increased or decreased by amount as the Contractor and City may agree upon as reasonable and proper allowance for increase or decrease in cost of work using the cost guidelines set forth in this Article, and absent such agreement, then as City may direct (with Contractor retaining its rights under Article 12 herein).

10.02 Required Documentation for Changed Work

- A. Changes affecting the contract time or contract sum of the Work shall be set forth in a written Change Order or Change Directive that shall specify:
 - 1. The work performed in connection with the change to be made
 - 2. The amount of the adjustment of the contract sum, if any, and the basis for compensation for the work ordered
 - 3. The extent of the adjustment in the contract time, if any
- B. A Change Order or Change Directive will become effective when signed by City, notwithstanding that Contractor has not signed it. A Change Order will become effective without Contractor's signature, provided City indicates same thereon (by indicating it as a "unilateral change order").
- C. All changes in any plans and specifications approved by any authority with jurisdiction may also require addenda or change orders approved by that authority.
- D. Where City requests, a performance bond rider covering the changed work must be executed and delivered to City before proceeding with the changed Work or shortly in time thereafter.

10.03 Procedures and Pricing of Changed Work

A. Procedures for changed work and pricing of changed Work, claims and all forms of extra compensation, are set forth in Section 01 26 00 (Payment for Changes and Extra Work).

ARTICLE 11 – TIME ALLOWANCES

11.01 Time Allowances

- A. Contract time may only be changed by Change Order, and the time limits stated in the Contract Documents are to mean that time is of the essence.
- B. <u>Float</u>. Float shall be treated as a Project resource. Contractor shall not be entitled to a time extension for impacts that consume float, but do not impact the critical path.

C. Time extensions will not be granted unless substantiated by the Critical Path Method **(CPM)** Schedule, and then not until the CPM project float becomes zero. If Contractor fails to submit a time impact analysis (TIA) within the required time period, then Contractor shall be deemed to have agreed that there is no time impact and that Contractor has irrevocably waived its rights to any additional contract time.

11.02 Excusable Delay and Inexcusable Delay Defined

- A. <u>Excusable Delay</u>. Subject to the provisions on Notice of Delay below, contract time may be adjusted in an amount equal to the time lost due to:
 - 1. Changes in the Work ordered by City (**Changes**)
 - 2. Acts or neglect by City, Engineer, any City Representative, utility owners or other contractors performing other work, not permitted or provided for in the Contract Documents, provided that Contractor has performed its responsibilities under the Contract Documents (including, without limitation, pre-bid investigations) (**Acts or Neglect**)
 - 3. Fires, floods, epidemics, abnormal weather conditions beyond the parameters otherwise set forth in this Article, earthquakes, civil or labor disturbances, or acts of God (together, "force majeure events"), provided damages resulting therefrom are not the result of Contractor's failure to protect the Work as required by Contract Documents (**Force Majeure**)
- B. <u>Inexcusable Delay</u>. Contract time shall not be extended for any period of time where Contractor (and/or any Subcontractor) is delayed or prevented from completing any part of the Work due to a cause that is within Contractor's risk or responsibility under the Contract Documents. Delays attributable to or within the control of a Subcontractor, or its subcontractors, or supplier, are deemed delays within the control of Contractor.

11.03 Notice of Delay

- A. Within seven days of the beginning of any delay (excepting adverse weather delays), Contractor shall notify City in writing, by submitting a notice of delay that shall describe the anticipated delays resulting from the delay event in question. If Contractor requests an extension of time, Contractor shall submit a TIA within ten days of the notice of delay. City will determine all claims and adjustments in the contract time.
 - 1. No claim for an adjustment in the contract time will be valid and such claim will be waived if not submitted in accordance with the requirements of this subparagraph.
 - 2. In cases of substantial compliance with the seven-day notice requirement here (but not to exceed twenty-one days from the beginning of the delay event), City may in its sole discretion recognize a claim for delay accompanied with the proper TIA, provided Contractor also shows good faith and a manifest lack of prejudice to City from the late notice.

11.04 Compensable Time Extensions

- A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in contract sum in addition to contract time for:
 - 1. Excusable delay caused solely by changes in the Work ordered by City, as provided above, and/or
 - 2. Excusable delay caused solely by acts or neglect by City or another person, as provided above.

11.05 Non-Compensable Time Extensions

- A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in contract time only, without adjustment in contract sum, for:
 - 1. Periods of excusable delay caused solely by weather or Force Majeure events as provided above in this Article, or
 - 2. Periods of concurrent delay, where delay results from two or more causes, one of which is compensable (resulting from changes or acts or neglect as set forth above in this Article), and the other of which is non-compensable or inexcusable, such as: acts or neglect of Contractor, Subcontractors or others for whom Contractor is responsible; other acts, omissions and conditions which would not entitle Contractor to adjustment in contract time; adverse weather; and/or actions of Force Majeure as provided above in this Article.

11.06 Adverse Weather

- A. Adverse weather delays may be allowed only if the number of workdays of adverse weather exceeds the parameters listed or referenced immediately below in this subparagraph and Contractor proves that adverse weather caused delays to Work on the critical path. Contractor shall give written notice of intent to claim an adverse weather day within one day of the adverse weather day occurring.
- B. Claims for extension of time for rain delay will not be granted unless the number of days work is prevented by rain exceeds 100% of the historical average number of rain days for the period of the contract time, based on the records of the National Oceanic & Atmospheric Administration (NOAA) weather station in San Mateo, California or that closest to the Project site, pro-rated in the individual month Contractor starts and finishes Work. Delays due to adverse weather conditions will not be allowed for weather conditions that fall within these parameters.
- C. To qualify as an adverse weather delay with respect to the foregoing parameters:
 - 1. Daily rainfall must exceed 0.1 inch and/or
 - 2. Daily snowfall must exceed 1.0 inch

Notwithstanding these allowances, Contractor shall at all times employ all available mitigation measures to enable work to continue, Contractor shall take reasonable steps to mitigate potential weather delays, such as dewatering the site, lime treatment, and covering Work and material that could be affected adversely by weather. Failure to do so shall be cause for City to not grant a time extension due to

adverse weather, where Contractor could have avoided or mitigated the potential delay by exercising reasonable care.

D. Normal number of rain days for which rainfall has exceeded 0.1 inch in San Mateo, CA is as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8	6	6	3	1	0	0	0	0	2	4	6

- E. Contractor shall include the foregoing precipitation parameters as a single working day activity, with the total number of rain days connected to the longest path, in its progress schedule. As Work on the critical path is affected by precipitation, Contractor shall notify City and request that the days be moved to the affected activities. Any adverse weather days remaining shall be considered Project float available to either City or Contractor.
- F. Adverse weather delay for precipitation shall be recognized for the actual period Contractor proves it was delayed by precipitation exceeding the specified parameters. For example, and not by way of limitation, if precipitation exceeding the specified parameters does not in fact delay Contractor's progress on the critical path, then no time extension shall be recognized; and conversely, if Contractor proves to City's satisfaction that precipitation exceeding the specified parameters causes delay to Contractor for a period longer than the number of precipitation days incurred (e.g., if it rains or snows during grading work), then Contractor shall be entitled to a time extension equal to the actual period of such delay.
- G. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall employ best practices to protect the Work, manage the construction site and rainwater during inclement weather. Persons performing the Work shall examine surfaces to receive their Work and shall report in writing to Contractor, with copy to City representative and the Engineer conditions detrimental to the Work. Failure to examine and report discrepancies makes the Contractor responsible, at no increase in contract sum, for corrections City may require. Commencement of Work constitutes acceptance of surface.

11.07 Liquidated Damages

- A. Time is of the essence. Execution of Contract Documents by Contractor shall constitute its acknowledgement that City will actually sustain damages in the form of Contract administration expenses (such as Project management and consultant expenses) in the amount fixed in the Contract Documents for each and every day during which completion of Work required is delayed beyond expiration of time fixed for completion plus extensions of time allowed pursuant to provisions hereof.
- B. Contractor and City agree that because of the nature of the Project, it would be impractical or extremely difficult to fix the amount of such actual damages incurred by City because of a delay in completion of all or any part of the work. Contractor and City agree that specified measures of liquidated damages shall be presumed to

be the amount of such damages sustained by City, and that because of the nature of the Project, it would be impracticable or extremely difficult to fix the actual damages.

- C. Liquidated damages for delay shall cover administrative, overhead, interest on bonds, and general loss of public use damages suffered by City as a result of delay. Liquidated damages shall not cover the cost of completion of the work, damages resulting from defective work, lost revenues or costs of adjacent facilities, or damages suffered by others who then seek to recover their damages from City (for example, delay claims of other contractors, subcontractors, tenants, or other third-parties), and defense costs thereof. City may deduct from any money due or to become due to Contractor after time for completion of entire work and extensions of time allowed pursuant to provisions hereof, a sum representing then-accrued liquidated damages.
- D. Contractor and City agree that Contractor shall not remove, reassign or make changes to any of the key personnel assigned to the Work without City's prior written approval, which will not unreasonably be withheld.

ARTICLE 12 – CLAIMS BY CONTRACTOR

12.01 Obligation to File Claims for Disputed Work

- A. Should it appear to Contractor that the Work to be performed or any of the matters relative to the Contract Documents are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of the Contract Documents, or should any dispute arise regarding the true value of any Work performed, Work omitted, extra Work that the Contractor may be required to perform, time extensions, payment to the Contractor during performance of this Contract, performance of the Contract, and/or compliance with Contract procedures, or should Contractor otherwise seek extra time or compensation for any reason whatsoever, then Contractor shall first follow procedures set forth in the Contract Documents (including, without limitation, Paragraphs 11.03, 11.04, 13.03 and 13.04 of this Section and Section 01 26 00.)
- B. If a dispute remains, then Contractor shall give written notice to City that expressly invokes this Article 12. City shall decide the issue in writing within 15 days; and City's written decision shall be final and conclusive.
- C. If Contractor disagrees with City's decision, or if Contractor contends that City failed to provide a decision timely, then Contractor's sole and exclusive is to promptly file a written claim setting forth Contractor's position as required herein.

12.02 Form and Contents of Claim

- A. Contractor's written claim must identify itself as a "**Claim**" under this Article 12 and must include the following:
 - 1. A narrative of pertinent events.
 - 2. Citation to contract provisions.
 - 3. Theory of entitlement.

- 4. Complete pricing of all cost impacts.
- 5. A time impact analysis based on an as-built critical path.
- 6. Documentation supporting items 1 through 5.
- 7. A verification under penalty of perjury of the claim's accuracy.
- B. The Claim shall be submitted to City within thirty (30) calendar days of receiving City's written decision, or the date Contractor contends such decision was due, and shall be priced like a change order according to Section 01 26 00, and must be updated monthly as to cost and entitlement if a continuing claim. Routine contract materials, for example, correspondence, RFI, Change Order requests, or payment requests shall not constitute a claim. Contractor shall bear all costs incurred in the preparation and submission of a claim.
- C. Receipt of monthly updates shall not be construed as an authorization for or acceptance of disputed work.

12.03 Administration During/After Claim Submission

- A. City may render a final determination based on the Claim or may in its discretion conduct an administrative hearing on Contractor's claim, in which case Contractor shall appear, participate, answer questions and inquiries, and present any further evidence or analysis requested by City prior to rendering a final determination. Should City take no action on the Claim within 45 days of submission, it shall be deemed denied.
- B. If the Contractor disputes the City's written statement, or if the City fails to respond, the Contractor may demand an informal conference to meet and confer for settlement of the issues in dispute. The City will then schedule the meet and confer conference within 30 days of the demand. Within 10 business days following the meet and confer conference, the City will provide a written statement identifying the portion of the claim that remain in dispute. Any payment due on an undisputed portion of the claim will be made within 60 days of the meet and confer conference.
- C. After the meet and confer conference, any disputed portion of the claim shall be submitted to non-binding mediation. Alternatively, upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. If mediation is unsuccessful, the parts of the claim that remain in dispute shall be subject to applicable procedures set forth below." to allow for the contractor's right to request non-binding mediation during the claims process.
 - D. Notwithstanding and pending the resolution of any claim or dispute, Contractor shall diligently prosecute the disputed work to final completion in accordance with City's determination.
 - E. After their submission, claims less than \$375,000 shall also be subject to the Local Agency Disputes Act.

12.04 Compliance

- A. The provisions of this Article 12 constitute a non-judicial claim settlement procedure that, pursuant to Government Code Section 930.2, shall constitute a condition precedent to submission of a valid Government Code Claim under the Government Code. Contractor shall bear all costs incurred in the preparation, submission and administration of a claim. Any claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein and the previous dispositions under Paragraph 12.03 above of the claims asserted. No suit may be brought against City arising out of or in connection with the Project unless and until Contractor presents to City a statutory Government Code Claim, in accordance with Government Code Sections 910, *et seq*. Pursuant to Government Code Section 930.2, the one-year period in Government Code section, substantial completion or termination of the contract, whichever occurs first; in all other respects, the Government Code shall apply unchanged.
- B. Failure to submit and administer claims as required in Article 12 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) or issue(s) not raised in a timely protest and timely claim submitted under this Article 12 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.
- C. City shall not be deemed to waive any provision under this Article 12, if at City's sole discretion, a claim is administered in a manner not in accord with this Article 12. Waivers or modifications of this Article 12 may only be made a signed change order approved as to form by legal counsel for both City and Contractor; oral or implied modifications shall be ineffective.

ARTICLE 13 – UNDERGROUND CONDITIONS

13.01 Contractor to Locate Underground Facilities

- A. During construction, Contractor shall comply with Government Code Sections 4216 to 4216.9, and in particular Section 4216.2 which provides, in part: "Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two working days, but no more than 14 calendar days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation."
- B. Contractor shall contact USA North 811 (USA), and schedule the work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in USA records. Prior to commencing excavation or
trenching work, Contractor shall provide City with copies of all USA records secured by Contractor. Contractor shall advise City of any conflict between information provided in Section 00 31 32 (Geotechnical Data and Existing Conditions), the Drawings and that provided by USA records. Contractor's excavation shall be subject to and comply with the Contract Documents.

C. Contractor shall also investigate the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the site, even if not shown or indicated in Section 00 31 32 (Geotechnical Data and Existing Conditions), the Drawings or that provided by USA records. Contractor shall immediately secure all such available information and notify City and the utility owner, in writing, of its discovery.

13.02 Contractor to Protect Underground Facilities

- A. At all times during construction, all operating underground facilities shall remain in operation, unless the Contract Documents expressly indicate otherwise. Contractor shall maintain such underground facilities in service where appropriate; shall repair any damage to them caused by the Work; and shall incorporate them into the Work, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take immediate action to restore any in service installations damaged by Contractor's operations.
- B. Prior to performing Work at the site, Contractor shall lay out the locations of underground facilities that are to remain in service and other significant known underground installations indicated by the underground facilities data. Contractor shall further locate, by carefully excavating with small equipment, potholing and principally by hand, all such utilities or installations that are to remain and that are subject to damage. If additional utilities whose locations are unknown are discovered, Contractor shall immediately report to City for disposition of the same. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor's attention, including reasonable action taken to protect or repair damage, shall be determined as provided in this Section.
- C. If during construction, an underground facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by City for bidding or in information on file at USA or otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven Days), and prior to performing any work in connection therewith (except in an emergency), identify the owner of such underground facility and give written notice to that owner and to City. During such time, Contractor shall be responsible for the safety and protection of such underground facility.
- D. The cost of all of the following will be included in the contract sum and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, without limitation, information made available for bidding and information on file at USA; (b) locating all underground facilities shown or indicated in the Contract Documents, available information, or indicated by visual observation

including, without limitation, and by way of example only, engaging qualified locating services and all necessary backhoeing and potholing; (c) coordination of the Work with the owners of such underground facilities during construction; and (d) the safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.

E. Consistent with Government Code Section 4215, as between City and Contractor, City will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the site only if such utilities are not identified in the Contract Documents or information made available for bidding. City will compensate for the cost of locating and repairing damage not due to Contractor's failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the Contract Documents or information made available for bidding with reasonable accuracy, and equipment on the Project necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay in completion of the Project, when such delay was caused by the failure of City or the utility to provide for removal or relocation of such utility facilities.

13.03 Concealed or Unknown Conditions

- A. If either of the following conditions is encountered at site when digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to City promptly before conditions are disturbed, except in an emergency as set forth in this Section, and in no event later than seven days after first observance of:
 - 1. Subsurface or latent physical conditions which differ materially from those indicated in the Contract Documents; or
 - 2. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.
- B. In response to Contractor's Notice of Differing Site Conditions under this Paragraph, City will investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, City will negotiate the appropriate change order following the procedures set forth in the Contract Documents. If City determines that physical conditions at the Site are not latent or are not materially different from those indicated in Contract Documents or that no change in terms of the Contract Documents is justified, City will so notify Contractor in writing, stating reasons (with Contractor retaining its rights under Article 12 of this Section.
- C. Contractor shall not be entitled to any adjustment in the contract sum or contract time regarding claimed latent or materially different site conditions (whether above or below grade) if Contractor knew or should have known of the existence of such conditions at the time Contractor submitted its bid, failed to give proper notice, or relied upon information, conclusions, opinions or deductions of the kind that the Contract Documents preclude reliance upon.
- D. Regarding underground facilities, Contractor shall be allowed an increase in the contract sum or an extension of the contract time, or both, to the extent that they are

attributable to the existence of any underground facility that is owned and was built by City only where the underground facility:

- 1. Was not shown or indicated in the Contract Documents or in the information supplied for bidding purposes or in information on file at USA North 811; and
- 2. Contractor did not know of it; and
- 3. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an underground facility, then an increase in the contract sum or an extension of the contract time will not be due, even if the underground facility was not indicated in the Contract Documents, in the information supplied to Contractor for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor.)
- E. Contractor shall bear the risk that underground facilities not owned or built by City may differ in nature or locations shown in information made available by City for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor. Underground facilities are inherent in construction involving facility installation, and the digging of trenches or other excavations on City's Project, and Contractor is to apply its skill and industry to verify the information available.
- F. Contractor's compensation for claimed latent or materially different site conditions shall be limited to the actual, reasonable, incremental increase in cost of that portion of the Work, resulting from the claimed latent or materially different site conditions. Such calculation shall take into account the estimated value of that portion of the Work and the actual value of that portion of the Work, using for guidance Contractor's or its subcontractor's bid amount and actual amounts incurred for that portion of the Work and the reasonable expectation (if any) of differing or difficult site conditions in the Work area based on the available records and locale of the Work. For example, if Contractor excavates in an area unexpected, then such costs would be recoverable entirely; while if Contractor extends an existing excavation, then such costs would be recoverable if the resulting excavation costs in that Work area exceeded the reasonable expectations, therefore.

13.04 Notice of Hazardous Waste or Materials Conditions

- A. Contractor shall give a written Notice of Hazardous Materials Condition to City promptly, before any of the following conditions are disturbed (except in an emergency as set forth in this Section), and in no event later than 24 hours after first observance of any:
 - Material that Contractor believes may be hazardous waste or hazardous material, as defined in Section 25117 of the Health and Safety Code (including, without limitation, asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material) that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law. (hazardous material)
 - 2. Other material that may present an imminent substantial danger to persons or property exposed thereto in connection with work at the site. (**other materials**)

- B. Except as otherwise provided in the Contract Documents or as provided by applicable law, Contractor shall not be required to give any notice for the disturbance or observation of any such hazardous materials or other materials where such matter is disturbed or observed as part of the scope of Work under the Contract Documents (such as hazardous waste or hazardous material investigation, remediation or disposal activities which are identified as the subject of Work under the Contract Documents), where Contractor complies with all requirements in the Contract Documents and applicable law respecting such materials.
- C. Contractor's Notice of Hazardous Materials Condition shall indicate whether the hazardous materials or other materials were shown or indicated in the Contract Documents to be within the scope of Work, and whether the hazardous materials or other materials were brought to the site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible.
- D. Contractor shall not be entitled to any adjustment in the contract sum or contract time regarding claimed hazardous waste or materials if:
 - 1. Contractor knew of the existence of such hazardous materials or other materials at the time Contractor submitted its bid.
 - 2. Contractor should have known of the existence of such hazardous material or other materials as a result of its having the responsibility to obtain additional or supplementary examinations, investigation, explorations, tests, studies, and data concerning the conditions at or contiguous to the Site prior to submitting its bid.
 - 3. Contractor failed to give the written notice within the required timeframe set forth below.
- E. If City determines that conditions involve hazardous materials or other materials and that a change in Contract Document terms is justified, City will issue either a Request for Proposal or Construction Change Directive under the procedures described in the Contract Documents. If City determines that conditions do not involve hazardous materials or other materials or that no change in Contract Document terms is justified, City will notify Contractor in writing, stating the reasons for its determination.
- F. In addition to the parties' other rights under this Section, if Contractor does not agree to resume work based on a reasonable belief that it is unsafe, or does not agree to resume work under special conditions, City may order the disputed portion of work deleted from the work, or performed by others, or City may invoke its right to terminate Contractor's right to proceed under the Contract Documents in whole or in part, for convenience or for cause as the facts may warrant.
- G. If Contractor does not agree with any City determination of any adjustment in the contract sum or contract time under this Article, Contractor may make a claim as provided in Article 12 of this Section.

ARTICLE 14 – LEGAL AND MISCELLANEOUS

14.01 Laws and Regulations

A. Contractor shall keep fully informed of and shall comply with all laws, ordinances, regulations and orders of any properly constituted authority affecting the Contract Documents, Work and persons connected with Work, and shall protect and indemnify City and its officers, employees, consultants and agents against any claim or liability, including attorney's fees, arising from or based on violation of law, ordinance, regulation or order, whether by Contractor or by Subcontractors, employees or agents. Authorized persons may at any time enter upon any part of Work to ascertain compliance of all applicable laws, ordinances, regulations and orders.

14.02 Permits and Taxes

- A. Contractor shall procure all permits and licenses applicable to the Work (including environmental matters to the extent applicable); pay all charges and fees, including fees for street opening permits; comply with, implement and acknowledge effectiveness of all permits; initiate and cooperate in securing all required notifications or approvals therefore; and give all notices necessary and incident to due and lawful prosecution of Work, unless otherwise provided herein.
- B. City will pay applicable building permits, sanitation and water fees for the completed construction, except as otherwise provided in the Contract Documents.
- C. Contractor shall pay all sales and/or use taxes levied on materials, supplies, or equipment purchased and used on or incorporated into Work, and all other taxes properly assessed against equipment or other property used in connection with Work, without any increase in the contract sum.
- D. Contractor shall make necessary arrangements with proper authorities having jurisdiction over roads, streets, pipelines, navigable waterways, railroads, and other works in advance of operations, even where City may have already obtained permits for the Work.

14.03 Communications and Information Distribution

- A. All communications recognized under the Contract Documents shall be in writing, in the form of a serialized document, by type of communication. For example, RFI's shall be serialized beginning with RFI No. 1; payment applications shall be serialized beginning with Payment Application No. 1, submittals shall be serialized per specification section and transmitted with transmittal sheets beginning with Transmittal No. 1; and correspondence shall be serialized beginning with letter No. 1. Contractor may propose other record management and identification systems or protocols, intended to facilitate orderly transmittal of project information, storage and retrieval of such information, which City will review consistent with these stated objectives, and accept or reject in its sole discretion.
- B. Documents Requiring Signatures. All documents requiring signatures for approval prior to implementing action, as stipulated in other portions of Contract Documents,

shall require a manually signed, serialized letter delivered to the other party at its address for notice otherwise specified in the Contract Documents, either personally or by mail.

- C. Electronic data transfer of such correspondence will serve to expedite preliminary concurrence of information, only. Receipt of "hard copy" signature on forms is required prior to implementing action or work as the conditions may require. For example, change orders and authorizations for extra cost, require signatures. A party may acknowledge receipt of PDF copies of required correspondence by e-mail, but in the absence of such acknowledgment, mail or personal delivery is required.
- D. All emails shall be copied to City's and Contractor's Project Representative. City reserves the right to preclude e-mail communication, in whole or in part, as Project needs may require. Communication between City and Contractor shall not be via Twitter, Facebook, or other types of instant text message systems. Any such communications shall be inadmissible for any purpose related to this Contract.

14.04 Suspension of Work

- A. City may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as City may determine.
- B. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in Section 01 26 00 (Payment for Changes and Extra Work).
- C. No adjustment shall be made to extent that performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible.

14.05 Termination of Contract for Cause

- A. The Contractor shall be in default of the Contract Documents and City may terminate the Contractor's right to proceed under the Contract Documents, for cause, in whole or in part, should the Contractor commit a material breach of the Contract Documents and not cure such breach within ten (10) calendar days of the date of notice from City to the Contractor demanding such cure; or, if such breach is curable but not curable within such ten (10) day period, within such period of time as is reasonably necessary to accomplish such cure.
 - 1. In order for the Contractor to avail itself of a time period in excess of 10 calendar days, the Contractor must provide City within the ten (10) day period with a written plan acceptable to City that demonstrates actual resources, personnel and a schedule to promptly to cure said breach, and then diligently commence and continue such cure according to the written plan.
- B. In the event of termination by City for cause as provided herein, the Contractor shall deliver to City possession of the Work in its then condition including, without limitation, all designs, engineering, Project records, cost data of all types, plans and specifications and contracts with vendors and subcontractors, all other

documentation associated with the Project, and all construction supplies and aids dedicated solely to performing the Work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period.

- 1. The Contractor shall remain fully liable for the failure of any Work completed and materials and equipment provided through the date of such termination to comply with the provisions of the Contract Documents. The provisions of this Section shall not be interpreted to diminish any right which City may have to claim and recover damages for any breach of the Contract Documents or otherwise, but rather, the Contractor shall compensate City for all loss, cost, damage, expense, and/or liability suffered by City as a result of such termination and/or failure to comply with the Contract Documents.
- C. In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and the Contractor shall have no greater rights than it would have had following a termination for convenience. Any Contractor claim arising out of a termination for cause shall be made in accord with Article 12 herein. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

14.06 Termination of Contract for Convenience

- A. City may terminate performance of the work under the Contract Documents in accordance with this clause in whole, or from time to time in part, whenever City shall determine that termination is in City's best interest.
 - 1. Termination shall be affected by City delivering to the Contractor notice of termination specifying the extent to which performance of the Work under the Contract Documents is terminated, and the effective date of the termination.
- B. Contractor shall comply strictly with City's direction regarding the effective date of the termination, the extent of the termination, and shall stop Work on the date and to the extent specified.
- C. Contractor shall be entitled to a total payment on account of the Contract Work so terminated measured by:
 - 1. The actual cost to Contractor of Work actually performed, up to the date of the termination, with profit and overhead limited to twelve percent (12%) of actual cost of Work performed, up to but not exceeding the actual contract value of the work completed as measured by the Schedule of Values and Progress Schedule.
 - 2. Offset by payments made and other contract credits. In connection with any such calculation, however, City shall retain all rights under the Contract Documents including, without limitation, claims, indemnities, or setoffs.
- D. Under no circumstances may Contractor recover legal costs of any nature, nor may Contract recover costs incurred after the date of the termination.

14.07 Contingent Assignment of Subcontracts

- A. Contractor hereby assigns to City each Subcontract for a portion of the Work, provided that:
 - 1. The assignment is effective only after City's termination of Contractor's right to proceed under the Contract Documents (or portion thereof relating to that Subcontract) as set forth herein.
 - 2. The assignment is effective only for the Subcontracts which City expressly accepts by notifying the Subcontractor in writing.
 - 3. The assignment is subject to the prior rights, if any, of the surety, obligated by Document 00 61 13.13 (Construction Performance Bond) provided under the Contract Documents, where the Surety exercises its rights to complete the Contract.
 - 4. After the effectiveness of an assignment, Contractor shall, at its sole cost and expense (except as otherwise provided in this Section), sign all instruments and take all actions reasonably requested by City to evidence and confirm the effectiveness of the assignment in City,
 - 5. Nothing in this Paragraph shall modify or limit any of Contractor's obligations to City arising from acts or omissions occurring before the effectiveness of any Subcontract assignment including, without limitation, all defense, indemnity and hold-harmless obligations arising from or related to the assigned Subcontract.

14.08 Remedies and Contract Integration

- A. Subject to Contract Documents provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, the exclusive jurisdiction and venue for resolving all claims, counter claims, disputes and other matters in question between City and Contractor arising out of or relating to Contract Documents, any breach thereof or the Project shall be the applicable court of competent jurisdiction located in the State and County where the Project is located. All City remedies provided in the Contract Documents shall be taken and construed as cumulative and not exclusive; that is, in addition to each and every other remedy herein provided; and in all instances City shall have any and all other equitable and legal rights and remedies which it would have according to law.
- B. The Contract Documents, any Contract Modifications and Change Orders, shall represent the entire and integrated agreement between City and Contractor regarding the subject matters hereof and thereof and shall constitute the exclusive statement of the terms of the parties' agreement. The Contract Documents, and any Contract Modifications and Change Orders, shall supersede any and all prior negotiations, representations or agreements, written or oral, express or implied, that relate in any way to the subject matter of the Contract Documents or written Modifications. City and Contractor represent and agree that, except as otherwise expressly provided in the Contract Documents, they are entering into the Contract Documents and any subsequent written Modification in sole reliance upon the information set forth or referenced in the Contract Documents or Contract

Modifications; the parties are not and will not rely on any other information, which shall be inadmissible in any proceeding to enforce these documents.

- C. Either party's waiver of any breach or failure to enforce any of the terms, covenants, conditions or other provisions of the Contract Documents at any time shall not in any way affect, limit, modify or waive that party's right thereafter to enforce or compel strict compliance with every term, covenant, condition or other provision hereof, any course of dealing or custom of the trade or oral representations notwithstanding.
- D. Neither acceptance of the whole or any part of Work by City nor any verbal statements on behalf of City or its authorized agents or representatives shall operate as a waiver or modification of any provision of the Contract Documents, or of any power reserved to City herein nor any right to damages provided in the Contract Documents.

14.09 Interpretation

- A. Should any part, term or provision of the Agreement or any of the Contract Documents, or any document required herein or therein to be executed or delivered, be declared invalid, void or unenforceable, all remaining parts, terms and provisions shall remain in full force and effect and shall in no way be invalidated, impaired or affected thereby. If the provisions of any law causing such invalidity, illegality or unenforceability may be waived, they are hereby waived to the end that the Agreement and the Contract Documents may be deemed valid and binding agreements, enforceable in accordance with their terms to the greatest extent permitted by applicable law. In the event any provision not otherwise included in the Contract Documents is required to be included by any applicable law, that provision is deemed included herein by this reference (or, if such provision is required to be included in any particular portion of the Contract Documents, that provision is deemed included in that portion).
- B. Contract Documents shall not be construed to create a contractual relationship of any kind between:
 - 1. Project Manager or any City's representative and Contractor.
 - 2. City and/or its Representatives and a Subcontractor, sub-Subcontractor, or supplier of any Project labor, materials, or equipment.
 - 3. between any persons or entities other than City and Contractor.

14.010 Patents

A. Fees or claims for any patented invention, article or arrangement that may be used upon or in any manner connected with performance of the Work or any part thereof shall be included in the bid price for doing the Work. Contractor shall defend, indemnify and hold harmless City and each of its officers, employees, consultants and agents including, without limitation, the Council and each City Representative, from all damages, claims for damages, costs or expenses in law or equity, including attorney's fees, arising from or relating to any claim that any article supplied or to be supplied under the Contract Documents infringes on the patent rights, copyright, trade name, trademark, service mark, trade secret or other intellectual property right of any person or persons or that the person or entity supplying the article does not have a lawful right to sell the same.

B. Such costs or expenses for which Contractor agrees to indemnify and hold harmless the above indemnities include but are not limited to any and all license fees, whether such fees are agreed by any indemnitee or ordered by a court or administrative body of any competent jurisdiction.

14.011 Substitution for Patented and Specified Articles

- A. Except as noted specifically in the Instructions to Bidders or in Contract Documents, whenever in Specifications, material or process is designated by patent or proprietary name or by name of manufacturer, such designation shall be deemed to be used for purpose of facilitating description of material and process desired, and shall be deemed to be followed by the words "or Approved Equal" and Contractor may offer any substitute material or process that Contractor considers "equal" in every respect to that so designated and if material or process offered by Contractor is, in opinion of City, Equal in every respect to that so designated, its use will be approved. However, Contractor may utilize this right only by timely submitting Document 00 63 25 (Substitution Request Form) as provided in Section 00 21 13 (Instructions to Bidders).
- B. A substitution will be approved only if it is a true "or equal" item in every aspect of its design and quality including, without limitation, its dimensions, weights, service requirements, durability, functioning, impact on contiguous construction elements, overall schedule and design.

14.012 Interest of Public Officers

A. No representative, officer, or employee of City no member of the governing body of the locality in which the Project is situated, no member of the locality in which City was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the Project, during the tenure of the official or for one year thereafter, shall, as principal, agent, attorney or otherwise, be directly or indirectly interested, in the Contract Documents or the proceeds thereof.

14.013 Limit of Liability

A. CITY, AND EACH OF ITS OFFICERS, COUNCIL MEMBERS, EMPLOYEES, CONSULTANTS AND AGENTS INCLUDING, WITHOUT LIMITATION, PROJECT MANAGER AND EACH OTHER CITY REPRESENTATIVE, SHALL HAVE NO LIABILITY TO CONTRACTOR FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, EXCEPT TO THE LIMITED EXTENT THAT THESE CONTRACT DOCUMENTS OR APPLICABLE PUBLIC CONTRACTING STATUTES MAY SPECIFY THEIR RECOVERY.

ARTICLE 15 – WORKING CONDITIONS AND PREVAILING WAGES

15.01 Use of Site/Sanitary Rules

- A. All portions of the Work shall be maintained at all times in neat, clean and sanitary condition. Contractor shall furnish toilets for use of Contractor's and Subcontractors' employees on the Site where needed, and their use shall be strictly enforced. All toilets shall be properly secluded from public observation, and shall be located, constructed and maintained subject to City's approval.
- B. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land areas identified in and permitted by Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements or as designated by City, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, any improvement located thereon, or to City or occupant thereof resulting from the performance of Work.
- C. During the progress of the Work, Contractor shall keep the site and the Project free from accumulations of waste materials, rubbish and other debris resulting from the work. At the completion of the work, Contractor shall clean the site, remove all waste materials, rubbish and debris from and about the site as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the premises clean and ready for occupancy by City at Substantial Completion of work. Contractor shall restore to original condition all property not designated for alteration by Contract Documents.
- D. Contractor shall not load nor permit any part of any structure or pavement to be loaded in any manner that will endanger the structure or pavement, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that will endanger it. Contractor shall conduct all necessary existing conditions investigation regarding structural, mechanical, electrical or any other system existing, shall perform Work consistent with such existing conditions, and shall have full responsibility for insufficiencies or damage resulting from insufficiencies of existing systems, equipment or structures to accommodate performing the Work.

15.02 Protection of Work, Persons, and Property

- A. Contractor shall be responsible for initiating, maintaining and supervising all safety and site security precautions and programs in connection with Work, and shall develop and implement a site security and safety plan throughout construction. Contractor shall comply with all safety requirements specified in any safety program established by City, or required by state, federal or local laws and ordinances. Contractor shall be responsible for all theft or damage to work, property or structures, and all injuries to persons, either on the site or constituting the Work (e.g., materials in transit), arising from the performance of work of the Contract Documents from a cause.
- B. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage,

injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of underground facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.

- C. Contractor shall remedy all damage, injury or loss to any property referred to above in this Article, caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, supplier, or any other person or organization directly or indirectly employed by any of them to perform or furnish any work or anyone for whose acts any of them may be liable. Contractor's duties and responsibility for safety and for protection of work shall continue until such time as all the Work is completed and final acceptance of the work. City and its agents do not assume any responsibility for collecting any indemnity from any person or persons causing damage to Contractor's Work.
- D. Contractor shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- E. City may, at its option, retain such moneys due under the Contract Documents as City deems necessary until any and all suits or claims against Contractor for injury to persons or property shall be settled and City receives satisfactory evidence to that effect.
- F. Work within the right-of-way lines of the City and/or County and/or State shall be done in accordance with the standards and specifications of the controlling agency. Permit for such work shall be obtained and paid for by the Contractor before executing the Work within such rights-of-way.

15.03 Responsibility for Safety and Health

- A. Contractor shall ensure that its and each tier of Subcontractors' employees, agents and invitees comply with applicable health and safety laws while at the site. These laws include the Occupational Safety and Health Act of 1970 and rules and regulations issued pursuant thereto, and City's safety regulations as amended from time to time. Contractor shall comply with all City directions regarding protective clothing and gear.
- B. Contractor shall be fully responsible for the safety of its and its Subcontractors' employees, agents and invitees on the site. Contractor shall notify City, in writing, of the existence of hazardous conditions, property or equipment at the Site that are not under Contractor's control. Contractor shall be responsible for taking all the necessary precautions against injury to persons or damage to the property of Contractor, Subcontractors or persons from recognized hazards until the responsible party corrects the hazard.
- C. Contractor shall confine all persons acting on its or its Subcontractors' behalf to that portion of the Site where Work under the Contract Documents is to be performed, City-designated routes for ingress and egress thereto, and any other City-designated area. Except those routes for ingress and egress over which Contractor has no right

of control, within such areas, Contractor shall provide safe means of access to all places at which persons may at any time have occasion to be present.

15.04 Emergencies

- A. In emergencies affecting the safety or protection of persons or Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from City, is obligated to act to prevent threat and damage, injury or loss, until directed otherwise by City.
- B. Contractor shall give City prompt written notice if Contractor believes that any significant changes in Work or variations from Contract Documents have been caused thereby. If City determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order or Construction Change Directive will be issued to document the consequences of such action.

15.05 Use of Roadways and Walkways

- A. Contractor shall not unnecessarily interfere with use of any roadway, walkway or other facility for vehicular or pedestrian traffic. Before beginning any interference and only with City's prior concurrence, Contractor may provide detour or temporary bridge for traffic to pass around or over the interference, which Contractor shall maintain in satisfactory condition as long as interference continues.
- B. Unless otherwise provided in the Contract Documents, Contractor shall bear the cost of these temporary facilities.

15.06 Nondiscrimination

A. No person or entity shall discriminate in the employment of persons upon public works because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sexual preference, or gender of such persons, except as provided in Government Code Section 12940. Every contractor for public works violating the provisions of Labor Code Section 1735 is subject to all the penalties imposed for a violation of Chapter 1, Part 7, Division 2 of the California Labor Code.

15.07 Prevailing Wages and Working Hours

A. Contractor shall pay to persons performing labor in and about Work provided for in the Contract Documents an amount equal to or more than the general prevailing rate of per diem wages for (i) work of a similar character in the locality in which the Work is performed and (ii) legal holiday and overtime work in said locality. The per diem wages shall be an amount equal to or more than the stipulated rates contained in a schedule that has been ascertained and determined by the Director of the State Department of Industrial Relations and City to be the general prevailing rate of per diem wages for each craft or type of workman or mechanic needed to execute this Contract. Contractor shall also cause a copy of this determination of the prevailing rate of per diem wages to be posted at each Site.

- B. Contractor shall forfeit, as a penalty to City, \$200.00 for each laborer, worker, or mechanic employed in performing labor in and about the Work provided for in the Contract Documents for each day, or portion thereof, that such laborer, worker or mechanic is paid less than the said stipulated rates for any Work done under the Contract Documents by him or her or by any Subcontractor under him or her, in violation of Articles 1 and 2 of Chapter 1 of Part 7 of Division II of the Labor Code. The sums and amounts that are forfeited pursuant to this Paragraph and the terms of the Labor Code shall be withheld and retained from payments due to Contractor under the Contract Documents, pursuant to this Document 00 7200 and the Labor Code, but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the State Department of Industrial Relations or by City. The Labor Commissioner pursuant to Labor Code Section 1775 shall determine the final amount of forfeiture.
- C. Contractor shall insert in every subcontract or other arrangement which Contractor may make for performance of Work or labor on work provided for in the Contract, provision that Subcontractor shall pay persons performing labor or rendering service under subcontract or other arrangement not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the Work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed in the Labor Code.
- D. Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation, Labor Code Sections 1776 and 1810-1815. Failure to so comply shall constitute a default under this Contract.
- E. Contractor and its Subcontractors shall be responsible for compliance with Labor Code Sections 1810-1815.
 - 1. Eight hours of labor performed in execution of the Contract constitutes a legal day's work. The time of service of any worker employed on the Project is limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week.
 - 2. Contractor and its Subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him or her in connection with the Project. The record shall be kept open at all reasonable hours to the inspection owner and to the Division of Labor Standards Enforcement.
 - 3. Contractor or its Subcontractors shall, as a penalty to City, forfeit twenty-five dollars (\$25) for each worker employed in the execution of the Contract Documents by the respective Contractor or Subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of Labor Code Sections 1810-1815.
 - 4. Work performed on the Project by employees of Contractor or its Subcontractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than 1 1/2 times the basic rate of pay.

- F. Contractor and its Subcontractors shall be responsible for compliance with Labor Code Section 1776. Further, if this Contract is awarded on or after January 1, 2015, this Project is subject to prevailing wage compliance monitoring and enforcement by the Department of Industrial Relations.
 - 1. Contractor and Subcontractors must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the Work of the Contract Documents. Each payroll record shall contain or be verified by a written declaration as required by Labor Code Section 1776.
 - 2. The payroll records enumerated above must be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor as required by Labor Code Section 1776.
 - a. Contractor shall inform City of the location of records enumerated above, including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.
 - b. Contractor or Subcontractor has 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated above. In the event that the Contractor or Subcontractor fails to comply with the ten-day period, he or she shall, as a penalty to City on whose behalf the contract is made or awarded, forfeit \$100.00 for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. Contractor is not subject to a penalty assessment pursuant to this Paragraph due to the failure of a Subcontractor to comply with this Paragraph.
 - 3. Contractor shall submit certified payroll (in no event less frequently than monthly) directly to the Labor Commissioner in the format prescribed by the Labor Commissioner. With each application for payment, Contractor shall submit confirmation sheets from certified payroll submissions to the Labor Commissioner for the time period for which payment is being requested.
 - 4. Contractor shall post all jobsite notices if and when prescribed by regulation.

15.08 Environmental Controls

- A. Contractor shall comply with all rules, regulations, ordinances, and statutes that apply to any Work performed under the Contract Documents including, without limitation, any toxic, water, stormwater management and soil pollution controls and air pollution controls specified in Government Code Section 11017.
- B. Contractor shall be responsible for insuring that Contractor's Employees, Subcontractors, and the public are protected from exposure to airborne hazards or contaminated water, soil, or other toxic materials used during or generated by activities on the site or associated with the Project.

15.09 Shoring Safety Plan

- A. Any conflict between this Paragraph and the Technical Specifications shall be resolved in favor of the most stringent requirement.
- B. At least five days in advance of any excavation five feet or more in depth, Contractor shall submit to City a detailed plan showing the shoring, bracing and sloping design (including calculations) and other provisions to be made for worker protection from the hazard of caving ground during the excavation, as required by Labor Code Section 6705. A civil or structural engineer registered in California shall prepare and sign any plan that varies from the shoring system standards established by the State Construction Safety Orders.
- C. During the course of Work, Contractor shall be responsible for determining where sloping, shoring, and/or bracing is necessary and the adequacy of the design, installation, and maintenance of all shoring and bracing for all excavation, including any excavation less than five feet in depth. Contractor will be solely responsible for any damage or injuries that may result from excavating or trenching. City's acceptance of any drawings showing the shoring or bracing design or Work schedule shall not relieve Contractor of its responsibilities under this Paragraph.
- D. Appoint a qualified supervisory employee who shall be responsible to determine the sloping or shoring system to be used depending on local soil type, water table, stratification, depth, etc.

SECTION 00 73 16 SUPPLEMENTAL CONDITIONS

ARTICLE 1 – INSURANCE

1.01 Classes of Insurance

- A. At or before the date specified in Section 00 21 13 (Instructions to Bidders), Contractor shall furnish to City satisfactory proof that Contractor has taken out for the entire period covered by the Contract the following classes of insurance in the form and with limits and deductibles specified herein, unless otherwise specified elsewhere in the Contract Documents.
- B. Comprehensive General Liability Insurance covering claims for personal injury, bodily injury and property damage arising out of the Work and in a form providing coverage not less than that of a Standard Commercial General Liability Insurance policy (**Occurrence Form**). Such insurance shall provide for all operations and include independent contractors, products liability, completed operations for one year after Final Completion and acceptance of the final payment for the Work, contractual liability, and coverage for explosion, collapse, and underground hazards. The limits of such insurance shall:
 - 1. Not be coverage of less than \$10,000,000 each occurrence, \$20,000,000 general aggregate limit, and \$10,000,000 aggregate for products and completed operations.
 - 2. Be endorsed to provide Broad Form Property Damage Coverage.
- C. Comprehensive Automobile Liability Insurance covering all owned, non-owned, and hired vehicles. Such insurance shall provide coverage not less than the standard Comprehensive Automobile Liability policy with limits not less than \$10,000,000 each person Bodily Injury, \$10,000,000 each occurrence Bodily Injury, and \$10,000,000 each occurrence Property Damage.
- D. All-Risk Course of Construction Insurance including damage to the Work and property incorporated into the Work caused by fire. Insurance shall be in the amount of 100 percent of the completed value of the Work to be performed under this Contract. Deductible shall not exceed \$100,000.00. Each loss shall be borne by Contractor.
- E. Workers' Compensation Insurance for all persons whom the Contractor may employ in carrying out Work contemplated under Contract Documents, in accordance with the Act of Legislature of State of California, known as "Workers' Compensation Insurance and Safety Act," approved May 26, 1913, and all acts amendatory or supplemental thereto, in the statutory amount.
 - 1. The Workers' Compensation policy must also include Employers' Liability coverage in amounts not less than \$2,000,000 per accident, \$2,000,000 per disease, and \$2,000,000 aggregate.

- 2. In the event Contractor is self-insured, it shall furnish Certificate of Permission to Self-Insure signed by Department of Industrial Relations Administration of Self-Insurance, State of California.
- F. Environmental Impairment Liability Insurance covering bodily injury and property damage utilizing an occurrence or claims made policy form, in an amount no less than \$1,000,000 combined single limit for each occurrence.

1.02 Insurance Limits

- A. If the Contractor's policy covering loss associated with this Contract provides greater coverage than the minimum amounts required by Owner in Paragraph 1.01 above, that greater amount shall become the minimum required amount of insurance for purposes of the Contract. Therefore, Contractor hereby acknowledges and agrees that all insurance carried by it shall be deemed liability coverage for all actions it performs in connection with the Contract.
- B. The limits of insurance this Contract requires may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the Owner's benefit, to the extent required by the Contract, before the Owner's insurance or self-insurance may be called upon to protect Owner as a named insured.

1.03 Underwriting of Policies

- A. All policies of insurance shall be placed with insurers acceptable to City. The insurance underwriter(s) for all insurance policies except Workers' Compensation shall have an A. M. Best Company rating of A-, VIII or better, unless otherwise specified in Contract Documents. Required minimum amounts of insurance may be increased should conditions of work, in opinion of City, warrant such increase. Contractor shall increase required insurance amounts upon direction by City.
- B. All self-insured retentions (SIR) must be disclosed to the City for approval and shall not reduce the coverage limits. Insurance policies containing an SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named Contractor/named insured or the City.

1.04 Required Endorsements

- A. The policies required under Section 00 72 00 (General Conditions) and this Section, including any umbrella or excess liability policies, shall be endorsed as follows (excluding Workers Compensation insurance with respect to Subparagraph 1 below):
 - Name City, its elected and/or appointed governing body and boards, employees, representatives, consultants, and agents, and Project Manager as additional insureds, but only with respect to liability arising out of the activities of the named insured. Additional insured language must be at least as broad as the Insurance Services Office (ISO) forms GC 20 38 04 13 and GC 20 37 04 13.

- 2. Each such policy shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limit of the insurance company's liability required hereunder. Should any of the policies identified herein contain a "cross-suits" exclusion, such exclusion must not apply to any additional insureds.
- 3. Insurance shall be primary to City and no other insurance or self-insured retention carried or held by City shall be called upon to contribute to a loss covered by insurance for the named insured.
- 4. Insurance shall contain a provision requiring the insurance carriers to waive their rights of subrogation against City and all additional insureds, as well as other insurance carriers for the work.
- 5. All endorsements shall include the applicable policy number, the named insured(s) and policy terms.
- 6. Contractor or its insurance broker shall submit to City a copy of the "Declarations Page" for each policy identified under Paragraph 1.01 above. The Declarations Page shall include the name of the insurance carrier, the applicable policy number, the types of coverage and limits of insurance provided, the effective date(s) of the policy, the insurance broker's name and license number, and a list of all coverage forms and endorsements.
- B. Certificates of insurance and endorsements shall have clearly typed thereon City Contract Number and title of Contract Documents. Written notice of cancellation, non-renewal, or reduction in coverage of any policy shall be mailed to City (Attention: City Risk Manager / Purchasing Agent) at the address listed in Document 00 52 00 (Agreement), 60 Days in advance of the effective date of the cancellation, nonrenewal, or reduction in coverage.
 - 1. Written notice of cancellation for non-payment shall be mailed within 10 Days of cancellation.
 - 2. Contractor shall maintain all insurance in full force and effect during entire period of performance of Contract Documents, including warranty and guarantee periods. However, Contractor may discontinue All-Risk Course of Construction Insurance after Substantial Completion or at the point the Work is put to its intended use, whichever occurs earlier, and shall maintain General Liability Insurance throughout the entire Extended Term specified Paragraph 1.01 above.
 - 3. At time of making application for extension of time, and during all periods exceeding the Contract Time resulting from any cause, Contractor shall submit evidence that insurance policies will be in effect during requested additional period of time. Upon City's request, Contractor shall submit to City, within 30 days, copies of the actual insurance policies or renewals or replacements.

1.05 Insurance Premiums

A. Contractor shall pay all insurance premiums, including any charges for required waivers of subrogation or the endorsement of additional insureds. If Contractor fails to maintain insurance, City may take out comparable insurance, and deduct and retain amount of premium from any sums due Contractor under Contract Documents or require Contractor to reimburse City.

1.06 Injuries

- A. If injury occurs to any employee of Contractor, Subcontractor or sub-subcontractor for which the employee, or the employee's dependents in the event of employee's death, is entitled to compensation from City under provisions of the Workers' Compensation Insurance and Safety Act, as amended, or for which compensation is claimed from City, City may retain out of sums due Contractor under Contract Documents, amount sufficient to cover such compensation, as fixed by the Act, as amended, until such compensation is paid, or until it is determined that no compensation is due. If City is compelled to pay compensation, City may, in its discretion, either deduct and retain from the contract sum the amount so paid, or require Contractor to reimburse City.
- B. Nothing herein shall be construed as limiting in any way the extent to which Contractor or any Subcontractor may be held responsible for payment of damages resulting from their operations.

1.07 Subcontractors

- A. Subcontractors shall carry the same insurance as the Contractor, with the exception of All-Risk Course of Construction Insurance. Subcontractors' General Liability and Auto Liability limits are reduced to \$2,000,000 per occurrence/accident, unless otherwise established by the Contractor. Worker's Compensation Insurance for all persons a Subcontractor may employ in carrying out the Work shall be in accordance with applicable State law in the statutory amount. Contractor shall cause the Subcontractors to furnish proof thereof to Owner within ten Days of Owner's request.
- B. The following provisions apply to any licensed professional engaged by Contractor to perform portions of the work (Professional). Each Professional shall maintain the following insurance, unless otherwise specified in Contract Documents:
 - 1. Professional Liability Insurance, insuring against professional errors and omissions arising from Professional's work on the Project, in an amount not less than \$1,000,000 combined single limit for each occurrence.
 - 2. If Professional cannot provide an occurrence policy, Professional shall provide insurance covering claims made as a result of performance of work on this Project and shall maintain such insurance in effect for not less than two years following Final Completion of the Project.
- C. Professional shall satisfy all other provisions of this Section relating to that insurance, including without limitation providing required insurance certificates (containing the required endorsements), with the exception of naming the Owner as an additional insured, before commencing its work on the Project.

1.08 Termination of Coverage

A. Contractor shall maintain insurance as required by the Agreement to the fullest amount allowed by law and shall maintain insurance for a minimum of five (5) years following completion of this project or service.

B. In the event Contractor fails to obtain or maintain completed operations coverage as required by this Agreement, City at its sole discretion may purchase the coverage required and the cost will be paid by Contractor.

ARTICLE 2 – RESPONSIBILITY OF CONTRACTOR AND INDEMNIFICATION

2.01 Liability

- A. City and each of its officers, employees, consultants and agents including, without limitation, the Board, Project Manager and each City's Representative, shall not be liable or accountable in any manner for:
 - 1. Loss or damage that may happen to any part of the Work.
 - 2. Loss or damage to materials or other things used or employed in performing the Work.
 - 3. Injury, sickness, disease, or death of any person.
 - 4. Damage to property resulting from any cause whatsoever except their sole negligence, willful misconduct, or active negligence, attributable to performance or character of the Work.
- B. Contractor releases all the foregoing persons and entities from any and all such claims.
- C. Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of Contractor, its Subcontractors of any tier, or the officers or agents of any of them.

2.02 Indemnification

- A. To the furthest extent permitted by law (including, without limitation, Civil Code Section 2782), Contractor shall defend, indemnify, and hold harmless, City and each of its officers, employees, consultants and agents including, without limitation, the Council, Project Manager and each City's Representative, from claims, suits, actions, losses and liability of every kind, nature and description including, without limitation, claims and fines of regulatory agencies and attorney's fees and consultant's fees, directly or indirectly arising out of, connected with, or resulting from performance of the work, failure to perform the Work, or condition of the Work that is caused in whole or part by any act or omission of Contractor, Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, resulting from any cause whatsoever except their sole negligence, willful misconduct, or active negligence.
- B. With respect to third-party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity including, without limitation, costs of defense, against City and each of its officers, employees, consultants and agents including, without limitation, City, the Council and its members, Project Manager and each City Representative. City shall provide timely notice to Contractor of any third-party claim relating to the Contract Documents, in accordance with Public Contract Code Section 9201.

- C. The Contractor's defense and indemnification obligations are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained herein.
- D. To the furthest extent permitted by law (including, without limitation, Civil Code §2782), the indemnities, releases of liability and limitations of liability, claims procedures, and limitations of remedy expressed throughout Contract Documents shall apply even in the event of breach of Contract, negligence (active or passive), fault or strict liability of the party(ies) indemnified, released, or limited in liability, and shall survive the termination, rescission, breach, abandonment, or completion of the Work or the terms of the Contract Documents. If Contractor fails to perform any of these defense or indemnity obligations, City may in its discretion back charge Contractor for City's costs and damages resulting therefrom and withhold such sums from progress payments or other Contract moneys which may become due.
- E. Contractor's obligations to defend and indemnify City shall survive the termination or completion of this Contract for the full period allowed by law.

SECTION 00 73 80 APPRENTICESHIP PROGRAM

ARTICLE 1 – COMPLIANCE REQUIRED

1.01 Labor Code

A. Contractor and Subcontractors shall comply with the requirements of California Labor Code Sections 1776, 1777.5, and 1777.6 concerning the employment of apprentices by Contractor or Subcontractors. Willful failure to comply may result in penalties, including loss of the right to Bid on or receive public works contracts.

ARTICLE 2 – CERTIFICATION OF APPROVAL

2.01 Application

- A. California Labor Code Section 1777.5, as amended, requires a Contractor or Subcontractor employing tradespersons in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of a public works project and which administers the apprenticeship program in that trade for a certification of approval.
- B. The certificate shall also fix the ratio of apprentices to journeypersons that will be used in performance of the Contract. The ratio of work performed by apprentices to journeypersons in such cases shall not be less than one hour of apprentices work for every five hours of labor performed by journeypersons (the minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeypersons), except:
 - 1. When unemployment for the previous three-month period in the area exceeds an average of 15 percent.
 - 2. When the number of apprentices in training in the area exceeds a ratio of one to five.
 - 3. When a trade can show that it is replacing at least 1/30 of its membership through apprenticeship training on an annual basis state-wide or locally.
 - 4. When assignment of an apprentice to any work performed under a public works contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyperson.

ARTICLE 3 – FUND CONTRIBUTIONS

3.01 Contributions

A. Contractor is required to make contributions to funds established for administration of apprenticeship programs if Contractor employs registered apprentices or

journeypersons in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

ARTICLE 4 – APPRENTICESHIP STANDARDS

4.01 Information

A. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of the California Department of Industrial Relations, or from the Division of Apprenticeship Standards and its branch offices.

SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Identification and summary description of the Project, the Work, location, City-furnished products and materials, activities by others, coordination, and early occupancy by City.

1.02 THE PROJECT; WORK

- A. The Project consists of completed construction of the Foster City Levee Protection Planning and Improvements Project (CIP 301-657) and any other items shown to be constructed on the Plans and as described in and pursuant to the Contract Documents (listed in Document 00 52 00 Section 5.01), including the Specifications.
- B. The scope of Work to be performed by Contractor includes, without limitation, the performing or furnishing of all project management, labor, materials, tools, equipment, documents and services necessary for and incidental to the construction and completion of the Project, or the various separately identifiable parts thereof, pursuant to the Plans and Specifications and all other Contract Documents within the Contract Time as defined in Section 01 42 00 1.03, collectively, "Work".
- C. The Work of this Contract comprises construction of all the Work indicated, described in the Specifications, or otherwise required by the Contract Documents. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Acceptance of the Work. Costs to maintain completed work, systems, and equipment prior to Final Acceptance shall be considered as included in prices Bid and no direct or additional payment will be made therefore.
- D. For all Bid items, furnish and install all Work, including connections to existing systems, indicated and described in Plans and Specifications and all other Contract Documents. Work and requirements applicable to each individual Bid item, or unit of Work, shall be deemed incorporated into the description of each Bid item (whether Lump Sum or Unit Price). Any Bid item may be deleted from the Work and Contract Sum, in total or in part, prior to or after award of Contract without compensation in any form or adjustment of other Bid items or prices therefore.
- E. Allowance Work shall be done as Change Orders and as specified in Section 01 26 00 (Payment for Changes and Extra Work). Identify Allowance Items (See Document 00 41 13 [Bid Form]) work on the Progress Schedules and on Applications for Payment. The Amount given on Document 00 41 13 (Bid Form) under each Allowance Item is the sum of money set aside for each Allowance Item. These amounts shall be included in the Contract Sum on the Bid Form. If the cost of Work done under any Allowance Item is less than the amount given on the Bid Form under

that Allowance Item, the Contract Sum shall be reduced by the difference between the amount given in the Bid Form and the cost of Work actually done.

1.03 LOCATION OF PROJECT

A. The Project Site is generally located within the footprint of the approximately 43,000linear-foot (8 miles) existing levee system and San Francisco Bay Trail that surrounds Foster City along the bayfront and includes six proposed construction staging areas as depicted in the Plans (collectively, the "Site").

1.04 CITY-FURNISHED EQUIPMENT AND MATERIALS

A. Should City-furnished equipment or materials be provided, Contractor shall coordinate those City-furnished equipment and materials with its own Work.

1.05 ACTIVITIES BY OTHERS

- A. City, County, public and private utilities, and others may perform activities within Project Site while the Work is in progress.
 - 1. Schedule the work with City, County, utilities, and others to minimize mutual interference.

1.06 PLANS AND SPECIFICATIONS

- A. As shown on the Plans and/or described in the Specifications, each element of the Work must be furnished complete, finished and functional. Whether shown or not, include all materials and ancillary equipment necessary to provide a complete installation. The Plans, Specifications and other Contract Documents are intended to be complementary and cooperative to describe and provide for a complete Project. Anything in the Specifications and not on the Plans, or on the Plans and not in the Specifications, shall be as though shown or mentioned in both. Details shown for an item of Work are typical and shall apply to similar items of Work.
- B. Do not deviate from the Plans and Specifications without written authorization from the Engineer.
- C. The Engineer does not warrant the accuracy of scaled dimensions. Dimensions indicated by figures or numerals shall govern. Larger scale drawings shall take precedence over smaller scale drawings.
- D. References made to other specifications and codes refer to the edition including amendments in effect and published at the time of advertising the project, unless specifically referred to by edition, volume, or date as noted in the Contract Documents.

1.07 PRECEDENCE OF CONTRACT DOCUMENTS

A. Supplemental Agreements, approved Change Orders, Engineer's written interpretations and clarifications, and Addenda, take precedence over all other components of the Contract Documents. Shown dimensions take precedence over scaled dimensions. Detailed drawings take precedence over general drawings.

1.08 SUPPLEMENTAL INFORMATION

- A. The following supplemental geotechnical information is provided for use by the Contractor:
 - 1. ENGEO, September 9, 2016, "Foster City Levee Improvement Project, Seismic Hazards and Methods of Evaluation."
 - 2. ENGEO, "Foster City Levee Improvement Project, FEMA 65.10 (b) Levee Evaluation," March 5, 2020.
- B. Aquatic Resources Mitigation Plan for the City of Foster City Levee Protection Planning and Improvement Project, prepared by Huffman-Broadway Group, dated September 2019 (Revision 1).
- C. These reports are made available to bidders electronically.

1.09 GROUND-BREAKING CEREMONY

- A. A ground-breaking ceremony will be held prior to issuance of a Notice to Proceed.
 - 1. The ceremony will be organized by the City.
 - 2. Contractor is invited to participate, but participation is not mandatory.

1.10 OCCUPANCY OF PORTIONS OF WORK

- A. Contractor shall coordinate work with the City of Foster City, and neighboring property owners and lessees to minimize disruption to their operations.
- B. Certificates of Substantial Completion will be executed for each designated portion of Work prior to City occupancy including specified testing, training of City's personnel, and other preparations necessary for City's occupancy or use of the facility.
- C. Certificates of Substantial Completion will be executed for each designated portion of Work completed prior to City occupancy.
 - 1. Such certificate of Substantial Completion will describe the portion of the Work to be occupied by City, items that may be incomplete or defective, date of occupancy by City, and other information required by City and Contractor.
 - 2. After City occupancy of any portion of completed Work, allow access for City's personnel, access for others authorized by City, and City operation of equipment and systems.
 - 3. Following Occupancy, City will:
 - a. Provide power to operate equipment and systems.
 - b. Repair damage caused by City's occupancy.
- D. Prior to such occupancy or use, enter into agreement with City indicating Work that remains to be performed in occupied areas.
- E. When City's use of occupied facilities reveals defective Work, correct defects.

- F. No partial acceptance of the Work will be made and no acceptance other than the final acceptance of the completed Work will be made except for those portions of Work designated for early occupancy by City.
 - 1. Allow City to take possession of and use any completed or partially completed portion of the Work during the progress of the Work as soon as is possible without interference to the Work.
 - 2. Possession, use of Work, and placement and installation of equipment by City shall not in any way evidence the completion of the Work or any part of it.
 - 3. Contractor shall not be held responsible for damage to the occupied part of the Work resulting from City occupancy.
- G. Use and occupancy by City prior to acceptance of Work does not relieve Contractor of its responsibility to maintain insurance and bonds required under the Contract until entire Work is completed and accepted by City.
- H. Prior to date of Final Acceptance of the Work by City, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to Defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in Section 00 72 00 (General Conditions).
- I. Use by City of Work or part thereof as contemplated by this Section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by City of any of the conditions thereof.
- J. City may specify in these Contract Documents that portions of the Work shall be substantially completed on certain dates, if any, prior to Substantial Completion of all of the Work.
 - 1. The Contractor shall notify the City in writing when it considers any such part of the Work ready for its intended use and Substantially Complete and request City to issue a Certificate of Substantial Completion for that part of the Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 11 40 ISSUANCE OF DRAWINGS AND SPECIFICATIONS

PART 1 GENERAL

1.01 REQUIREMENTS

- A. Unless otherwise provided in the Contract Documents, the City will furnish to the Contractor five (5) sets each of the Plans and Specifications and one copy of each referenced geotechnical report without charge. Additional sets desired by the Contractor or Subcontractors will be furnished upon request, but at the Contractor's expense.
- B. All Contract Documents, Plans, Specifications, Special Provisions, and copies thereof are the property of the City. They are not to be used on other work. All necessary bid documents will be available to prospective bidders electronically.
- C. Pre-qualified bidders will be issued electronic Plans and Specifications for free.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 01 11 50 MANDATORY PROVISIONS

PART 1 GENERAL

1.01 REQUIREMENTS

- A. Any mention in the Divisions of these Specifications which follow the General Conditions or indication on drawings of articles, materials, operations, or methods requires that the Contractor provide each item mentioned or indicated, of quality or subject to qualifications noted; perform according to conditions stated, each operation the same prescribed; and provide therefore all necessary labor, equipment, and incidentals, even though such mention of articles, materials, operations, methods, quality, qualifications, or conditions is not expressed in complete sentences.
- B. The Contractor shall perform the Work in accordance with all applicable regulations, laws, and ordinances, even though such requirements may not be specifically mentioned in the Specifications or shown on the Plans.
- C. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 01 13 00 PROJECT SCHEDULE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for scheduling and completing the Work on a calendar basis, including:
 - 1. Duration for completion of flood protection improvements.
 - 2. Substantial completion duration.
 - 3. Final completion duration.
- B. Related Sections:
 - 1. Section 01 14 00 Work Restrictions.
 - 2. Section 01 32 16 Progress Schedules and Reports.
 - 3. Section 01 77 00 Closeout Procedures.

1.02 DEFINITIONS

- A. **Milestone Completion Duration:** A certain period of time during which specific work must be completed due to regulatory permit conditions or other concerns.
- B. **Completion of Flood Protection Elements:** The levee protection system is sufficiently complete to meet FEMA requirements for accreditation, and the City has accepted all the relevant portions of work described by the Contract Documents for this to be so. The Engineer will have sole discretion as to the determination of the completion of flood protection elements.
- C. **Substantial Completion:** All work described by the Contract Documents other than planting maintenance is completed, and the City has accepted all the relevant portions of work described by the Contract Documents for this to be so.
- D. **Final Completion:** All work described by the Contract Documents is completed, acceptable to the City, and the planting maintenance periods have concluded.

1.03 PROJECT SCHEDULE

- A. Work to complete the Foster City Flood Protection Improvements shall generally include, but not necessarily be limited to, the following as a complete flood protection system:
 - 1. Water pollution control and erosion control measures in accordance with the Contract Documents and the State General Construction Permit.
 - 2. Site preparation activities.
 - 3. Grading and earth moving activities.

- 4. Placement of rock slope protection.
- 5. Installation of sheet pile flood walls.
- 6. Installation of concrete flood walls.
- 7. Installation of operable flood barriers.
- B. Substantial Completion means that all Work described by the Contract Documents is complete and has been accepted by the City in conformance with Section 01 77 00. Work to Substantial Completion shall generally include, but not necessarily be limited to, the following in addition to the Work completed for flood protection:
 - 1. Pedestrian and vehicular access bridges.
 - 2. Paving and striping.
 - 3. Trail signage.
 - 4. Recreational amenities including appurtenant structures.
 - 5. Landscaping and irrigation.
 - 6. Pedestrian and bicycle detour closure.
 - 7. Repair and rehabilitation of any facilities damaged during construction or scheduled for said repair or rehabilitation.
- C. **Final Completion** shall mean City acceptance of the project, including closeout procedures and final payment request. A Certificate of Completion will be issued and start the one-year plant maintenance period and the guarantee period.
- D. Contractor shall adhere to the following calendar schedule, with milestone durations beginning on the day the Notice to Proceed is issued.

Milestone	Maximum Calendar Duration
Foster City Flood Protection Improvements	1,000
Substantial Completion	1,100
Final Completion	1,200

E. The milestone work schedules indicated herein and shown on the Plans do not relieve the Contractor of his responsibility for completion of Work within the specified calendar schedule nor his sole control over the means and methods of construction.

SECTION 01 13 50 PROJECT COORDINATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for ongoing project coordination during construction.
 - 1. Surveying.
 - 2. Documentation of progress.
 - 3. Utilities.
 - 4. Facility operations.
- B. Related Sections:
 - 1. Section 00 72 00 General Conditions.
 - 2. Section 01 73 00 Field Engineering and Surveying.
 - 3. Section 01 50 00 Temporary Facilities and Controls.
 - 4. Section 01 73 29 Cutting and Patching.
 - 5. Section 01 77 00 Closeout Procedures.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
 - 2. Statement of Qualifications (SOQ) for professional photographer and videographer.
- B. Digital Images: Submit two copies of disc or flash drive containing images within seven (7) days of being taken. Each image is to have a minimum file size of 1.4 Mb (1,400 Kb) so viewed resolution is high quality. The production of larger file sizes with higher resolution is encouraged.
- C. Video Recordings: Submit two copies including updated copy of project video log, within seven (7) days of being taken.

1.03 RELATED WORK AT SITE

- A. City may conduct other work at the site to maintain existing facilities or facilitate other work.
 - 1. City will provide reasonable notice regarding other work that will be conducted at the site.
 - 2. Contractor shall cooperate in providing reasonable access for City forces to complete such work.

B. Coordinate the Work of these Contract Documents with the work of others.

1.04 UTILITY NOTIFICATION AND COORDINATION

- A. Notify utilities and coordinate Work with various utilities within the Project limits. Notify the Engineer prior to commencing Work, if damage would occur, or if conflicts or emergencies arise during the prosecution of Work.
- B. Affirm that conflicting utilities shown on the Plans have been cleared from Work areas prior to the commencement of Work in those areas.
 - 1. Areas with conflicting utilities are shown on the Plans based on information obtained from utility owners and field location.
 - 2. Conflicting utilities that are to be relocated by others are identified on the Plans.

1.05 ADJACENT FACILITY OPERATION

- A. Continuous operation of City's adjacent facilities (e.g. parks and trails) is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of City's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, access, and similar items to maintain continuous operations of City's facilities.
- D. Do not take actions that would affect the operation of existing facilities that are to remain open during construction, without first coordinating the Work with the City.

1.06 GENERAL WORK SEQUENCE

- A. The Contractor is directed to other Sections for information on regulatory constraints to Work within certain segments of the Project area.
 - 1. Other than the stated regulatory constraints, the general Work sequence is solely the responsibility of the Contractor.
- B. Do not proceed with Work affecting City or private properties or facility operations without obtaining the City's advance approval of the need for and duration of such Work.

1.07 ADJACENT PROPERTIES

- A. Examination:
 - 1. After Notice of Award, but before a Notice to Proceed is granted, the Contractor, Engineer, and affected property owners and utility owners will make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
- B. Periodic reexamination will be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.
- C. Documentation:
 - 1. Record and submit documentation of observations made on examination inspections in accordance with this Section.
 - 2. Such documentation will be used as evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, the Contractor, and the City.

1.08 CONSTRUCTION PHOTOGRAPHS

- A. General:
 - 1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.
 - 2. Photography shall be by a professional commercial photographer, experienced in shooting interior/exterior construction photos, in daylight and nighttime conditions, and in good and inclement weather.
 - 3. Engineer shall have right to select subject matter and vantage point from which photographs are to be taken.
 - 4. Digital Images: No post-session electronic editing of images is allowed. Stored image shall be actual image as captured without cropping or other edits.
- B. Preconstruction and Post-Construction:
 - 1. After Notice of Award but before the Notice to Proceed, and again upon issuance of a Certificate of Substantial Completion, take a minimum of 100 photographs of Site and property adjacent to perimeter of Site.
 - 2. Emphasis shall be directed to structures both inside and outside the Site.
 - 3. Format: Digital, minimum resolution of 1680 by 2240 pixels and 24 bit, millions of color.
- C. Construction Progress Photos:
 - 1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
 - 2. Weekly: Take 48 photographs using digital, minimum resolution of 1680 by 2240 pixels and 24-bit, millions of colors.
- D. Documentation:
 - 1. Digital Images:
 - a. Electronic image shall have date taken embedded into image.
 - b. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.

c. Label file folders or database records with Project and City's name, and month and year images were produced.

1.09 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning the work on Site or of an area of the Work, and again within 7 days following date of Substantial Completion, videograph Site and property adjacent to Site.
- B. In the case of preconstruction recording, no work shall begin in the area prior to Engineer's review and approval of content and quality of video for that area.
- C. Emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within and areas adjacent to and within the work, and on Contractor storage and staging areas.
- D. Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Video recording shall be by a professional commercial videographer, experienced in shooting exterior and interior construction videos, in both good and inclement weather.
- F. Video Format and Quality:
 - 1. DVD format, with sound.
 - 2. Video:
 - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
 - b. Electronically, and accurately display the month, day, year, and time of day of the recording.
 - 3. Audio:
 - a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
 - b. Indicate date, project name, and a brief description of the location of recording, including:
 - 1) Facility name.
 - 2) Street names or easements.
 - 3) Addresses of adjacent private property.
 - 4) Direction of coverage, including engineering stationing, if applicable.
- G. Documentation:
 - 1. DVD Label:
 - a. DVD number (numbered sequentially, beginning with 001).
 - b. Project name.
 - c. Name of facility included.

- d. Date and time of coverage.
- 2. Project Video Log: Maintain an ongoing log that incorporates above noted label information for DVDs on Project.

1.10 REFERENCE POINTS AND SURVEYS

- A. City's Responsibilities:
 - 1. Benchmarks convenient to work have been established. Locations and elevations are indicated on the Plans.
 - 2. A coordinate system with reference points for Contractor's use as necessary to lay out work has been established and is shown on the Plans.
- B. Contractor's Responsibilities:
 - 1. Provide additional survey and layout required to layout the Work.
 - 2. Notify Engineer at least 3 working days in advance of the time when additional information not shown on the Plans, but which is the City's responsibility will be needed.
 - 3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
 - 4. In event of discrepancy in data or staking provided by City, request clarification before proceeding with Work.
 - 5. Maintain complete accurate log of survey work as it progresses as a Record Document.
 - 6. On request of Engineer, submit documentation.
 - 7. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
 - a. Establish control points, lines, and easement boundaries.
 - b. Check layout, survey, and measurement work performed by others.
 - c. Measure quantities for payment purposes.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
 - 1. Conform to the requirements of Section 01 73 29, Cutting and Patching.
- B. Obtain prior written authorization of Engineer before commencing Work to cut or otherwise alter:
 - 1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or another structural member.
 - 2. Weather-resistant or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Work of others.
- C. Refinish surfaces to provide an even finish.
 - 1. Refinish continuous surfaces to nearest intersection.
 - 2. Refinish entire assemblies.
 - 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing Work and the Work is evident in finished surfaces.
- D. Restore existing work, underground facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on the Plans.
 - 1. Make restorations with new materials and appropriate methods as specified for new work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
- E. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.
- F. Remove specimens of installed work for testing when requested by Engineer.

END OF SECTION

SECTION 01 14 00 WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for sequencing and scheduling the Work affected by existing site and facility, Work restrictions and coordination between construction operations and plant/facility operations, including:
 - 1. Access to site.
 - 2. Use of site.
- B. Related Sections:
 - 1. Section 01 11 00 Summary of Work.
 - 2. Section 01 13 00 Project Schedule.
 - 3. Section 01 14 19 Contractor's Use of the Premises.
 - 4. Section 01 33 00 Submittal Procedures.
 - 5. Section 01 50 00 Temporary Facilities and Controls.
 - 6. Section 01 55 00 Traffic Regulation.
 - 7. Section 01 57 23 Stormwater Pollution Prevention.

1.02 HOURS OF WORK

- A. Normal hours of Work for construction operations, including deliveries, are Monday through Friday between the hours of 8:00 am and 5:00 pm; and Saturday from 9:00 am to 5:00 pm except as otherwise specified herein. Work on Sunday and Holidays is prohibited except as defined herein.
 - 1. Haul trucks shall leave the Project Site by 4:00 p.m. on weekdays.
 - 2. Contractor may perform Work functions that do not generate significant noise prior to 8:00 a.m., but only if in conformance with the City of Foster City Noise Ordinance. (FCMC §17.68.030)
- B. Holidays shall be as defined by the City of Foster City:
 - 1. New Year's Day (January 1).
 - 2. Martin Luther King Jr. Day (third Monday of January).
 - 3. Washington's Birthday (third Monday of February).
 - 4. Cesar Chavez Day (March 31).
 - 5. Memorial Day (last Monday of May).
 - 6. Independence Day (July 4).
 - 7. Labor Day (first Monday of September).

- 8. California Admission Day (September 9).
- 9. Native American Day (fourth Friday of September).
- 10. Veterans Day (November 11).
- 11. Thanksgiving (fourth Thursday of November).
- 12. Day after Thanksgiving (fourth Friday of November).
- 13. Christmas (December 25).
- C. Work may take place on weekends and holidays only after receiving written authorization from the Engineer. Requests for weekend and holiday Work must be made at least five working days in advance.
- D. The Contractor shall be subject to liquidated damages in the amount of \$500 for each hour, or fraction thereof, of unauthorized Work outside of the normal hours defined herein. The Contractor shall also be responsible for inspection costs on Sunday and holiday Work, or Work taking place outside of the normal work hours specified herein.

1.03 SPECIFIC CONSTRAINTS ON SEQUENCE AND SCHEDULING OF WORK

- A. Specific means and methods of construction are at the sole discretion of Contractor.
- B. The City has obtained regulatory permits that set forth specific constraints on Work that shall be followed by the Contractor when scheduling and performing Work on the Project.
 - 1. Work within the defined Bay Jurisdiction (generally elevations below Mean High Water) shown on the Plans, regardless of location, is not allowed between December 1 and May 31 of the subsequent calendar year.
 - a. Cofferdams cannot be installed or removed during this restricted Work window.
 - b. Once a cofferdam is installed and a site dewatered, Work can occur in the dewatered area during the restricted work window. As an example, if a cofferdam is installed to dewater the access path Work zone near the golf course by November 30th, Work can proceed within the dewatered area between Dec 1 and May 31, but once installed, the cofferdam could not be removed until after May 31.
 - c. No pilings or other wood structures that have been pressure treated with creosote shall be used within the defined Bay Jurisdiction shown on the Plans.
 - d. The Contractor shall notify the City if any individual steelhead or green sturgeon listed by NOAA Fisheries under the Endangered Species Act appear to be injured or killed as a result of discharges of dredged or fill material, or work in navigable waters of the United States. The finder shall leave the animal alone, make note of any circumstances likely causing the death or injury, note the location and number of individuals involved and if possible, take photographs.

- e. Adult animals shall not be disturbed unless circumstances arise where they are obviously injured or killed by discharge exposure, or some unnatural cause.
- 2. Work from Control Line 1 Station 0+00 to Control Line 1 Station 14+23 and from Control Line 1 Station 202+20 to Control Line 1 Station 342+93 is not allowed between February 1 and August 31 due to the potential for nesting birds including least tern, burrowing owls and California Ridgeway's rail.
 - a. If construction is proposed within this identified levee segment during the restricted Work window, USFWS protocol nesting surveys must be conducted by the Project Biologist, and the results submitted to the USFWS to determine if and where Work could occur within this identified Project segment during the restricted Work window.
 - b. Construction within the restricted Work window must be approved by the USFWS. Annual decisions are anticipated by January 31.
 - c. Even if allowed to work within a nesting season based on protocol surveys, the City may establish construction-free buffer zones around discovered active nesting or breeding sites for raptors, migratory birds, burrowing owls, or California Ridgeway's rail during the indicated time window (February 1 August 31). The Contractor shall notify the City as soon as it believes such buffer zones will materially affect its Work.
 - 1) A Contract Time extension will not be granted based on impacts to Work performed during the defined breeding season, as the Contract Time assumes that such Work will not take place.
- Prior to the commencement of construction of the two roadway bridges (approximate Control Line 1 Stations 306+00 and 331+15), vegetation shall be removed from the areas of work using hand tools.
 - a. Do not begin vegetation removal prior to authorization from the City's Biologist.
 - b. Provide a minimum of 48 hours' notice for biological inspection.
- 4. Prior to the commencement of construction activity in areas adjacent to salt marsh where suitable habitat is present, the City will conduct preconstruction surveys for that day to ensure that endangered species are not present within the Work area.
- 5. If a salt marsh harvest mouse or Ridgeway's rail is observed at any time during construction, Work would not be initiated or would be stopped immediately by the City's Biologist unless the animal leaves the vicinity of the Work area of its own accord.
 - a. If the animal does not leave the Work area, Work would remain halted until the USFWS is contacted and has given authorization for Work to proceed.
 - b. The City's Biologist will direct the contractor on how to proceed according to the situation.
 - c. The City's Biologist and any other persons at the site shall not pursue, capture, or handle any endangered species observed.

- d. Attention is directed to Sections 00 72 00 and 01 26 00 for changed conditions to the Contract occasioned by the presence of endangered species.
- C. Mitigation Planting Restrictions
 - 1. The seed mixes and planting materials specified herein and shown on the Plans shall be broadcast and installed prior to the rainy season, October 1 at the latest.
- D. Work within Easements and Adjacent Private Property
 - 1. Work may proceed within easements identified on the Drawings, subject to other restrictions.
 - 2. Work on adjacent private property may proceed upon approval from the Engineer. Provide a minimum of 30 days' notice before beginning work outside identified City rights-of-way and easements.
- E. Work Sequence and Constraints:
 - 1. Utilize description of critical events in Work sequence in this Section as a guideline for scheduling and undertaking the Work.
 - 2. Work sequence and constraints presented do not include all items affecting completion of the Work but are intended to describe critical events necessary to minimize disruption of the existing facilities.
 - 3. Indicate required closures of existing facilities or interruptions of existing operations on the Progress Schedule. Closures will be permitted to the extent that existing operation of the facilities will not be jeopardized and identified constraints are satisfied. All shutdowns and disruptions to operation of facilities shall be coordinated with the Engineer.
 - 4. Submit written notification of required closures or disruptions to existing facilities at least 7 days prior to planned date of shutdown or disruption.
 - 5. Do not begin alterations until Engineer's written permission has been received.
 - 6. Minimize closures through advanced planning. Have required equipment, materials and labor on hand at time of closure.
- F. Work Sequence and Constraints:
 - 1. Utilize description of critical events in Work sequence in this Section as a guideline for scheduling and undertaking the Work.
 - 2. Work sequence and constraints presented do not include all items affecting completion of the Work but are intended to describe critical events necessary to minimize disruption of the existing facilities.
 - Indicate required closures of existing facilities or interruptions of existing operations on the Progress Schedule. Closures will be permitted to the extent that existing operation of the facilities will not be jeopardized and identified constraints are satisfied. All shutdowns and disruptions to operation of facilities shall be coordinated with the Engineer.
 - 4. Submit written notification of required closures or disruptions to existing facilities at least 7 days prior to planned date of shutdown or disruption.

- 5. Do not begin alterations until Engineer's written permission has been received.
- 6. Minimize closures through advanced planning. Have required equipment, materials and labor on hand at time of closure.

1.04 ACCESS BY OTHER PARTIES

A. Provide safe and continuous access to all adjacent public and private properties at all times, unless specific written approval has been obtained to temporarily discontinue said access.

1.05 UTILITIES

- A. Maintain electrical, telephone, water, gas, sanitary facilities, and other utilities within existing facilities in service. Provide temporary utilities when necessary.
- B. Provide advance notice to and utilize services of Underground Services Alert (USA) for location and marking of underground utilities a minimum of five (5) days in advance of any activities that have the potential to encounter such utilities.

1.06 WORK BY OTHERS

A. Where proper execution of the Work depends upon work by others, inspect and promptly report discrepancies and defects.

1.07 WORK SEQUENCE AND CONSTRAINTS

- A. The following sequencing of Work and/or constraints shall be adhered to by the Contractor and shown in the progress schedule in accordance with Section 01 32 16.
 - 1. All existing storm drainage pipes, channels, ditches, pumping equipment and outfalls shall always remain operational, unless noted otherwise on the Plans or in the Specifications.
 - 2. At least one lane of traffic in each direction shall be maintained on all streets where construction or construction hauling is occurring unless otherwise approved in writing by the City.
 - 3. All Work within the public right of way shall comply with the approved traffic control plan as specified in the General Conditions (Section 00 72 00) and Section 01 55 00.
- B. Construction activities within areas exposed to tidal action shall cease during period of high tide that might endanger workers or the release of pollutants into San Francisco Bay.
 - 1. Engineer and Inspector shall retain sole authority over determination of a dangerous tide condition, which could include storm surge and wind-wave activity.
 - 2. In the event that material escapes or is placed in an area subject to tidal action of the Bay, the Contractor shall immediately retrieve and remove such material at no additional expense.

1.08 TEMPORARY SERVICES, MATERIALS, AND EQUIPMENT

- A. Locate temporary facilities in a manner that minimizes interference to neighboring and adjacent property owners' operation and maintenance personnel.
- B. Unless otherwise specified, install temporary pipelines of the same size as its connection to the existing facility at the downstream end of the pipeline.
- C. Provide submittals on proposed temporary electrical and instrumentation components necessary to maintain existing facilities.
- D. Dewater and promptly clean basins and channels temporarily removed from service.
- E. Dimensions for all existing structures, piping, paving, and other nonstructural items are approximate. The Contractor shall field verify all dimensions and conditions and report any discrepancies to the Engineer a minimum of 14 days in advance of any construction in the area.
- F. Discrepancies between coordinates, bearings and lengths, and stationing shall be resolved in the following order of precedence:
 - 1. Coordinates.
 - 2. Bearings and lengths.
 - 3. Stationing.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 14 10 GENERAL REQUIREMENTS FOR UTILITY WORK

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies general requirements for construction, protection, support, maintenance, and restoration for underground and overhead utilities affected by construction of the Project. This section includes coordination with private utility companies. The Work includes new construction, reconstruction, relocation, and abandonment, and relocation of utilities by utility companies.
- B. The utility works and services that may be affected include, but are not limited to:
 - 1. Storm drain
 - 2. Sanitary sewer
 - 3. Water distribution and transmission mains
 - 4. Gas distribution and transmission mains
 - 5. Electric power, utility poles, and street lighting (underground and overhead)
 - 6. Telephone
 - 7. Traffic signals
 - 8. Fiber optic communications
 - 9. Cable television
 - 10. Signal communication
 - 11. City fire signal lines and pull boxes
- C. This Section shall be used in conjunction with all the specific underground utility work sections that apply to the Contract and the Contract Documents.

1.02 WORK BY UTILITY COMPANIES

- A. Certain parts of the utility work may be performed, where shown or specified, by a utility company.
- B. For all utilities, except for storm drains, sanitary sewers, and water, disconnecting and connecting of service shall be performed by the respective utility companies.
 - 1. Disconnecting and connecting storm drains and sanitary sewers owned by the City shall be the Contractor's responsibility as required in the Specifications or after having notified the Engineer.
 - 2. Disconnecting and connecting water services owned by California Water Service Company shall be the Contractor's responsibility as required in the Specifications or after having notified the Engineer.

- C. Coordinate with the Engineer to ensure that contact with utility companies is made in advance of construction to allow enough time for the utility companies to accomplish the work they are required to perform.
 - 1. Notice from the Engineer to the utility company must be made at least thirty (30) days in advance of scheduled date for commencement of this work.
 - 2. Allow for this notification in Project schedules.
- D. Work performed by utility companies as directed by the Contractor to facilitate the Work of this Contract, and other work performed by utility companies solely for the convenience of the Contractor, shall be at no additional cost to the City.

1.03 DEFINITIONS

- A. <u>Abandoned</u> means that use has been discontinued by the utility company.
- B. <u>To be abandoned</u> means that use will be discontinued as part of the work of this Contract, either by the Contractor or by the utility company.
- C. <u>Maintenance</u> means providing continuous and service that meets project requirements and specifications during construction.
- D. <u>Maintain complete-in-place</u> means to protect, support, and otherwise maintain the existing condition and function of a facility during construction.
- E. <u>Restoration</u> means replacement of a facility or portions of a facility that have been removed or made inoperative by the Contractor in the performance of the work.
- F. <u>Utility Company</u> means the company, agency, owner, or operator of the facility concerned.
- G. <u>Temporary Facility</u> means a facility provided, in lieu of an existing or new facility, to ensure continuity of service. When a temporary facility is not shown on the Contract Drawings, but is provided for the convenience of the Contractor, it shall be constructed at no additional cost to the City.

1.04 SUBMITTALS

- A. Shop Drawings: Submit the following in accordance with Section 01 30 30, Shop Drawings.
 - Working drawings and, if applicable, shop drawings showing the details, procedures, and scheduling for performance of each utility work. Show actual verified field locations of existing utility facilities that are affected by the Work of this Contract; interferences which these facilities present to the new Work; location of settlement markers; method proposed to proceed with the construction; and, if applicable, method of testing and procedure for restoration.
 - 2. Specifications and drawings describing the method to be used to temporarily support existing subsurface, surface and overhead utilities during construction. Include working drawings that indicate proposed materials and details.

- 3. A detailed excavation procedure for subsurface utilities. At a minimum, the procedure shall include:
 - a. Equipment to be used for anticipated subsurface utility investigation and excavation.
 - b. Personnel to be used and designated utility coordinator.
 - c. Duration and schedule of investigation and excavation.
 - d. Techniques proposed to isolate and protect existing utilities.
 - e. Method for the Contractor to provide utility information derived from subsurface investigation to field personnel doing excavation.
 - f. A disciplinary plan that delineates all steps to be taken as a result of a utility disruption, including possible removal of Contractor's individuals from the site.
- B. Submit an emergency action plan that outlines procedures to be followed by the Contractor in case of unplanned utility interruptions or unplanned damage to utilities in service.
 - 1. Obtain concurrence from each affected utility company.
 - 2. List Contractor's personnel assigned responsible charge for emergency action on site for each shift, and those on call.
 - 3. List phone notification numbers for each utility company, fire, and police departments, and other relevant agencies.
 - 4. Include copies of utility plans showing the valve or switch locations to isolate each line.
- C. Transmit to the Engineer any as-built utility location survey data as specified in Part 3 of this Section.

1.05 APPROVAL BY UTILITIES

- A. All personnel performing Work on utility facilities shall be fully qualified and able to meet the standards of the affected utility company.
 - 1. If the Contractor does not have the required utility experience, Contractor shall retain a specialist firm acceptable to the affected utility company to perform the Work.
- B. Prior acceptance of temporary support methods for each affected utility facility shall be obtained by the Contractor from each utility company concerned.
- C. Prior permission for disrupting a utility shall be obtained by the Contractor from each utility company concerned.
- D. Prior approval for disrupting fire signal lines, high pressure fire water mains and hydrants, and fire service lines shall be obtained from the Engineer.

1.06 NOTIFICATION

- A. In addition to the initial 30-day utility company notification, the Contractor shall notify the appropriate utility companies and the Engineer at least two (2) days prior to starting any Work involving or adjacent to surface, subsurface, or overhead utility facilities.
- B. Gas Utility Requirements:
 - 1. If cut-off or connection is expected, notify the PG&E's Engineering Department four (4) weeks prior to cut-off or connection to gas main.
 - 2. Immediately notify PG&E's Engineering Department if surface or subsurface settlement or movement in excess of the design amount is observed, regardless of the proximity to an existing gas facility.
 - Gas valves shall always remain exposed during Work. Contractor shall coordinate with PG&E at least two (2) weeks prior to any require gas valve adjustments (raising or lowering).
 - 4. At locations where the sand bedding material of gas mains are excavated and removed by the Contractor, the Contractor shall put back or replace the bedding material, in kind. Crushed stone shall not be used as backfill for bedding material beneath gas mains.
 - 5. For the gas line crossing the new Baffin Street Bridge near Station 306+03:
 - a. Shutdown may only occur between March 1 and October 31 (shutdown is not allowed from November 1 through February 28.
 - b. The gas line may only be deactivated for a maximum of 6 months.
 - c. PG&E requires 6 months advanced notification prior to shutdown.

1.07 WORK BY OTHERS

- A. Specifications and construction methods from each utility owner apply to individual utility specification sections.
- B. It is the Contractor's responsibility to ensure that, unless otherwise specified, the standards for materials and construction methods required by the utility owner are met.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials for temporary and permanent Work shall be of the type, grade, and class specified by reference to utility company standards.

PART 3 EXECUTION

3.01 GENERAL CONSTRUCTION REQUIREMENTS

- A. Unless otherwise noted, conform to the construction standards, specifications, and standard practices of the affected utility companies. Coordinate with each utility company the Work to be done by the Contractor and the work to be done by utility company. Ensure continuity of all existing utility services to all users, except when the utility company determines that temporary interruption is acceptable.
- B. Unless otherwise indicated, maintain all utility facilities complete in place. Provide temporary support of utilities during construction only by methods acceptable to the utility company concerned.
- C. Provide and maintain all temporary facilities required to provide interim utility service when a utility facility is to be relocated and when a utility facility to be replaced is abandoned prior to replacement.
- D. Where an existing utility facility is encountered that is not indicated on the Plans or that is determined to be a different utility facility than that indicated, promptly notify the Engineer. The Contractor is responsible for determining the owner of the facility and the disposition of the facility.
- E. All water, sanitary, and storm services must be maintained throughout the Work of the Project using temporary pumps and piping as required. Unless otherwise noted, no service interruptions will be permitted. Where interruption or temporary continuation means are permitted, the relevant Contract Documents shall govern the Work.
- F. The Contractor shall dewater existing utility manholes and structures prior to beginning construction. Any dewatered material shall be properly treated and disposed per the Specifications and Contract Documents.

3.02 SUBSURFACE UTILITY INVESTIGATION

- A. The Contractor shall locate subsurface utilities that are not as indicated in the Contract Documents.
- B. Notify Engineer before locating utilities.

3.03 UNSAFE AND UNSUITABLE UTILITY STRUCTURES

- A. If, upon exposure, the condition of a facility to be maintained complete-in-place is found to be unsafe, for support or for maintenance of service, the Contractor shall notify the utility owner and shall promptly notify the Engineer.
- B. For storm drains and sanitary sewers, the Contractor shall notify the Engineer of unsafe or unsuitable conditions and complete repairs as directed. Additional costs shall be paid per Section 01 26 00.

3.04 ABANDONED FACILITIES

- A. The Contractor may be required to demolish and remove abandoned utility facilities located within areas of the work of this Contract.
- B. Abandoned facilities that do not interfere with the Work of this Contract may remain.
- C. The Contractor shall not undertake demolition or removal until written permission for such work has been obtained from the utility company.
- D. When abandoned drainage facilities are to be left in place, plug or cap the ends of conduits and pipes, and fill with control density fill (CDF) per the Plans and Specifications unless otherwise indicated.
- E. Remove abandoned utility manholes, junction boxes, and similar structures as directed by the Engineer to a minimum depth of 3 feet below finish grade, and puncture or break the bottom slabs of manholes and similar structure to allow drainage. Backfill and compact excavations resulting from removal of utility facilities as required to restore original grade.

3.05 SETTLEMENT OR MOVEMENT

- A. In case of settlement or other movement due to Contractor's work that causes or could cause damage to a utility, take immediate remedial measures to correct the conditions and repair the damage.
- B. Notify the Engineer immediately of any instances of settlement requiring remedial measures.

3.06 ACCESS

- A. At all times permit free and clear access to the affected facilities by personnel of the utility companies.
- B. Throughout the construction period, maintain access to all utility vaults and structures.

3.07 SERVICE CONNECTIONS

A. Work required for maintaining, supporting, relocating, restoring, and constructing all service connections is included as part of the work of this Contract, even though some existing service connections, for which record information is not available, may not be shown on the Contract Drawings.

3.08 REPAIR AND RESTORATION

- A. Immediately notify the Engineer and the utility company of damage to their utilities.
- B. Repair to the utility owner's satisfaction, or coordinate repair of all damage to utilities caused by work of this Contract.
- C. Clean all utility structures of dirt caused by work of this Contract.

3.09 AS-BUILT UTILITY LOCATION SURVEY

- A. For each new or relocated utility installed, including those installed or relocated by others in the Project area during Work, perform an as-built location survey by coordinates prior to backfilling the excavation.
- B. The survey work, including verification of the existing survey data, shall be performed by a licensed Professional Land Surveyor registered in the State of California.

END OF SECTION

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SECTION 01 14 19 CONTRACTOR'S USE OF THE PREMISES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for working in and around Project sites, and protection of existing improvements, including:
 - 1. Access to sites.
 - 2. Use of sites.
 - 3. Use of premises.
 - 4. Protection of existing improvements to remain.
 - 5. Public Safety.
- B. Related Sections:
 - 1. Section 01 11 00 Summary of Work.
 - 2. Section 01 14 00 Work Restrictions.
 - 3. Section 01 35 23 Safety Plan.
 - 4. Section 01 57 23 Stormwater Pollution Prevention.
 - 5. Section 01 50 00 Temporary Facilities and Controls.
 - 6. Section 01 55 00 Traffic Regulation.
- C. This Section applies to all situations in which the Contractor or his representatives, including but not necessarily limited to, suppliers, Subcontractors, employees and field engineers, enter upon the City's property or utilize the public right-of-way for purposes other than conveyance.
- D. Contractor shall commence the work and provide security and protection to the existing facility and job site within 15 days from the issuance of the "Notice to Proceed".

1.02 ACCESS TO THE JOB SITE

- A. Restrict Contractor's employees to the immediate Work areas on the job site and in no way go beyond the Work limits noted on the Plans or as otherwise directed by the Engineer.
- B. Allow site access only to those persons so authorized by the City.

1.03 CITY OCCUPATION OF THE PREMISES

A. The City will occupy the existing premises during construction operations to maintain certain operations including storm drainage and access to parks.

B. Contractor shall provide and maintain full access to those facilities maintained by the City throughout the progress of Work.

1.04 CONTRACTOR'S USE OF THE PREMISES

- A. Do not interfere with City operations during the Work.
- B. All items, materials and equipment remaining in the existing structures and on the premises (job site), which are not specified to be salvaged or incorporated into the Work, shall become the property of the Contractor and shall be removed from the job site. The City makes no claims or assumes any value in any of these items, materials and/or equipment if they are removed from the structures or the job site or vandalized prior to and/or during the Contract period. The City assumes no responsibility for any additional operation or works as a result of the conditions described herein.

1.05 RIGHTS OF WAY

- A. The Contractor shall not allow its employees to use private property for any reason, or to use water or electricity from such property without written permission from the owner. The Contractor shall provide evidence of such permission, in writing, to the Engineer, before entering upon such lands.
- B. The Contractor shall be fully responsible for locating and obtaining permission to use stockpile sites that are not indicated on the Plans. Where the Contractor may find it advantageous to use private property, it shall arrange for such use and assume full responsibility for its rental, preparation, maintenance and cleanup in a manner satisfactory to the City and property owner.

1.06 PARKING

- A. No parking of Contractor's vehicles will be allowed outside of the job site except for the purposes of active unloading and/or loading. Contractor shall not use newly paved areas for loading or unloading. All traffic controls in the work area shall conform to the San Mateo County Work Area Traffic Control Handbook (WATCH).
- B. Contractor's employees shall park within areas designated for construction parking as approved by the Engineer and shall otherwise observe posted City parking restrictions. Pre-approved parking areas may be designated on the Plans.

1.07 SECURITY

- A. The Contractor shall be responsible for the security of all its construction equipment, materials, tools, facilities, and vehicles (personal, private, or contractual) while performing the Work of this Contract. This requirement shall be effective twenty-four (24) hours per day for the entire duration of the Contract.
- B. Contractor shall furnish and maintain approved type site security protection between the Work areas and other areas. All such site security protection shall remain for the duration of this Contract to Substantial Completion.

1.08 PROTECTIONS

- A. Where necessary for the safety of the public and the protection of the adjacent street improvements and adjacent properties, provide and maintain adequate protections, fences and gates and barricades to separate Work areas from areas outside the job site limits. Such protections shall comply with provisions of Section 01 50 00 "Temporary Facilities and Controls" and shall remain in place during extent of this Contract or as otherwise directed by the Engineer.
- B. Provide protections, barricades, signs, etc., as necessary so that persons will be protected from the Work areas and construction activities thereon. Upon completion of such Work operations, such protections shall be removed. Such protections shall not unnecessarily disrupt the public right-of-way at the job site.
- C. All equipment, material, soil, debris and any heavy loaded object shall not be stock piled in adjacent areas to create any surcharging to trenches, other excavations, or completed Work.
- D. Protection of Existing Building and Site Conditions:
 - Protect existing surfaces in areas where Work of this Contract is being performed or passed through for access to the Work areas from damage in a manner approved by the Engineer. Take all necessary precautions to protect and preserve the integrity of all existing Work and other work. Submit protection plans or details as required by the Engineer.
 - 2. Provide adequate protection for existing wall, fencing, post or sign, lighting, plant, traffic signal equipment including loop detectors, paving, etc. indicated to remain within the Work area and those facilities outside the Work area. Contractor shall make necessary repair to damages that occurred under Contractor's responsibility or jurisdiction.
- E. Environmental Protection
 - 1. All personnel and equipment shall remain within the designated Work sites and shall not be allowed to enter adjacent salt marsh wetlands, drainages, and habitat of listed species.
 - 2. Pets shall not be allowed on or near the Work site.
 - 3. Firearms shall not be allowed in or near the Work sites.
 - 4. Trash shall be placed in closed containers and properly disposed of offsite daily.
 - 5. No fires shall be permitted within the Work sites.

1.09 REPAIR OF DAMAGES

- A. Repair or replace any damage to existing structures or equipment under Contractor's protection.
- B. Repair or replace damaged Work with new materials as necessary to restore the damaged areas or surfaces to a condition equal to and matching such conditions existing prior to damage or start of Work at no added cost to the City.

1.10 RESTORATION OF STORAGE AND STAGING AREAS

- A. Contractor shall restore improvements and ground within storage and staging areas to their pre-occupancy condition or better.
- B. Soil areas disturbed during the Work shall be hydroseeded in conformance with Section 32 92 13, Hydroseeding.

1.11 INTERRUPTION OF SERVICES

A. Contractor shall make all provisions to accomplish all Work without undue interference with the City's operations of the existing facilities or utilities on the job site premises. Any necessary interruptions to existing facilities shall be done only after 48 hours advance consultations with the Engineer and at such time and duration as instructed by the Engineer.

1.12 NON-INTERFERENCE WITH OTHERS

- A. Confine Work operations to the immediate boundaries of the job site and execute Work operations in a manner to minimize interference with City operations and/or Work operations of other contractors.
- B. Provide and maintain adjacent pedestrian and vehicular accesses.
- C. Obtain approval of the Engineer prior to any street closure.

1.13 UNDERGROUND SERVICE ALERT

A. Before commencing any excavation, the Contractor shall obtain an underground service alert inquiry I.D. Number by calling (800) 642-2444. Five (5) working days shall be allowed after the I.D. Number is obtained and before the excavation Work is started so that utility owners can be notified.

1.14 JOB SAFETY

A. Observe all safety rules and regulations of the applicable Building Code and CAL/OSHA as applicable to the safety of the Contractor, Subcontractors, Contractor's personnel, Subcontractor's personnel, City employees, and City's consultants during Work operations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 19 00 PROJECT MANUAL LANGUAGE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Explanation of reference standards and Project Manual arrangement and language.

1.02 REFERENCES

- A. Construction Specifications Institute (CSI):
 - 1. Manual of Practice Document MP-2-1, MasterFormat™.
 - 2. Manual of Practice Document MP-2-2, SectionFormat[™].
 - 3. Manual of Practice Document MP-2-3, PageFormat[™].

1.03 PROJECT MANUAL ARRANGEMENT

- A. Document and Section numbers used in the Technical Provisions are in accordance with CSI Document MP-2-1, MasterFormat[™], except where departures have been deemed necessary.
- B. Sections are written in CSI SectionFormat[™] in accordance with CSI Document MP-2-2, Three-Part Section Format, except where departures have been deemed necessary.
- C. Page format for Sections in the Project Manual is in accordance with CSI Document MP-2-3, Page Format, except where departures have been deemed necessary.

1.04 PROJECT MANUAL LANGUAGE

- A. Specification Section Paragraphs entitled "Section Includes" summarizes briefly what is generally included in the section. Requirements of Contract Documents are not limited by "Section Includes" paragraphs. Specifications have been partially streamlined by intentionally omitting words and phrases, such as "the Contractor shall," "in conformity therewith," "shall be" following "as indicated," "a," "an," "the" and "all". Assume missing portions by inference.
- B. Phrase "by Engineer" modifies words such as "accepted," "directed," "selected," "inspected," and "permitted," when they are unmodified.
- C. Phrase "to Engineer" modifies words such as "submit," "report," and "satisfactory," when they are unmodified.
- D. Colons (:) are used to introduce a list of particulars, an appositive, amplification, or an illustrative quotation.

- 1. When used as an appositive after designation of product, colons are used in place of words "shall be."
- E. Word "provide" means to manufacture, fabricate, deliver, furnish, install, complete, assemble, erect in place, test, render ready for use or operation, including necessary related material, labor, appurtenances, services, and incidentals.
- F. Words "Contractor shall" are implied when direction is stated in imperative mood.
- G. Term "products" includes materials and equipment as specified in Section 01 60 00.

1.05 DIVISION OF SPECIFICATION SECTIONS

- A. The Technical Section of the Specifications, including the General Conditions and General Requirements, are arranged into the Construction Specifications Institute (CSI) fifty (50) Divisions - Section format. Each "Section" constitutes a unit of Work and related "Sections" are grouped under broad generic headings called Divisions.
- B. The organization of the Technical Sections of the Specifications into Division, Sections, and articles shall not control or limit the Contractor in dividing the Work among Subcontractors, a Sub-subcontractor, or to establish the extent of Work to be performed by any trade. The Contractor shall be solely responsible for all subcontract arrangements of Work regardless of the Specifications organization.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 20 00 PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Procedures for submitting applications for payment and means used as a basis for Progress Payments, including:
 - 1. Cost Summaries.
 - 2. Payment for Mobilization.
 - 3. Payment for Start-up and Demobilization.
 - 4. Partial Payments.
 - 5. Permits.
- B. Related Sections:
 - 1. Document 00 62 90 Escrow Agreement for Security Deposits in Lieu of Retention.
 - 2. Section 01 26 00 Payment for Changes and Extra Work.
 - 3. Section 01 26 57 Change Order Requests.
 - 4. Section 01 29 73 Schedule of Values.

1.02 BASIS FOR PROGRESS PAYMENTS

A. Base Application for Payment on the breakdown of costs for each activity identified in the Schedule of Values and the Percentage of Completion for each activity. Identify the cost of each activity, the estimated Percent Complete for each activity, and the Value of Work Completed for both the payment period and job to date.

1.03 PAYMENT REQUESTS

- A. Prepare progress payment requests on a monthly basis. Base requests on the Schedule of Values and the percentage of completion for each activity.
- B. Identify the cost for each activity identified in the Schedule of Values, the estimated percent complete for each activity, and the value of work completed for both the payment period and job to date.
- C. Submit progress payment requests at progress meetings.

1.04 PAYMENT FOR MOBILIZATION

- A. Limit amounts included under Mobilization to the following items:
 - 1. Moving on the site any equipment required for first month operations.

- 2. Stockpile management for City-furnished fill, if any.
- 3. Installing temporary construction power and wiring.
- 4. Developing construction water supply.
- 5. Providing field office trailers for the Contractor and the Engineer.
- 6. Providing on-site sanitary facilities and potable water facilities as specified.
- 7. Arranging for and erection of Contractor's work and storage yards.
- 8. Obtaining all required permits, licenses, and fees.
- 9. Developing construction schedule.
- 10. Providing and erecting the project signs.
- 11. Contractor and Subcontractor bonds and insurance.
- B. Furnish data and documentation to substantiate the amounts claimed under mobilization.
- C. Limit price for mobilization to no more than 5 percent of Contract Price.

1.05 PAYMENT FOR START-UP AND DEMOBILIZATION

- A. Start-up and Demobilization must total at least 3 percent of Contract Price.
- B. Limit amounts under Demobilization to the following items:
 - 1. Removing on the site any equipment.
 - 2. Removing temporary construction power and wiring.
 - 3. Removing field office trailers for the Contractor and the Engineer, complete with all specified furnishings and utility services including telephones.
 - 4. Removing on-site sanitary facilities and potable water facilities as specified.
 - 5. Closure and cleanup of the Contractor's work and storage yards.
 - 6. Removal of the temporary project signs.

1.06 PARTIAL PAYMENTS

- A. General
 - 1. The quantities listed in the bid schedule will not govern final payment. Payment to the Contractor will be made only for actual quantities of Contract items constructed in accordance with the Plans and Specifications. Upon completion of construction, if the actual quantities show either an increase or decrease from the quantities given in the Bid Form, the Contract Unit Prices will prevail subject to the provisions of Section 01 26 00 "Payment for Changes and Extra Work".
 - 2. The unit and lump sum prices to be paid shall be full compensation for the items of Work and all appurtenant work, including furnishing all materials, labor, equipment, tools, and incidentals.
 - 3. Payment will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected material not unloaded from

vehicles, material rejected after it has been placed, and material placed outside of the Plan limit lines. No compensation will be allowed for disposing of rejected or excess material.

- 4. Whenever any portion of the Work is performed by the City at the Contractor's request, the cost thereof shall be charged against the Contractor, and may be deducted from any amount due or becoming due from the City.
- 5. Whenever immediate action is required to prevent injury, death, or property damage, and precautions which are the Contractor's responsibility have not been taken and are not reasonably expected to be taken, the City may, after reasonable attempt to notify the Contractor, cause such precautions to be taken and shall charge the cost thereof against the Contractor, or may deduct such cost from any amount due or becoming due from the City. City action or inaction under such circumstances shall not be construed as relieving the Contractor or its Surety from liability.
- 6. Guarantee periods shall not be affected by any payment but shall commence on the date equipment or material is placed into service at the direction of the City. In the event such items are not placed into service, prior to partial or final acceptance of the project, the guarantee period will commence on the date of such acceptance.
- B. Partial Payments
 - 1. Unless otherwise prescribed by law, three (3) working days prior to the last work day of each month, or other such date mutually agreed upon by the Contractor and the Inspector, the Contractor shall prepare and submit to the Inspector, an estimate of the cumulative amount and value of acceptable work performed by the Contractor up to that date. Said amount may also include the value of all acceptable materials and equipment for the Contract that have been delivered and suitably stored but not yet used in the Work, subject to the discretion of the Engineer.
 - 2. Upon verification and approval by the Engineer, such estimate shall be processed by the Engineer in accordance with the provisions of the California Public Contracts Code.
- C. Partial Payments for Inclusion of Materials on Hand
 - Materials, as used herein, are those items that are fabricated and manufactured material and equipment. Only those materials for which Contractor can transfer clear title to Authority will be qualified for partial payment. Contractor may request payment of seventy-five (75) percent of the actual net cost of these materials. The request for partial payment will be subject to retention as provided elsewhere in the Contract Documents.
 - 2. To receive partial payment for materials and equipment not incorporated in the Work, it shall be necessary for Contractor to submit to the Construction Manager a list of such materials, at least seven (7) days prior to submitting the monthly estimate of amount earned for Work completed. At the Construction Manager's sole discretion, it will approve items for which partial payment is to be made subject to the following:

- a. Equipment and materials will only be eligible if given conditional or final acceptance by the Engineer and are in apparent compliance with favorably reviewed shop drawings.
- b. Only equipment or materials which have received favorable review of shop drawings will qualify.
- c. Eligible equipment or materials must be delivered and properly stored, protected, and maintained in a manner favorably reviewed by the Construction Manager, at the job site or at a bonded warehouse, which shall be acceptable to the Authority, in the vicinity of the Work.
- d. Contractor's actual net cost for the materials must be supported by paid invoices of suppliers, or other documentation requested by the Construction Manager.
- e. Materials or equipment delivered to the Site less than thirty (30) days prior to their scheduled incorporation in the Work shall not qualify.
- f. Final payment shall be made only for materials actually incorporated in the Work and, upon Acceptance of the Work, all materials remaining for which advance payments had been made shall revert to Contractor, unless otherwise agreed, and partial payments made for these items shall be deducted from the final payment for the Work.
- g. Partial payments for materials and equipment on hand shall not be deemed to be final payment for the material nor relieve Contractor of its obligations under the Contract.
- h. Partial payments for materials and equipment on hand shall be subject to retention in accordance with Section 01 20 20 1.06D.
- D. Retention
 - 1. The City will retain a portion of the amount otherwise due to the Contractor, as follows:
 - a. Retention of ten percent (10%) will be held on the original Contract value on each approved payment claim.
 - 2. Retention payments shall conform to the terms of Document 00 62 90.
- E. Additional deductions will be made from each monthly payment request for amounts due the Contractor as follows:
 - 1. Equipment or materials furnished by the City.
 - 2. Services rendered to the Contractor by the City.
 - 3. Amounts due the City for liquidated damages under the terms of the Contract.
 - 4. Amounts required to be deducted by federal, state, or local governmental authority or other provisions of these Contract Documents.
 - 5. Penalties or inspection costs due to the City.

- F. Procedure
 - 1. From the balance thus determined will be deducted the amount of all previous payments, and the remainder shall constitute the monthly payment due the Contractor. Within thirty (30) calendar days after receipt of the Engineer's recommendation of the monthly payment due the Contractor and subject to the deductions provided, herein, the City will pay the amount found due.
- G. The Contractor shall promptly submit the following in response to requests by the Engineer:
 - 1. All information and records necessary to determine the cost of the Work for purposes of estimating monthly payment.
 - 2. All itemized statements, in a form satisfactory to the Engineer, of the actual cost of all acceptable materials delivered by the Contractor to the site.
- H. Obligations
 - 1. The making of any payment to the Contractor shall not relieve the Contractor from its Contractual obligations. These payments shall not be construed as the transfer of ownership of any equipment or materials to the City.
- I. Ownership
 - Responsibility of ownership shall remain with the Contractor who shall be obligated to store, protect, repair, replace, rebuild or otherwise restore any fully or partially completed Work or structure for which payment has been made. The Contractor shall replace any materials or equipment required to be provided under the Contract which may be damaged, lost, stolen, or otherwise degraded in any way prior to final acceptance of the Work under the Contract.

END OF SECTION

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SECTION 01 26 00 PAYMENT FOR CHANGES AND EXTRA WORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Procedures for submitting applications for payment and means used as a basis for compensating Change Orders and Extra Work.
- B. Related Sections:
 - 1. Section 01 20 00 Payment Procedures.
 - 2. Section 01 26 30 Differing Site Conditions.
 - 3. Section 01 26 57 Change Order Requests.

1.02 REQUIREMENTS

- A. Payment to the Contractor, or credit to the City, for any change, addition, deletion or extra to the Work, or settlement of any claim, covered by any Change Order, shall be determined by the methods set forth herein. The Engineer may change the Plans and Specifications, character of the Work, or quantity of Work provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed twenty-five percent (25%) of the base Contract Value. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the Contractor and the City, which shall be executed by a Change Order.
- B. Unless otherwise stipulated, "Unit Prices" and "Stipulated Prices" include all costs necessary to furnish, install and complete the Work. The "Unit Prices" and "Stipulated Prices" include all direct costs for labor, equipment and materials, all insurance and bond costs, all field and office supervisors and assistants, all onsite project administration, security costs, the cost of small tools and consumables, incidental job burdens, and all general home office expenses and no separate allowance will be made therefor. Assistants to field and office supervisors include all clerical, stenographic, and general office help. Incidental job burdens include, but are not limited to, office equipment and supplies, temporary toilets, telephone, utilities, safety equipment, warning devices, personal protective equipment, and conformance to OSHA requirements. Project administration includes, but is not limited to, review and coordination, estimating, engineering, scheduling, and expediting relative to Change Orders, and updating and furnishing Record Drawings to incorporate changes, schedule update, supervision not applied solely to the Work of the Change Order, home office salaries and expenses.
- C. Unit Prices
 - 1. Unit prices stipulated in the bid or itemized in the approved Schedule of Values shall be utilized, where they are applicable and determined reasonable by the Engineer. In the event that the Change Order results in a change in the original

quantity or value of more than twenty-five percent (25%), either increase or decrease, then either the Engineer or the Contractor may request a review of the unit price to determine if a new unit price shall be mutually determined by negotiation. Any new unit price mutually determined under this subsection shall only apply to the units in excess of one hundred twenty five percent (125%) of the original quantity for overruns. In case of underruns, the unit price stipulated in the bid shall be applied to the first twenty-five percent (25%) of the actual quantity of Work performed and the new mutually determined price shall be applied to the quantity between twenty-five percent (25%) and seventy-five percent (75%) of the original quantity.

- 2. Renegotiated unit prices or unit prices for new items added to the Contract by Change Order shall be determined in accordance with subsections D through I. Whether stipulated in the bid, itemized in the approved Schedule of Values or renegotiated, the unit prices used for payment constitute the total adjustment with no further costs owed for overhead, impact, profit, delay or impact to unchanged portions of the Contract, or any other reason. The unit price shall be full and final compensation as described in subsection F.
- 3. The cost proposals for renegotiated unit prices shall be presented in accordance with the provisions of Subsections D through I. Should any bid item be deleted in its entirety, the amount bid for that bid item shall be subtracted from the total Contract amount. The Contractor shall be paid only for the actual cost incurred prior to the notification of such deletion for that bid item.
- D. Lump Sum
 - The Engineer and the Contractor may mutually determine a total sum for the changed or extra Work. The Contractor shall summarize the total cost and furnish a breakdown of the proposed lump sum costs satisfactory to the Engineer in accordance with Subsections D through I. Such lump sum costs shall be full and final compensation as described in Subsection F. A sample Cost Summary sheet is attached for convenience. The attached Cost Summary sheet(s) cannot be used to nullify or supersede any specification or contractual provision.
 - 2. If the method or amount of payment cannot be agreed prior to performing the changed or extra Work, the Engineer has the option to issue a Change Order directing the work be done on a time and materials basis with the Contractor providing all labor, equipment, and materials necessary to complete the Work in a satisfactory manner and within a reasonable period of time. Estimates for lump sum quotations and accounting for time and materials work shall be limited to direct expenditures necessitated specifically by the subject changed or extra Work, and shall be segregated as follows:
 - a. Labor, up to and including working general foremen, who are directly assigned to the changed or extra work. Employees identified as superintendents or are non-working general foremen shall not be charged as labor on changed or extra Work.
 - 1) The labor costs shall include actual documented payroll costs including wages, payroll taxes as established by law (i.e. FICA, Federal and State Unemployment Taxes), fringe benefits as established by negotiated labor agreements, and any insurance costs (such as Worker's Compensation

and General Liability Insurance but shall not include Automobile Liability Insurance or any other insurance costs).

- 2) A detailed breakdown of those subcomponents of labor costs, by all crafts shall be submitted to the Engineer, by the Contractor and all Subcontractors, for approval, as part of the documentation of labor costs, within ten (10) working days after issuance of the Notice to Proceed.
- 3) No other subcomponents of labor costs shall be considered, unless approved in writing by the Engineer.
- b. The labor cost is not allowed to be increased by using labor classifications with pay grades higher than necessary to accomplish the Work.
- 3. Materials: The cost of materials used in performing the changed or extra Work will be the cost, including sales tax and freight, to the purchaser, whether Contractor, Subcontractor or other forces, from the supplier thereof, except as follows:
 - a. Cash or trade discounts available to the purchaser shall be credited to the City notwithstanding the fact that such discounts may not have been taken by the Contractor.
 - b. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the Engineer. Supplier markup, except for actual costs incurred in the handling of such materials, will not be allowed.
 - c. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on contract items or the current wholesale price for such materials delivered to the jobsite, whichever price is lower.
 - d. If, in the opinion of the Engineer, the cost of materials is excessive, or the Contractor does not furnish satisfactory evidence of the cost of such materials, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned, delivered to the jobsite less cash or trade discount. The City reserves the right to furnish materials for the Work and no claim shall be made by the Contractor for costs and profit on such materials.
 - e. For the purposes of this Section, a "Supplier" is defined as any person or persons, firm or business, who supplies materials of construction and/or permanent equipment, but who does not perform any portion of the Work of the Contract on site for the Contractor, except that labor or labor supervision which may be required by some manufacturers as part of their equipment installation for warranty or other purposes.
- 4. Equipment Costs, including ownership, lease or rental costs, as well as operating costs, for individual equipment units whose replacement value is in excess of \$500: Transportation and set up costs shall be included, but only if the equipment is imported to the worksite solely to perform work on the changed or extra work described in the Change Order and the Contractor can demonstrate that the changed work cannot or could not be performed economically with equipment already at the site. Equipment costs shall be determined in accordance with the requirements set forth in Subsection I.

- 5. Small tools, equipment, consumables and incidental costs: No separate payment will be made for the use of small tools or equipment with a replacement value of \$500 or less. This applies to tools and equipment owned by the Contractor or its subcontractors of any tier. Also, no separate payment will be made for fuel, lubricants, tool or equipment repairs, tool or equipment maintenance, consumables, drinking water, sanitary facilities or other incidentals. These costs are already included as a part of Markup.
- 6. Subcontractor Costs, including their overhead and profit, provided that such costs are direct costs to the Contractor for performing the changed or extra Work as set forth in Subsections D through I.
- E. Time and Materials Work
 - The costs of all changed or extra Work submitted under the time and materials (T&M) method shall be formulated in accordance with the provisions of Subsections D through K. A sample Cost Summary sheet is attached for convenience. The attached Cost Summary sheet(s) cannot be used to nullify or supersede any specification or contractual provision.
 - 2. Unless otherwise stipulated on the Change Order, the "Not-to-Exceed" amount for all T&M Change Orders is \$25,000. The Contractor is responsible for tracking costs and for notifying the Engineer in writing when costs approach 50% and 75% of the "Not-to-Exceed" amount. In addition, if the changed or extra Work cannot be completed within the "Not-to-Exceed" limit, the Contractor shall notify the Engineer in writing, and in a timely manner, that the limit requires an increase. The City will only reimburse eligible costs up to the "Not-to-Exceed" amount and will not retroactively accept costs beyond this amount.
 - 3. The Contractor shall notify the Engineer at the beginning of each day when changed or extra work is being performed. The Contractor shall notify the Engineer of the changed or extra Work being performed and describe the personnel involved, whether by Contractor forces or by its subcontractors at any tier. Failure to notify the Engineer prior to the start of changed or extra Work serves as the Contractor's waiver to claim for compensation on that day.
 - 4. For each working day, the Contractor shall submit a "Daily Report of Time and Material Work", provided by the City, to the Engineer. The Engineer will only consider forms that are properly completed as described below:
 - a. Separate forms must be used for labor and for equipment/materials.
 - b. Labor, equipment, material or expenditures that are not included on the supplied form are ineligible for payment. There will be no exceptions to this requirement. It is the responsibility of the Contractor to include all items of labor, equipment, or material for which it requests compensation for each day's Work completed.
 - c. Information required on the labor form shall include name of personnel, personnel classification, and only the number of hours worked on changed or extra Work for the day being reported. Since the overhead allowance already includes all necessary supervision, any hours for additional supervision or non-working foremen are ineligible for additional payment. The general foreman rate is eligible for payment only during the time that a general foreman was required for the changed or extra Work.

- d. Information required on the Equipment/Material form shall include contractorowned equipment and/or tools, and rented equipment or tools for which compensation is requested. Information shall include the type of equipment, size of equipment, equipment identification number, appurtenances, and only the number of hours worked on the changed or extra Work.
- e. The only allowable materials are materials delivered to the job site and / or incorporated only into the changed or extra Work. The allowable materials shall be listed on the T&M sheet for the day that they are delivered to the job site and/or incorporated into the changed or extra Work.
- f. Delivery ticket(s) and/or bill(s) of lading for rental equipment and/or tools delivered to the site and/or material incorporated into the work for the day being reported must be attached with the T&M sheet for that day. No payment will be allowed for materials and/or rented equipment unless receipt(s) or bill(s) of lading are attached. If the request for payment is not substantiated by original vendor/supplier invoices, acceptable copies of original invoices, or other documentation acceptable to the Engineer, the City may establish the cost of the item(s) at the lowest possible wholesale price or rental rate applicable while the work was being performed.
- g. Failure to submit the required "Daily Report of Time and Material Work" by the close of the next working day shall waive all rights for that day unless otherwise approved by the Inspector. Work that cannot be substantiated by a "Daily Report" that is approved and signed by the Engineer is ineligible for payment.
- h. The Contractor is responsible for preparing the "Daily Report" for Work by its subcontractors and submitting the forms to the Engineer on time.
- i. The Contractor must have each "Daily Report" verified by the Engineer. After the "Daily Report" is approved by the Engineer, both the Contractor and Engineer sign the report. The original "Daily Report" is retained by the Engineer with a copy provided to the Contractor.
- j. When the "Daily Report" is signed by the Engineer and the Contractor, it is binding on the Contractor and its subcontractors.
- F. General
 - 1. Costs which shall not be paid in Change Orders under this Contract include, but are not limited to, interest costs of any type; claim preparation or filing costs; legal expenses; the costs of preparing or reviewing proposed Change Orders or Change Order proposals; lost revenue; lost profits; lost income or earnings; rescheduling costs; costs of idled equipment when such equipment is not at the site or has not yet been employed on the work; lost earnings or interest on unpaid retainage; claims consulting costs; and the costs of corporate officer or staff visiting the site; any compensation due to the fluctuation of foreign currency conversion or exchange rates; loss of other business; changes in taxes or increased tax rates of any kind or any costs identified as unallowable under the provisions of the Federal Acquisition Regulations.
 - 2. Extensions of time shall be based solely upon the effect of delays to the Work as a whole. Extensions of time shall not be granted for delays to the Work, unless the Contractor can clearly demonstrate, through analysis of the current updated

schedule, that the delay to the Work as a whole arose or will arise from causes other than normal weather, beyond the control and without fault or negligence of the Contractor, or any Subcontractor, at any tier, and that such delays did or will, in fact, delay the progress of the Work as a whole. The Contractor shall not be entitled to a time extension unless it submits a Time Impact Analysis which is a calculation of the extent of the delay to the end date of the Work and which shows that the Work has been or will be extended beyond the current Contract completion date.

- 3. The objective of a Time Impact Analysis is to pinpoint, isolate, and quantify all time impact associated with a specific issue and determine its time relationship to past or current delays. Time extensions shall not be allowed for delays to parts of the Work that are not on the critical path of the currently approved updated project schedule. Time extensions shall not be granted, nor delay damages of any kind whatsoever paid to the Contractor, until all available float, slack, or contingency time on the project is used and the end date of the Work is moved beyond the current, adjusted Contract completion date.
- 4. The cost summary, cost breakdowns and requests for cost reimbursement submitted by the Contractor (for delay, disruption, hindrance and interference associated with the changes, additions, deletions or extras) shall be itemized in a manner that, with mathematical certainty and without reliance upon probabilities or inferences, segregates the direct, actual reimbursable costs associated with each individual, change, addition, deletion, extra and (on an event-by-event basis) each individual delay or disruption event.
- 5. The daily rate for compensable delay indicted in the Bid Proposal Form shall be the total amount of Contractor entitlement for each day of compensable delay caused by the City during the performance of Work through Substantial Completion, and shall constitute payment in full for all delay costs, direct or indirect (including, without limitation, compensation for all extended home office overhead and field overhead), of the Contractor and all subcontractors, suppliers, persons and entities under or claiming through Contractor on the Project.
 - a. The number of days of compensable delay shown as a multiplier on the Bid Form is not an estimate of the number of days of compensable delay anticipated by the City.
 - b. The City will pay the daily rate of compensation only for the actual number of days of compensable delay (if any) as determined herein.
 - c. The actual number of days of compensable delay, if any, may be greater, lesser, or equal to the multiplier shown on the Bid Form.
- 6. Except for as described hereinbefore, the Contractor shall have no right to recovery of any compensation, costs, expenses or damages resulting from delay, disruption, interference, or hindrance in the performance of the Work including without limitation interruption of schedules, excess or extraordinary extended field and indirect overhead costs, loss of productivity and the impact, ripple or cumulative effect on other work.
- 7. Contractor waives any claim or rights and remedies based on abandonment, quantum merit, rescission or other similar legal theory by reason of any of the following circumstances, which the Contractor acknowledges and agrees are within the reasonable contemplation of the parties:
- a. Changes, additions, deletions and extras to the Work after execution of the Contract and issued from time to time throughout the period of construction, regardless of their scope, number, cumulative value, or complexity, to correct errors, omissions, conflicts, and ambiguities in the Contract Documents, or to implement discretionary changes to the scope of work requested by the City.
- b. The issuance and performance of changes, additions, deletions and extras in a manner that is not in sequence with the as-built or as-planned progress of the Work.
- c. Changes due to Differing Site Conditions.
- d. Suspensions of the work or parts thereof, or limitations on access to portions or all the Work, for the convenience of City or in the interests of the Project.
- e. Delay or disruption to the Work due to failure of the City, Engineer or Inspector to timely perform any contractual obligation.
- G. Markups Overhead and Profit
 - 1. In addition to the direct expenditures specified for labor, materials and equipment in Subsection D, a lump sum will be paid for all overhead and profit, including:
 - a. All insurance costs other than specifically mentioned in this Section,
 - b. all field and office supervisors and assistants,
 - c. all onsite project administration,
 - d. security costs,
 - e. the cost of small tools and consumables,
 - f. incidental job burdens, and
 - g. all general home office expenses,

and no separate allowance will be made therefor.

- 2. Assistants to field and office supervisors include all clerical, stenographic, and general office help. Incidental job burdens include, but is not limited to, office equipment and supplies, temporary toilets, telephone, utilities, safety equipment, warning devices, personal protective equipment, and conformance to OSHA requirements. Project administration includes, but is not limited to, review and coordination, estimating, engineering, scheduling, and expediting relative to Change Orders, and updating and furnishing Record Drawings to incorporate changes, schedule update, supervision not applied solely to the Work of the Change Order, home office salaries and expenses, Insurances, and Bonds.
- 3. Such lump sum shall conform to the following schedule of percentages of the total amount of direct expenditures of the Contractor and Subcontractors:

T&M Changed/ Extra Work - Direct Expenditures	Markup
Contractor direct labor	20%
Contractor direct materials, equipment, other items and expenditures	15%
Subcontractor (of any tier) direct labor	20%
Subcontractor (of any tier) direct materials, equipment, other items and expenditures	15%
Contractor administrative fee for subcontractors (of any tier) direct materials, equipment, other items and expenditures	5%
Lump Sum Changed/ Extra Work –Total Direct Contractor's Expenditures	Contractor's Markup
Contractor total direct expenditures up to and including \$50,000	16%
Contractor total direct expenditures greater than \$50,000 and up to and including \$100,000	13%
Contractor total direct expenditures greater than \$100,000	9%
Contractor administrative fee for subcontractors' (of any tier) direct materials, equipment, other items and expenditures	5%
Lump Sum Changed/ Extra Work –Total Direct Subcontractor's Expenditures	Subcontractor's Markup
Subcontractor total direct expenditures up to and including \$50,000	16%
Subcontractor total direct expenditures greater than \$50,000 and up to and including \$100,000	13%
Subcontractor total direct expenditures greater than \$100,000	9%
Subcontractor administrative fee for sub- subcontractors' (of any tier) direct materials, equipment, other items and expenditures	5%
Lump Sum Changed/ Extra Work –Total Direct Sub- subcontractor's Expenditures	Sub- subcontractor's Markup
Sub-subcontractor total direct expenditures up to and including \$50,000	16%
Sub-subcontractor total direct expenditures greater than \$50,000 and up to and including \$100,000	13%
Sub-subcontractor total direct expenditures greater than \$100,000	9%

- 4. Bonds and Insurance
 - a. An additional allowance of one percent (1%) of all direct costs (less markup) is allowed.
- 5. Add / Deduct Changes
 - a. The overhead rates determined above shall be applied to all additive Change Orders, except those utilizing as-bid unit prices or stipulated prices listed in the Bid Proposal.
 - b. Any change in the Work involving both extras and credits shall show a net total cost, including subcontracts. Allowances for overhead and profit to the net total cost, as specified herein above, shall be applied if the net total cost is an extra; overhead and profit allowances shall not be applied if the net total cost is a credit. The estimated cost of deductions shall be based on labor and material prices on the date the Contract was signed.
- H. City Furnished Materials, Equipment and Services
 - 1. The Engineer reserves the right to furnish materials, equipment and services deems expedient for use on the changed or extra Work. The Contractor shall have no claim for profit or overhead on the cost of such materials, equipment and services.
- I. Equipment Costs
 - The rates for rental or leased equipment shall not exceed the rates listed in the Rental Rate Blue Book (the "Blue Book") published by Primedia Information, Inc., San Jose, California, as adjusted to the regional area of the Work under this Contract. For T&M Change Orders, the rates are established by the actual paid invoice(s) that comply with the requirements of the subsections below. Owned equipment costs shall not exceed the rates listed in the Cost Reference Guide (the "CRG") for Construction Equipment, published by Primedia Information, Inc., San Jose, California. The most recent published edition in effect at the commencement of actual equipment use shall be used.
 - 2. The rates paid for any rented or leased equipment or tools shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidental costs associated with the operation of the equipment or tools.
 - 3. It is the responsibility of the Contractor to include any appurtenances added to equipment which would increase the basic rate for said equipment (i.e., hoe-ram, oversize bucket, etc.) as established in the acceptable rental rate guide. All equipment and / or tools shall be acceptable to the Inspector, in good working condition, suitable for the purpose for which it is to be used, and necessary to complete the changed or extra work. Payment will be based on the way the equipment was powered, operated and modified per the equipment manufacturer's recommendations.
 - 4. Rented or Leased Equipment

a. For equipment rented or leased (including lease with purchase option) in arm's length transactions from outside vendors, the Contractor shall be paid the actual invoiced, rented or leased rates provided that the invoiced lease or rental rates do not exceed the rates set forth in the Blue Book. Arm's length rental or lease transactions are those in which the firm involved in rental or lease of such equipment is not associated with, owned by, have common management, directorship, facilities, or stockholders with the firm renting the equipment. Submittal by a Contractor of a rental or leased invoice from the lessor will be prima facie proof of compliance with the above. However, such invoices are not conclusive proof; if questioned, the burden of proof remains with the Contractor. In no event shall the leased equipment rate billed to the City be at rates exceeding those prescribed in the following table:

Actual Usage (Change Order & Blue Book Contract Work Combined)	Payment Category
Less than 8 hours	Hourly Rate
8 or more hours but less than 7 days	Daily Rate
7 or more days but less than 30 days	Weekly Rate
30 calendar days or more	Monthly Rate

- b. When in Use:
 - Actual equipment use time documented by the Engineer shall be the basis that the equipment was utilized on the changed Work and paid for under the Change Order. In addition to the lease or rental rate, equipment-operating costs shall not exceed the estimated hourly operating rate as set forth in the Blue Book. The hours of operation shall be based upon actual equipment usage on the changed work as recorded by the Engineer. For multiple shift work sequences, the allowable equipment rate shall not exceed fifty percent (50%) of the base rate, for second or third shifts.
- c. When Idle:
 - Idle equipment is equipment on site and necessary to perform the Work under the change but not in actual use due solely to the impact of the changed work. Equipment operating costs due to idle time, documented by the Engineer, shall be paid at the rate determined above. Idle time shall include a reasonable time allowance to and from the project site.
- d. Payment for equipment or tools shall be limited to hours worked on the changed or extra Work if the equipment or tool is already on site for Work under the original Contract. No "standby" time will be paid for equipment already on site for Work under the original Contract.
- e. If equipment or tools are used intermittently and, when not in use, could be returned to the rental source at less expense than holding it at the Work site, it shall be returned, unless the Contractor elects to keep it at the Work site at no expense to the City.

- 5. Owned and Other Equipment
 - a. Equipment rates for owned equipment or equipment provided in other than arm's length transactions shall not exceed the total hourly costs as set forth in the Cost Reference Guide. Adjustments to the listed rates provided for under the section of the Cost Reference entitled "Cost and Production Formulas" shall not be allowed. Except as noted herein below, this equipment hourly rate plus the estimated operating cost per hour from the Cost Reference Guide will be paid for each hour the equipment performs the changed or extra Work. Daily records listing the equipment units and their respective operators, identification code. and actual usage on the Work under the Change Order, as certified at the end of each work day (or work shift if the Work is being performed in multiple work shift sequence) by the Inspector shall be the record upon which actual equipment use shall be based. For multiple shift work sequences, the allowable equipment rate shall not exceed the hourly depreciation and operating costs listed in the Cost Reference Guide for second or third shifts. It is agreed that this rate shall represent payment in full for all the Contractor's direct costs.
 - b. When Idle:
 - Payment for equipment necessary to be on the site to complete the Work, but not in actual use due solely to the impact of the changed Work, shall not exceed fifty percent (50%) of the hourly rates identified in the "Ownership" column under the heading "Hourly Operating and Overhaul Expenses" set forth in the Cost Reference Guide, provided that its presence and necessity on the site has been documented by the Inspector, and further provided that the equipment was idled solely by actions of the City.
 - 2) Idle equipment time will only be paid as a function of delays specifically directed or caused by the City's actions.
 - 3) In no event shall the idle time claimed in a day for a particular piece of equipment exceed the normal work schedule established for the Project usually eight (8) hours per day or forty eight (48) hours per week, and excluding Sundays, and holidays.
 - 4) For multiple shift work sequence, the allowable idle equipment rate shall not exceed fifty percent (50%) of the hourly depreciation costs listed in the Cost Reference Guide, for second or third shifts.
 - 5) It is agreed that this rate shall represent payment in full for all the Contractor's direct costs.
- 6. Equipment Haulage and Set Up Costs
 - a. Documented and actual equipment haulage and set up costs shall be paid for, if applicable, as set forth in Subsection D.4.
- 7. Other Equipment Cost Guides
 - a. In the event that a piece of equipment used on a Change Order is not listed in the Blue Book or the CRG, costs may be derived from a recognized equipment ownership guide, equipment dealers guide, or equipment rate guide as adjusted appropriately for the type of work and use and the regional area of the Work under this Contract.

- J. Records
 - At any time should the Contractor deviate substantially from the schedule, method and sequence of operation, equipment, cost or pricing data furnished by the Contractor and agreed to by the City in connection with the Change Order or should the City determine that any price negotiated in connection with the Change Order is defective due to such deviation or the fault of the Contractor, the City reserves the right to reduce the Change Order cost and reissue the Change Order at the amount in which the City determines to be the actual costs to complete the change.
 - 2. Whenever any material or process is indicated or specified by patent or a proprietary name, or by name of a manufacturer in the Change Order, such direction shall not relieve the Contractor's responsibility or obligation to perform work in accordance with the contract requirements. The Contractor shall be solely responsible for, and have control over construction means, methods, techniques, sequences and procedures, coordination of all portions of the Contract and Change Order Work.
 - 3. The Contractor shall on a weekly basis submit an approximate accounting of the amount expended on the Time and Materials Work to date and an estimate of the impact to the time of performance of Work.
- K. Partial Payments for Time and Materials Work.
 - Progress payments for Time and Materials Work shall only be made if the anticipated cost of the changed work is in excess of \$100,000 and/or the time to perform the changed work will exceed two (2) months duration. To receive payments for Time and Materials Work, the Contractor shall submit to the Engineer an invoice of the daily reports which were verified by the Inspector, with details and documents, verifying the Contractor's and subcontractor's actual costs incurred for the Time and Materials Work as set forth herein.
 - 2. Costs shall be submitted within thirty (30) calendar days after the T&M Work has been satisfactorily completed unless an extension of time for submittal is authorized in writing by the Inspector.
- L. Changes in Work that Extend the Contract Time
 - 1. If a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct labor, equipment, and material costs, provided Contractor demonstrates such additional costs:
 - a. Are incurred performing the Work.
 - b. Are not compensated by the Markups described in Paragraph 1.02G.
 - c. Directly result from the extended Contract Time.
 - 2. Contractor shall make such requests and provide such documentation following the procedures, documentation, and time requirements specified herein, subject to Contract limitations of liability.
 - 3. Contractor may not seek or recover such costs using formulas (e.g. Eichleay).

END OF SECTION

SECTION 01 26 30 DIFFERING SITE CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section defines "Differing Site Conditions" and establishes policies and procedures for the resolution of differing site conditions.
- B. Related Sections:
 - 1. Section 01 26 00 Payment for Changes and Extra Work.
 - 2. Section 01 26 57 Change Order Requests.

1.02 DEFINITION

- A. During construction, the Contractor may encounter existing utilities, structures, etc. that are not shown on the Plans or are not specified, and which may interfere with or may impact construction activities. In the event of this occurrence, pursuant to Public Contract Code Section 7104, Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing, or any:
 - Material that Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.
 - 2. Subsurface or latent physical conditions at the Site differ from those indicated in the Contract Documents.
 - 3. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in the Contract.
- B. The Engineer shall promptly, investigate the conditions, and if it finds that the conditions do materially differ, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, Engineer shall cause to be issued a change order under the procedures provided in Section 012600 Payment for Changes and Extra Work. The Engineer may also direct the Contractor to proceed with necessary exploratory or corrective work to alleviate the situation. Costs shall be calculated in accordance with Section 01 26 00 "Payment for Changes and Extra Work" subsection "Cost Reimbursement (Time and Materials Work)".
- C. If the total cost of the Work directed under the "Differing Site Condition" clause is different from the amount set forth in the Bid Form, the Contract Price shall be adjusted by a Change Order. The adjustment shall be the difference between the total actual cost and the amount included in the bid, as either an additional amount due the Contractor or as a credit to the City, as appropriate.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 26 46 CONSTRUCTION INCENTIVE CHANGE PROPOSALS

PART 1 GENERAL

1.01 SUMMARY

- A. This Article defines a "Construction Incentive Change Proposal" (CICP) and establishes policies and procedures for the application of CICPs.
- B. Related Sections:
 - 1. Section 01 26 57 Change Order Requests.

1.02 **DEFINITION**

- A. A CICP is a formally written proposal for a Change Order during the construction of this Project. A CICP shall be initiated, fully designed and developed, and identified as such by the Contractor. A CICP must result in a net capital savings of twenty-five-thousand dollars (\$25,000) or more. However, if, in the sole judgment of the Engineer, a disproportionate amount of the net capital savings is offset due to the City's development and implementation costs, the Engineer will decline to approve and pursue the CICP.
- B. Net capital savings are defined as the total savings proposed by the Contractor, and accepted by the Engineer, less the City's added development and implementation costs. The Contractor's development and implementation costs accepted or rejected, shall be borne solely by the Contractor and shall not be included in the calculation of savings herein.
- C. A CICP must result in a net capital saving while causing no increase in the total life cycle cost of the Project and must also meet the following conditions.
 - 1. The required quality, function, reliability, and safety of the Project shall be maintained.
 - 2. There shall be no impact to cost or increase in difficulty of the facility/system operation and maintenance.
 - 3. The proposed change will not result in any Contract re-bidding.
 - 4. The proposed change shall not be solely based on a reduction in end item quantities. Reductions in specified end item quantities or quantities necessary to complete the Work as specified or shown shall not be considered CICP's and shall be addressed as deductive Change Orders.
 - 5. The proposed change shall not be solely based on a change in material quality. Reductions in specified material quality shall not be considered CICP's and shall be addressed as deductive Change Orders.
 - 6. The proposed change shall not cause undue interruption of the work of the Contract.

- 7. The proposed change shall be in full compliance with all applicable codes, permits, and regulations.
- 8. The proposed change shall not result in a substitution of material or equipment only.

1.03 CONTENT

- A. A CICP shall contain all pertinent information and supporting documentation for evaluation by the Engineer. As a minimum, the following information shall be included.
 - 1. Name(s) of the individual(s) associated with the development and preparation of the CICP.
 - 2. A detailed description with duly signed Plans and Specifications of the present design and the proposed change(s).
 - 3. A written discussion and clear identification of all advantages and disadvantages for each change proposed.
 - 4. A detailed design, procedure, and schedule for implementing the proposed change. This shall include all necessary plans, sketches, drawings, design calculations, etc. (stamped by a California Registered Professional Engineer, as applicable) and the latest date the CICP must be approved for implementation without any impact to the construction progress. Such submittal shall be provided to the Engineer no later than forty-five (45) calendar days prior to the proposed date of implementation.
 - 5. A summary of the estimated costs shall include the following:
 - 6. Construction costs before and after the CICP for the proposed change. This shall be a detailed estimate identifying the following items for each trade involved in the CICP including:
 - 7. Quantities of materials and equipment
 - 8. Unit prices of materials and equipment
 - 9. Labor hours and rates for installation
 - 10. Subcontractor and Contractor mark-ups.
 - 11. If applicable, operation and maintenance costs before and after the CICP.
 - 12. Contractor's share of the savings based on the paragraph entitled "Sharing Provisions" contained herein.
 - 13. Time required for executing the proposed change.
 - 14. Prices for items or products shown or specified shall form the basis for cost comparison for alternatives or equals that the Contractor may choose to employ under a CICP.
 - 15. The Contractor may not restrict the City's use of any CICP or the supporting data submitted.

1.04 SHARING PROVISIONS

- A. Sharing of Net Capital Savings
 - 1. Upon acceptance of a CICP, the Contractor shall share the net capital savings based on the Sharing Formula below.
 - 2. Net Capital Savings = (Initial Construction Costs Revised Construction Costs) (City CICP Implementation Costs)
 - 3. The Contractor's CICP development costs shall not be included in this formula. The Contractor shall bear such costs exclusively.
 - 4. Sharing Formula
 - 5. When the total cumulative net savings based on the formula set forth above is one hundred thousand dollars (\$100,000) or less, the Contractor shall receive fifty percent (50%) of the savings.
 - 6. When the total cumulative net savings based on the formula set forth above exceeds one hundred thousand dollars (\$100,000) the Contractor's share will be computed based on the following formula:

$$y = .2x + $30,000$$

where:

- y = Contractor's share in dollars
- x = Total net savings in dollars

For example, if the total net savings is \$1,200,000

y = .2(\$1,200,000) + \$30,000 = \$270,000

1.05 GENERAL PROVISIONS

- A. Any CICP may be accepted, in whole or in part, by the Engineer's issuance of a Change Order to this Contract citing this Section and referencing the Contractor's CICP. Until a Notice-To-Proceed is issued, or a Change Order applies a CICP to this Contract, the Contractor shall perform in strict accordance with the existing Contract requirements.
- B. If the CICP is not accepted, the Engineer shall notify the Contractor, in writing, setting forth the reasons for rejection.
- C. The Engineer's decision to accept or reject all or a part of any CICP shall be final and conclusive of the matter and shall not be subject to appeal, claims or protests.
- D. In recognition of the fact that the Contractor is the originator and the designer of all CICP's, the Contractor shall be responsible for the installation, implementation, and performance of any CICP and shall guaranty and warranty the CICP in accordance with the provisions of Section 01 61 00, Warranties and Guarantees.

E. The Contractor shall indemnify the Engineer and its agents from claims or damages arising directly or indirectly out of any CICP in accordance with the indemnification provisions of this Contract. The Contractor shall be solely responsible for any and all impacts (both time and costs) and delays arising either directly or indirectly out of the implementation of any CICP.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 26 57 CHANGE ORDER REQUESTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Procedures for submitting change order requests for payment and means used as a basis for Progress Payments, for necessary Work items not part of the Contract Documents including:
 - 1. Unforeseeable project conditions.
 - 2. Changed project conditions.
 - 3. Change orders requested by City.
 - 4. Where direction provided by Contract Documents is not sufficiently clear, in the opinion of the Engineer, for the prosecution of the Work.
- B. Related Sections:
 - 1. Section 01 20 00 Payment Procedures.
 - 2. Section 01 26 00 Payment for Changes and Extra Work.
 - 3. Section 01 26 30 Differing Site Conditions.
 - 4. Section 01 26 46 Construction Incentive Change Proposal.
 - 5. Section 01 29 73 Schedule of Values.

1.02 REQUIREMENTS

- A. All quotations for preliminary change orders for extras, changes, additions, or deletions to the Work as described in Section 01254 "Payment for Changes and Extra Work" shall be submitted to the Engineer, in writing, on the Change Order Cost Quotation Form provided by the Engineer, and in conformance with the requirements of Section 01 26 00 "Payment for Changes and Extra Work". (See Attachments 01 26 57-A1 and 01 26 57-A2.) The quotation shall be firm for a period of not less than sixty (60) calendar days from the date of receipt of the quotation by the Engineer.
 - 1. The Contractor shall submit its written cost quotation and Time Impact Analysis not later than fifteen (15) days after being requested to provide such quotation, unless the Engineer allows more time.
 - 2. Delays in submitting quotations beyond the fifteen (15) days set forth herein, which cause a delay in the issuance of a Change Order or a delay to the completion date of the project, shall not be cause for a claim or a time extension under the Contract.
- B. The Engineer's request for quotation on a preliminary change shall not be considered authorization to proceed with the changed Work prior to the issuance of a final Change Order, unless directed otherwise, in writing, by the Engineer, nor shall

such request constitute justification for a delay to the existing work or a time extension under the Contract.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SEE ATTACHMENTS

ATTACHMENTS TO SECTION 01 26 57

Attachments to General Requirements Section 01 26 57 consists of two (2) documents, as follows:

ATTACHMENT NUMBER	TITLE OF ATTACHMENT	NUMBER OF PAGES IN THIS ATTACHMENT
01251-A1	Change Order Cost Quotation Form Estimate Summary for <u>Prime</u> Contractor Total Costs	2
01251-A2	Change Order Cost Quotation Form Estimate Summary for <u>Subcontractor</u> Total Costs	2

Change Order Cost Quotation Form Estimate Summary for <u>Prime</u> Contractor Total Costs

W.O	_C.O	CONTRACT #	ESTIMATOR	
DATE/	_/			
	1) LABOR	PER GR. 01 26 00 Journeyman	Supervision \$ IHMH	
	2) MATER Includ	IALS (and Other Taxables) ing Sales Tax	\$	
	3) EQUIPI Blue B	/IENT (Rented, Leased, and/or OV ook and/or CRG, including Sales	VNED) \$ Tax if applicable	
SUBTOTAL	(A)	1) + 2) + 3)		\$
	4) G and A Show	OH per General Requirements 0 calculations on separate sheet	1 26 00 \$	
SUBTOTAL	(B)	(A) + 4)		\$
	5) PROFII Per G	% x Line (B) eneral Requirements 01 26 00	\$	
SUBTOTAL	(C)	(B) + 5)		\$
	6) SUBCC	NTRACTS (All Subcontractors)	\$	
	7) FIXED I Per Ger	FEE FOR ALL SUBS 6% neral Requirements 01 26 00	\$	
SUBTOTAL	(D)	(C + 6) + 7)		\$
	8) FIELD \$ Exclud	OFFICE OVERHEAD: XDAYS e if not required	\$	
	9) SCHEI Exclue	DULING COSTS (\$200 Max.) de if not required	\$	
SUBTOTAL	(E)	(D) + 8) + 9)		\$
	10) IMPAC Shov	CT COST, per GR 01 26 00 v calculations on separate sheet	\$	
GRAND TOTAL		(E) +10)		\$

	Estimate outlinary for <u>outcontractor</u> for	00313	
W.O	C.O CONTRACT # ESTIMAT	OR	
DATE/	_/		
	1) LABOR PER GR. 01 26 00 Journeyman Supervision MH MH	\$	
	2) MATERIALS (and Other Taxables) Including Sales Tax	\$	-
	 EQUIPMENT (Rented, Leased, and/or OWNED) Blue Book and/or CRG, including Sales Tax if applicable 	\$	
SUBTOTAL	(A) 1) + 2) + 3)		\$
	4) G and A OH per General Requirements 01 26 00 Show calculations on separate sheet	\$	
SUBTOTAL	(B) (A) + 4)		\$
	5) PROFIT% x Line (B) Per General Requirements 01 26 00	\$	
SUBTOTAL	(C) (B) + 5)		\$
	6) SUBCONTRACTS (ALL SUB-SUBS)	\$	
	7) FIXED FEE FOR ALL SUB-SUBS 6% Per General Requirements 01 26 00	\$	
SUBTOTAL	(D)(C + 6) + 7)		\$
	8) FIELD OFFICE OVERHEAD: \$XDAYS Exclude if not required	\$	
SUBTOTAL	(E) (D) + 8)		\$
	9) IMPACT COST, per GR 01 26 00 Show calculations on separate sheet	\$	
GRAND TOTAL	FOR SUBCONTRACTOR (E) + 9) To line 6) of Prime Contractor's Summary		\$

Change Order Cost Quotation Form Estimate Summary for <u>Subcontractor</u> Total Costs

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SECTION 01 29 73 SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Requirements for preparation and submittal of Schedule of Values.

1.02 PREPARATION

A. Assign prices to major items of Work that aggregate to the Contract Price. Base prices on costs associated with scheduled activities based on the Project Schedule for each major item of Work.

1.03 SUBMITTALS

- A. Submit preliminary Schedule of Values upon receipt of Notice to Proceed from the City.
- B. Submit corrected schedule of values within 10 days upon receipt of reviewed Schedule of Values, but no later than 10 days prior to anticipated submittal of first Application for Payment.
- C. Upon request, support prices with data that will substantiate their correctness.
- D. If activities are added or removed from the Progress Schedule revise the Schedule of Values and resubmit.

1.04 REQUIREMENTS

- A. The Schedule of Values shall be used as a basis for determining progress payments on a lump sum contract or any designated lump sum bid item. The Schedule of Values shall be a schedule of cost loaded construction activities equal, in total, to the lump sum bid and shall be in such form and sufficient detail to correctly represent a reasonable apportionment of the lump sum. Prior to submitting an invoice for payment, the Contractor shall have submitted a detailed Schedule of Values and obtained approval from the Engineer.
- B. Each lump sum bid item set forth in the Bid Form must be broken down separately. The breakdown of each lump sum bid item must cover the cost of construction required by the Plans and Specifications for that item. The sum of the values for the construction activities, within a bid item, must equal the total bid amount for that item. The breakdown shall include subcontract amounts which shall not deviate from the amounts submitted in the Bid Form. The Contractor shall provide certification from the subcontractors certifying the subcontract amounts.

C. Each activity in the Schedule of Values shall delineate one construction activity. The costing for each activity should include all costs for the labor and materials or equipment required to complete the activity. The Contract Price breakdown shall include the itemized costs for the plant establishment and any maintenance services to be performed before the final project acceptance is made.

1.05 DESCRIPTION OF BID ITEMS

- A. The bid items are presented to indicate major categories of the Work for purposes of comparative bid analyses, and a preliminary breakdown for monthly progress payments. Bid items are not intended to be exclusive descriptions of Work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item as included in the Schedule of Values.
- B. Contractor shall perform all Work depicted in the Contract Documents whether it is specifically mentioned in the Bid Schedule and bid item descriptions or not. The Bid Schedule and the Bid Item Descriptions below are intended to cover all Work depicted in the Contract Documents. Not all elements of every part of the work are explicitly listed. It is the intention of City and a provision of this Contract, that all the Work depicted shall be included in Contractor's Bid and installed complete at a price included in a bid item submitted with Contractor's bid. No adjustments will be made to unit, extended, or total prices for an item that is depicted in the contract documents but is not specifically described or itemized. Such items may be included for payment in a bid item of the Contractor's choice, if the chosen Bid item is closely related.
- C. Lump sum bid item descriptions are listed herein for general information. The Schedule of Bid Prices is provided with Document 00 41 13.
 - 1. Mobilization

This bid item shall constitute full compensation for preparatory Work and operations, including but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project sites; for the establishment of all field offices, storage areas and fencing, and all other temporary facilities necessary for Work on the Project; and for the removal of all such items and facilities at the completion of construction. Ten percent of this bid item will be reserved and paid at the job close when the Contractor has completed all operations and removed all temporary facilities from the Work sites. This bid item will be paid in accordance with Section 00 72 00 and Section 01 20 00 of these Contract Documents.

2. Bonds and Insurance

This bid item includes all costs for the performance bond, payment bond, and required insurance. It will be paid as a lump sum after the City receives satisfactory bond and insurance forms.

3. Pedestrian and Traffic Control

This bid item includes all Work necessary to prepare, implement, and maintain a pedestrian and traffic control plan, including the Bay Trail detour as shown on the Plans. It will be paid on a monthly prorated basis beginning in the month when the first traffic control measures are installed. Ten percent of this bid item will be reserved and paid at the job close when the Contractor has completed all Work requiring pedestrian and traffic control and removed all control devices from the Work sites.

4. Work Planning and Submittals

This bid item includes all work to prepare various Work plans and submittals required by the Contract Documents prior to beginning physical Work on site, including but not limited to construction schedules, Storm Water Pollution Prevention Plan (SWPPP), site specific Work plans, utility protection plan, environmental protection submittals, shoring plan, stockpile management and dewatering plans, temporary flood protection plan, contaminated material handling plan, erosion control plans and any other special plans in conformance with the applicable permits; and any other plans or submittals not covered in other bid items. Up to 90 percent of this bid item will be paid to the Contractor upon acceptance of all required pre-construction plans and submittals; the remaining cost of this bid item will be paid to the Contractor at the close of construction.

5. Erosion Control and SWPP Measures

This bid item includes all Work necessary to prepare, implement, and maintain the erosion control and storm water pollution prevention measures planned by the Contractor, as shown on the Plans, and specified herein. It will be paid on a monthly prorated basis beginning in the month when the storm water pollution prevention and erosion control measures are installed. Ten percent of this bid item will be reserved and paid at the job close when the Contractor has completed all Work requiring storm water pollution prevention and erosion control and removed all control devices from the Work sites.

6. Temporary Shoring and Excavation Protection

This bid item includes all Work necessary to comply with OSHA, CalOSHA, and California Labor Code Section 6707 Construction Safety Orders including the preparation of an excavation safety plan. Payment for sheeting, shoring, and bracing will be bid as a separate bid item whenever excavation of any kind is included in the project. Measurement for this item will be equal to the percentage of grading and excavation completed as specified herein and as estimated by the Engineer. This price shall constitute full compensation for completion of all planning, design, engineering fees, furnishing and construction, and removal and disposal of such temporary sheeting, shoring and bracing as a lump-sum item, complete, as required under the provisions of any permits, and in accordance with the requirements of OSHA and the provisions of Section 6707 of the California Labor Code.

7. Coffer Dams and Dewatering

This bid item shall constitute full compensation for the design, installation, and removal of temporary cofferdams needed to protect the Work sites from San Francisco Bay tide and other waters. This bid item provides full compensation for the preparation of a water management plan; the installation of surface or subsurface drains, dewatering pumps, and discharge piping; pump operation; and pollution prevention. This bid item also includes compliance with applicable regulatory permits.

8. Site Preparation, Clearing and Demolition

This bid item shall constitute full compensation for site preparation including but not limited to: clearing, grubbing and stripping on-site as necessary to remove all interfering or objectionable material from Work areas within which excavation and grading are to be conducted, or storage of excavated materials or fill is to be made.

9. Sheet Pile Flood Walls with Concrete Cap (Control Line 1 Station 49+25 to Control Line 1 Station 98+25)

This bid item shall constitute full payment for furnishing and installing steel sheet piling of the sections shown on the Plans, as specified herein, driven in the locations indicated to the final elevations shown on the Plans. This bid item includes all equipment, transportation, labor and materials necessary for sheet pile installation to the final configuration shown on the Plans. This bid item includes the concrete cap constructed along the sheet pile flood walls, to the lines and grades shown on the Plans, and as specified herein. This bid item includes form work, reinforcement, cast-inplace concrete, finishing, and all other materials, equipment, transportation and labor necessary for the construction of the concrete sheet pile flood wall cap in the locations indicated.

10. Sheet Pile Flood Walls with Concrete Cap (Control Line 1 Station 102+59 to Control Line 1 Station 188+00)

This bid item shall be identical to Bid Item No. 9, but for the locations so indicated.

11. Sheet Pile Flood Walls with Concrete Cap (Control Line 1 Station 202+21 to Control Line 1 Station 228+42)

This bid item shall be identical to Bid Item No. 9, but for the locations so indicated.

12. Sheet Pile Flood Walls with Concrete Cap (Control Line 1 Station 252+58 to Control Line 1 Station 306+13)

This bid item shall be identical to Bid Item No. 9, but for the locations so indicated.

13. Sheet Pile Flood Walls with Concrete Cap (Control Line 1 Station 331+21 to Control Line 1 Station 342+91)

This bid item shall be identical to Bid Item No. 9, but for the locations so indicated.

14. Corrosion Protection Stations

This bid item shall constitute full payment to furnish and install corrosion protection stations as shown and detailed on the Plans, and as specified herein. This bid item includes conduits, probes, test stations, fittings and hardware for complete test station assemblies.

15. Concrete Flood Walls (Control Line 1 Station 9+29 to Control Line 1 Station 14+23)

The price bid for this item shall constitute full payment for concrete walls identified by the term "Floodwall" or "FW" on the Plans; complete, to the lines and grades shown on the Plans; as specified herein; and within the Plan limits indicated. This bid item includes excavation, subgrade preparation, form work, reinforcement, cast-in-place concrete, structural backfill and all other materials, equipment, transportation and labor necessary for the construction of concrete flood walls.

16. Concrete Flood Walls (Control Line 1 Station 44+18 to Control Line 1 Station 102+59)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

 Concrete Flood Walls (Control Line 1 Station 102+59 to Control Line 1 Station 188+00)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

 Concrete Flood Walls (Control Line 1 Station 202+21 to Control Line 1 Station 228+42)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

 Concrete Flood Walls (Control Line 1 Station 252+28 to Control Line 1 Station 306+13)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

20. Concrete Flood Walls (Control Line 1 Station 306+23 to Control Line 1 Station 331+09)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

 Concrete Flood Walls (Control Line 1 Station 331+27 to Control Line 1 Station 342+91)

This bid item shall be identical to Bid Item No. 15, but within the Plan limits so indicated.

22. Public Shoreline Access Ramps, Stairs, Paths, and Associated Structures and Recreational Spaces

The price bid for this item shall be full compensation for site preparation, excavation, backfill and all materials, labor, and equipment to construct access ramps, stairs, paths, and their associated structures including floodwalls and retaining walls, that allow access from the Bay Trail to the public shoreline as shown on the Plans. The items of Work included hereunder include, but are not limited to:

Access Type	Control Line 1 Station
Boat Launch Ramp	37+06
Ramp	38+91
Path	44+83
Stairs	49+25
Ramp and Viewing Platform	56+96
Stairs and Viewing Platform	63+10
Ramp	69+91
Stairs and Viewing Platform	82+81
Stairs and Viewing Platform	94+04
Path	98+25
Stairs	104+00
Ramp and Viewing Platform	111+13
Viewing Platform	153+28
Stairs and Viewing Platform	168+70

The price bid for this item shall also be full compensation for the shoreline recreational area located between Control Line1 Station 136+00 and Control Line 1 Station 140+00, including floodwalls, paths, stairs, ramps, finish surfaces, and pre-engineered shade structures.

23. Compacted Earthen Backfill and Levee Fill

The price bid for this item is full compensation for the preparation to place earthen backfill or fill, including levee fill, and compaction of said earthen backfill or levee fill to final grades as shown on the Plans wherever occurring, and as specified herein. The final payment quantity for this item shall not exceed the limits of excavation or fill shown on the plans unless the Contractor is specifically directed by the Engineer in writing to place additional earthen backfill, fill, or levee fill.

24. Rock Slope Protection

The price bid for this item is full compensation for all labor and materials to furnish and place new rock slope protection as shown on the Plans or as necessary for a complete installation as directed in the field. The removal and/or stockpiling of existing rock slope protection to facilitate construction and grading activities shall be paid as part of Clearing and Demolition. The replacement of existing rock slope protection so moved and stockpiled after grading or construction is complete shall be paid for as part of Paving and Site Restoration.

25. Miscellaneous Concrete Walls and Structures not in Other Bid Items

The price bid for this item shall constitute full payment for concrete walls and other structures that are not identified as floodwalls on the Plans or are associated with public shoreline access or Bay Trail access; complete, to the lines and grades shown on the Plans; and as specified herein. This bid item includes excavation, subgrade preparation, form work, reinforcement, cast-in-place concrete, structural backfill and all other materials, equipment, transportation and labor necessary for the construction of concrete walls and structures.

26. Flood Break Structures

The price bid for this item shall constitute full payment for furnishing and installing operating flood break structures as shown and detailed on the Plans and specified herein. This bid item includes excavation, subgrade preparation, structural concrete work, installation of the fabricated flood break system and in-place field testing to demonstrate operation.

27. Mechanically Stabilized Earth Walls

This bid item shall constitute full payment for mechanically stabilized earth walls, complete, to the lines and grades shown on the Plans, and as specified herein. This bid item includes excavation, subgrade preparation, form work, reinforcement, precast concrete block fascia and caps, geogrid earth reinforcement, structural backfill, drainage systems, and all other materials, equipment, transportation and labor necessary for the construction of mechanically stabilized earth retaining walls.

28. Lightweight Concrete Fill

The price bid for this item is full compensation for the preparation to place fill, formwork, geotextiles and fabrics, placement of lightweight concrete fill of the specified classes, and compaction of lightweight fill to final lines and grades shown on the plans and as specified herein. The final payment quantity for this item shall not exceed the limits of excavation or fill shown on the plans unless the Contractor is specifically directed by the Engineer in writing to place additional lightweight concrete fill of any class.

29. Bay Trail Access Ramps, Stairs, Paths, and Associated Structures

The price bid for this item shall be full compensation for site preparation, excavation, backfill and all materials, labor, and equipment to construct access ramps, stairs, paths, and their associated structures including floodwalls and retaining walls, that allow access to the Bay Trail as shown on the Plans. The items of Work included hereunder include, but are not limited to:

Access Type	Control Line 1 Station
Emergency Ingress/Egress Ramp	45-90
Ramp	64+00
Ramp	94+00
Ramp and Stairs	112+40
Stairs	122+65
Ramps and Stairs	130+70
Stairs	144+76
Ramp and Stairs	153+28
Ramp and Stairs	164+96
Stairs	178+85
Misc. Ramps, Stairs, and Paths	200+00 to 342+00

30. Interior Landscaping

The price bid for this item includes soil treatment, broadcast seeding, plug planting, to complete planting on the inboard side of the identified floodwalls shown on the Plans, and as specified herein.

31. Mitigation Planting

The price bid for this item includes soil treatment, broadcast seeding, plug planting, and all work needed to complete planting on the outboard side of the identified floodwalls shown on the Plans, and as specified herein.

32. Irrigation Systems

The price bid for this item includes points of connection to the City water main, irrigation systems and all appurtenances as shown on the Plans and specified herein.

33. Utility Relocation and Reconstruction

The price bid for this item includes the relocation of City-owned utilities as shown on the Plans, including storm drain systems and the emergency water system connection. 34. Precast Decorative Panels

The price bid for precast decorative panels shall include furnishing and installing precast decorative panels, complete in place, at the locations shown on the Plans, and as specified herein.

35. Asphalt Concrete Trail Paving and Trail Markings

The price bid for paving the reconfigured Bay Trail and other asphaltic concrete paths shown on the Plans includes aggregate base, asphaltic concrete pavement and trail markings as shown on the Plans and specified herein.

36. Trail Shoulders

The price bid for decomposed granite paving of the reconfigured Bay Trail shoulders and adjacent areas includes aggregate base and decomposed granite paving as shown on the Plans and specified herein.

37. Design-Build Vehicular Bridges

This bid item includes designing, furnishing, and placing two bridges rated for vehicular load at Control Line 1 Station 306+03 and Control Line 1 Station 331+15, as generally shown on the Plans, and as specified herein. The scope of work includes each bridge in its entirety including earthwork and concrete work for the deep foundations, abutments, and bridge deck. Guardrails, paving markings, and other appurtenances, if shown on the Plans, shall be paid for under those respective bid items.

38. Design-Build Pedestrian Bridge

This bid item includes designing, furnishing, and placing the replacement pedestrian bridge at Control Line 1 Station 85+70, as generally shown on the Plans, and as specified herein. The scope of work includes the bridge in its entirety including earthwork and concrete work for the deep foundations and abutments, and a pre-engineered bridge superstructure and deck.

39. Guardrails and Handrails

The price bid for this item shall be full compensation for furnishing and installing guardrail and handrails per the Plan Guardrail Schedule and as specified herein including posts, railings, hardware, and attachment to improvements as detailed on the Plans.

40. Directive Signs and Wayfinding Elements

This bid item includes furnishing and installing the full schedule of directive signs and wayfinding elements shown on the Plans as specified herein. This bid item shall also include associated grading activities, anchorage and other work required.

41. Outdoor Furniture and Recreational Elements

This bid item includes furnishing and installing the full schedule of furniture and recreational elements shown on the Plans as specified herein. This bid item shall also include associated grading, excavation, and backfill activities, reinforced concrete slabs on grade, anchorage and other work required for fully operational amenities.

42. Streetlight Replacement

The price bid for this item includes furnishing and installing replacement streetlights (electroliers) as shown on the Plans and specified herein. Work paid under this bid item includes each electrolier, their foundations (excavation, form work, reinforcement and concrete placement), and Work necessary to reconnect streetlights to the existing electrical system.

43. Restoration of Beach Park Boulevard

This bid item includes full compensation for removing all temporary barricades and striping from Beach Park Boulevard, within the detour limits indicated on the Plans, and repaying and restriping these limits of Beach Park Boulevard, as shown on the Plans.

44. Restoration of Improvements Damaged during Construction

This bid item includes full compensation for repairing all improvements not shown as being demolished on the Plans, to their existing condition or better. Such improvements could be within the Project Work sites, along a haul route, or elsewhere.

45. Plant Maintenance

This bid item includes the maintenance of all planted areas from plant material installation through Final Completion. Escrow in lieu of retention shall be provided for the one-year period of plant maintenance that commences at Final Completion, and include the plant material guarantee.

46. All Work of Contract Documents other than Work Separately Provided for under Other Bid Items

This bid item includes all other Work not specifically included in any other bid item, as necessary for the complete Work that conforms to the Contract Documents in their entirety.

47. Daily Rate for Compensable Delay

This bid item is the daily rate of compensation for any compensable delay caused by the City during the performance of Work through Substantial Completion. The final Bid Price shall be based on 60 days at this rate.

END OF SECTION

SECTION 01 30 10 PROJECT CONTROL SYSTEM

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for use of project control system.
- B. Related Sections:
 - 1. Section 01 30 30 Shop Drawings, Product Data and Samples.
 - 2. Section 01 32 16 Progress Schedules and Reports
 - 3. Section 01 33 00 Submittal Procedures

1.02 WEB DATABASE

- A. The City will use and maintain a web-based database as the primary means of communication related to the Project's correspondence, submittals, requests for information (RFIs), advisory notices, and non-compliance issues.
 - 1. Correspondence from the Contractor shall be sent to the Construction Manager via the PROCORE System.
- B. Contractor shall utilize PROCORE's system for electronic submittal of all data and documents (unless specified otherwise by the Construction Manager) throughout the duration of the Contract.
- C. PROCORE is a web-based electronic media site that is hosted by PROCORE LLC utilizing their PROCORE web solution.
 - 1. PROCORE will be made available to the Contractor's project personnel.
 - 2. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of the Contract.
 - 3. PROCORE shall be the primary means of project information submission and management. When required by the Construction Manager, paper documents will also be required.
 - 4. In the event of discrepancy between the electronic version and paper documents, the document uploaded to PROCORE, the official record of the Project will govern.
 - 5. PROCORE is a registered trademark of PROCORE LLC.

1.03 USER ACCESS LIMITATIONS

A. The Construction Manager will control the Contractor's access to PROCORE by allowing access and assigning user profiles to accepted Contractor personnel.

B. User profiles will define levels of access into the system, determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do).

1.04 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

- A. Review comments made (or lack thereof) by the Construction Manager and Design Consultant on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents.
- B. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Neither automated system notifications nor audit logs constitute validation of the Contractor's submitted information.

1.05 CONTRACTOR RESPONSIBILITY

- A. The Contractor shall be responsible for the validity of their information placed in PROCORE and for the abilities of their personnel.
- B. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution program.
- C. Adobe PDF documents shall be created through electronic conversion rather than optically scanned whenever possible.
- D. The Contractor is responsible for the training of their personnel in the use of PROCORE (outside what is provided by the Construction Manager) and the other programs indicated above as needed.
- E. Provide a list of Contractor's key PROCORE personnel for the Construction Manager's acceptance. The Construction Manager is responsible for adding and removing users from the system. The Construction Manager reserves the right to perform a security check on all potential users.

1.06 CONNECTIVITY PROBLEMS

- A. PROCORE is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the Internet.
- B. PROCORE response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The City and Construction Manager will not be liable for any delays associated from the usage of PROCORE including, but not limited to slow response time, down time periods, connectivity problems, or loss of information.
- C. The Contractor shall ensure that connectivity to the PROCORE system (whether at the home office or job site) is accomplished through some form of high-speed communications with 1 Mbps as the minimum bandwidth requirements for using the

system. It is recommended a faster connection be used when uploading pictures and files into the system.

- D. Under no circumstances shall the usage of PROCORE be grounds for a time extension or cost adjustment to the Contract.
 - 1. If there are problems that persist with the PROCORE site for more than 24 consecutive hours that prevent the electronic submission of data by the Contractor, the Contractor may submit documents in paper form to the Construction Manager until such time that the Construction Manager notifies the Contractor that the PROCORE site is operable and available for use.

1.07 TRAINING

- A. The Construction Manager will provide a one-hour training class to the Contractor within ten (10) days of NTP at a time mutually agreeable to Contractor and Construction Manager.
- B. Thereafter the Construction Manager will provide up to one hour of additional training via telephone during the project per month of the project life.

PART 2 PRODUCTS

2.01 HARDWARE

- A. Contractor shall provide and have in place for its own use a computer with internet access and sufficient capabilities to perform all duties stated herein and the following hardware:
 - 1. A scanner at least large enough to scan 11" x 17" sheets with sufficient resolution to maintain clarity and legibility of the document at its native size.
 - 2. A color printer of sufficient size and capacity to accept incoming correspondence as described in this section.

2.02 SOFTWARE

- A. Adobe Acrobat 9 Standard or higher; Microsoft's Internet Explorer v9 or higher; Microsoft Office 2010 or higher, including but not limited to Microsoft Word and Microsoft Excel.
- B. PROCORE currently supports Mozilla's Firefox v15.0.1 and newer, Google Chrome v22.01229.79 m and newer, Apple's Safari v6 and newer, and Microsoft's Internet Explorer v9 and newer web browsers for accessing the application. (Certain functions may not be available when using any program other than the newest version of the respective web browser.)

2.03 FACILITIES

A. The Contractor shall make its own arrangements to provide high-speed (minimum speed: download 1Mbps/upload 1Mbps) internet connection for its own use as soon as practicable.

PART 3 EXECUTION

3.01 ITEMS PROCESSED THROUGH PROJECT CONTROL SYSTEM

- A. Items to be uploaded to PROCORE by the Construction Manager include but are not limited to:
 - 1. RFI responses.
 - 2. Submittal comments.
 - 3. Clarification Letters.
 - 4. Design Clarifications.
 - 5. Field Orders.
 - 6. Contract Change Orders.
- B. Items to be uploaded to PROCORE by the Contractor include but are not limited to:
 - 1. RFIs.
 - 2. Submittals.
 - 3. Potential Change Orders.
 - 4. System Outage Requests.
- C. These items will be attached in PDF file format. These attachments may include files that need to be viewed and/or printed in color. Formal letters, stop notices, Field Orders, and Contract Change Orders shall always include a wet-signed hard copy.

3.02 PROCORE UTILIZATION

- A. All project related correspondence (RFIs, submittals, etc.) originated by the Contractor or Subcontractor, Supplier, et al. shall be uploaded to PROCORE and directed to the Construction Manager by the Contractor, unless otherwise indicated in the Specifications.
- B. PROCORE shall be utilized in connection with submittal preparation and information management as required by the Contract Documents and the Construction Manager.
 - 1. The use of the electronic communication does not waive requirements for the provision of hard copies of formal correspondence and submittals. Any hard copies of documents must match electronic copies of those documents.
 - Submittals shall be in accordance with Section 01 33 00, Submittal Procedures. The provisions of Section 01 33 00 shall apply both to electronic copies and hard copies of submittals, unless otherwise stated in writing by the Construction Manager.

3.03 TERMINATION OF USE

A. The City reserves the right to terminate the use of PROCORE for the electronic submission of data to the City.

B. The City may provide an alternate project control system or require the use of paper documents submitted in accordance with the Contract Documents. The Contractor will be provided, in writing, ten (10) days' notice that The City intends to discontinue use of PROCORE.

3.04 ADOBE PDF

- A. All information, comments, questions and statements shall be scanned and/or converted to the PDF file format and attached to the PROCORE system.
- B. Items to be sent via PROCORE system include but are not limited to large-format plan sheets (22" x 34" or larger), small-format plan sheets, pages within tabbed binders, RFIs, transmittal sheets, et al.
- C. The PDF attachments supplied to the Construction Manager shall be in sufficient resolution to be fully legible at its native size.
- D. All separate files within a given piece of correspondence shall be combined into a single PDF document (i.e. An RFI that contains a text file and two photo files shall be combined into a single PDF document prior to delivery to the Construction Manager.)

3.05 LABELING FORMAT

- A. The subject line of each email, and the file name of any attached files shall begin with the file labeling scheme:
 - 1. RFI_XXXY_ (Contractor Name) _(Subject)
 - 2. Letter_XXXY_ (Contractor Name) _(Subject)
 - 3. Transmittal_XXXY_ (Contractor Name) _(Subject)
 - 4. PCO_XXXY_ (Contractor Name) _(Subject)
- B. The first section of the label indicates the type of correspondence (i.e RFI). "XXX" indicates a unique number, sequentially assigned for the given piece of correspondence. "Y" is a sequential letter assigned for revised or resubmitted documents, i.e. A, B, or C being the 1st, 2nd, and 3rd revision or resubmittal, respectively. "(Contractor Name)" indicates to the database that the correspondence is from the Contractor. The Contractor will indicate the subject at the end of the numbering scheme.
- C. Each piece of correspondence shall be sent in a separate email.

3.06 SUBMITTALS

- A. The subject line of each email, and the file name of any attached files shall begin with the file labeling scheme, where "XXXXX" indicates the specification section from which the submittal originates:
 - 1. Submittal_XXXX-ZZ. Y_ (Contractor Name)_(Subject)
- B. If a submittal package has multiple items, each item shall be considered a separate piece of correspondence and sent separately. For example, if "Submittal 3:

Concrete" had two items, "3.01: Mix Design," and "3.02: Curing Compound," two separate items would be emailed to the Construction Manager labeled as:

- 1. Submittal_XXXXX-03.01_ (Contractor Name) _Mix Design
- 2. Submittal_XXXX-03.02_ (Contractor Name) _Curing Compound

3.07 ORIGINAL DOCUMENTS

A. Where possible, the Contractor will obtain the electronic document from its original source to maintain the integrity, legibility, and searchability of the document.

3.08 ORGANIZATION

A. The information included in the attachments shall be organized in a logical and thoughtful manner. Where the information originated in a tabbed format (a binder, for example), the scanned and/or converted PDF file shall be electronically bookmarked accordingly using the "bookmark" function of Adobe Acrobat 9 Standard.

3.09 PRINTING

A. Except where otherwise indicated, the Contractor will receive no hard copies of the above outlined correspondence. The Contractor shall print for its use, in color if necessary, any record copies, field copies, sub-contractor copies, etc. if such copies are desired.

3.10 PROJECT FORMS

A. The Contractor shall use its own correspondence forms for attachments uploaded to PROCORE. These forms shall include the identifying information specific to the PDF document succeeding the cover form. Additionally, the Contractor shall input all identifying information within PROCORE as requested when generating a new document within the system.

END OF SECTION

SECTION 01 30 30 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for preparation and submittal of shop drawings, product data and samples.
- B. Related Sections:
 - 1. Section 01 30 10 Project Control System
 - 2. Section 01 32 16 Progress Schedules and Reports
 - 3. Section 01 33 00 Submittal Procedures

1.02 PROJECT COORDINATION

- A. Project Coordinator: Construction Manager.
- B. Make the following types of submittals required by other portions of Contract Documents to Engineer through the Project Coordinator:
 - 1. Shop drawings, product data, and samples.
 - 2. Mill certificates.
- C. Construction, fabrication, or ordering of materials shall not begin until Contractor has received submittals reviewed by Engineer governing all aspects of the intended Work.

1.03 SHOP DRAWINGS

- A. Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- B. Identify details on Shop Drawings by reference to sheet and detail numbers of Contract Drawings and/or specific reference to Sections and Paragraphs of the Specifications.

1.04 PRODUCT DATA

- A. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data shall:

- 1. Have each copy clearly marked to identify pertinent materials, products, models, finishes, etc.
- 2. Show clearly all standard options included.
- 3. Show dimensions and clearances required.
- 4. Show performance characteristics and capacities.
- 5. Show wiring diagrams and controls and necessary rough-in requirements for utility services and connections (where applicable).
- C. Identify each item of product data by reference to sheet and detail numbers of the Plans and/or specific reference to Sections and Paragraphs of the Specifications.
- D. Where product data, as submitted, contains extraneous information, unmarked options, or is incomplete, it will be returned to the Contractor without review.

1.05 MILL CERTIFICATES

A. Mill certificates are documents that provide testing data regarding the fabrication and strength of metal products. Mill certificates shall be less than 1 year old.

1.06 SAMPLES

- A. Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.
- B. Where samples are required of materials which inherently show a range of size, color, texture or finish, submit samples in sufficient quantity to show this range.
- C. Samples shall be tagged or otherwise clearly identified as to pertinent information illustrated and specific relationship to the Work, and shall show the name and address of the Subcontractor or agency submitting them, the date, and the name of the Work for which they are intended.
- D. Unless the Engineer determines that samples must be retained for reference purposes, samples will be returned when so requested by the Contractor. No sample shall be incorporated into the Work unless specific approval is given by the Engineer.
- E. Charges for submission of samples shall be borne by the Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Document: Submit one electronic copy in PDF or Word format not larger than 24 x 36 inches; an electronically marked up file will be returned. Create files at native size and right-side up; illegible files will be rejected.
- D. Samples: Submit the number specified in individual specification sections.
- E. Submittals shall contain:
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The Project title and number.
 - 3. Contract identification.
 - 4. The names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - 5. Identification of the product, with the Specification Section number.
 - 6. Field dimensions clearly identified as such.
 - 7. Relation to adjacent or critical features of the work or materials.
 - 8. Applicable standards, such as ASTM or Federal Specifications numbers.
 - 9. Identification of deviations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed Work.
 - 10. Identification of revisions on resubmittals.
 - 11. An 8 inches x 3 inches blank space for Contractor and Engineer stamps.
 - 12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
- F. Make submittals promptly in accordance with an approved submittal schedule, as put forth by the Contractor, and in such sequence as to cause no delay in the Work.
- G. For each shop drawing for review, allow 15 days excluding delivery time to and from the Contractor.

3.02 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by the Engineer and resubmit.
- B. Shop Drawings and Product Data
 - 1. Revise initial drawings or data and resubmit as specified for the initial submittal.

- 2. Indicate any changes which have been made other than those requested by the Engineer.
- C. Samples: Submit new samples as required for initial submittal.

3.03 DISTRIBUTION

- A. Distribute copies of shop drawings and product data which carry the Engineer stamp to:
 - 1. Job site file.
 - 2. Record Documents file.
 - 3. Other affected contractors.
 - 4. Subcontractors.
 - 5. Supplier or Fabricator.

END OF SECTION

SECTION 01 31 19 PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for conducting conferences and meetings for the purposes of addressing issues related to the Work, reviewing and coordinating progress of the Work and other matters of common interest, and includes the following:
 - 1. Qualifications of Meeting Participants.
 - 2. Preconstruction Conference
 - 3. Progress Meetings.
 - 4. Pre-installation Meetings.
 - 5. Post Construction Meeting.

1.02 QUALIFICATIONS OF MEETING PARTICIPANTS

A. Representatives of entities participating in meetings shall be qualified and authorized to act on behalf of entity each represents.

1.03 PRECONSTRUCTION CONFERENCE

- A. Upon issuance of Notice to Proceed or earlier when mutually agreeable, Engineer will arrange preconstruction conference in convenient place for most persons invited, in accordance with the General Conditions.
- B. Attending Preconstruction Conference: Contractor's superintendent, authorized City representatives, Engineer, Construction Manager, Design Engineer, representatives of utilities, major subcontractors and others involved in performance of the Work, and others necessary to agenda.
- C. Engineer will preside at conference.
- D. Purpose of Conference: To establish working understanding between parties and to discuss construction schedule, shop drawing and other submittals, cost breakdown of major lump sum items, processing of submittals and applications for payment, and other subjects pertinent to execution of the Work.
- E. Agenda Will Include:
 - 1. Distribution of Contract Documents.
 - 2. Distribution and discussion of list of major subcontractors and suppliers.
 - 3. Proposed progress schedules and critical construction sequencing.
 - 4. Major equipment deliveries and priorities.

- 5. Project coordination.
- 6. Designation of responsible personnel.
- 7. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Requests for Information
 - d. Submittals.
 - e. Change Orders.
 - f. Applications for Payment.
 - g. Record Documents.
- 8. Use of Premises:
 - a. Office, construction, and storage areas.
 - b. City's requirements.
- 9. Construction facilities, controls, and construction aids.
- 10. Shoring requirements and recommendations from geotechnical report.
- 11. Temporary utilities.
- 12. Safety and first aid procedures.
- 13. Security procedures.
- 14. Housekeeping procedures.
- F. Engineer will record minutes of meeting and distribute copies of minutes within seven days of meeting to participants and interested parties.

1.04 PROGRESS MEETINGS

- A. Conduct progress meetings at least once per week in Contractor's field office, Engineer's field office or other mutually agreed upon place and frequency.
- B. Distribute to each anticipated participant written notice and agenda of each meeting at least two days before meeting.
- C. Require attendance of Contractor's superintendent and subcontractors who are or are proximate to be actively involved in the Work, or who are necessary to agenda.
- D. Invite Engineer, utility companies when the Work affects their interests, and others necessary to agenda.
- E. Complete and bring Application for Payment and Progress Schedule to progress meeting.
- F. Purpose of Progress Meetings: To expedite work of subcontractors or other organizations that are not meeting scheduled progress, resolve conflicts, and coordinate and expedite execution of the Work.

- G. Review progress of the work, Progress Schedule, narrative report, Application for Payment, record documents, and additional items of current interest that are pertinent to execution of the Work.
- H. Verify:
 - 1. Actual start and finish dates of completed activities since last progress meeting.
 - 2. Durations and progress of activities not completed.
 - 3. Reason, time, and cost data for Change Order Work that will be incorporated into Progress Schedule and Application for Payment.
 - 4. Percentage completion of items on Application for Payment.
 - 5. Reasons for required revisions to Progress Schedule and their effect on contract time and contract price.
- I. Discuss potential problems which may impede scheduled progress and corrective measures.
- J. Engineer will record minutes of meeting and distribute copies of minutes within seven days of meeting to participants and interested parties.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 32 16 PROGRESS SCHEDULES AND REPORTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Preparation, submittal, and maintenance of computerized progress schedule and reports, contract time adjustments, and payment requests, including the following:
 - 1. Preliminary Schedule.
 - 2. Baseline Schedule.
 - 3. Weekly Schedule.
 - 4. Schedule Updates.
 - 5. Schedule Revisions.
 - 6. Time Impact Analyses.
 - 7. Final Schedule Submittal.
- B. Related Sections:
 - 1. Section 01 13 00 Project Schedule.
 - 2. Section 01 29 73 Schedule of Values.
 - 3. Section 01 31 19 Project Meetings.

1.02 **RESPONSIBLE PERSON**

- A. Designate, in writing and within 5 calendar days after Notice of Award, person responsible for preparation, maintenance, updating and revision of all schedules.
- B. Qualifications of Responsible Person:
 - 1. Authority to act on behalf of Contractor.
 - 2. Five (5) years verifiable experience in preparation of complex construction schedules for projects of similar value, size and complexity.
 - 3. Knowledge of CPM scheduling utilizing Primavera.
- C. Engineer reserves the right to disapprove scheduler when submitted by Contractor if not qualified. Engineer reserves the right to remove scheduler from the project if found to be incompetent.

1.03 SCHEDULING FORMAT AND SOFTWARE

- A. Schedule Format: Utilize critical path method (CPM) format.
- B. Prepare computerized schedule utilizing Primavera (P6).

C. The Contractor shall provide one licensed copy of the scheduling software to the Engineer, registered in the Engineer's name, for the duration of the project.

1.04 PRECONSTRUCTION SCHEDULING MEETING

- A. In conformance with Section 01 13 00, Engineer will conduct a Preconstruction Scheduling Meeting with Contractor's Project Manager, General Superintendent and scheduler within 7 calendar days after Notice of Award. This meeting is separate from the Preconstruction Conference Meeting and is intended to cover schedule issues exclusively.
- B. At the meeting, scheduling requirements shall be reviewed with Contractor. These include schedule preparation, reporting requirements, updates, revisions, and schedule delay analysis. Contractor shall present their schedule methodology, planned sequence of operations, and present their proposed activity coding structure.
- C. Coding Structure: Contractor shall submit proposed coding structure, identifying the code fields and the associated code values it intends to use in the project schedule. The coding structure shall, at a minimum, include code fields for Project Segment or Phase, Area of Work, Type of Work, Submittal/Procurement/Construction and Responsibility/ Subcontractor. Refer to Section 1.09I for listing of activity categories to be included in the schedule.

1.05 PREPARATION

- A. Contractor's bid covers all costs associated with the execution of the work in accordance with the Progress Schedule. Bid shall include overhead for the duration of the Contract.
- B. The P6 schedule shall have a detailed Work Breakdown Structure (WBS) based on Project area.
- C. Additional activity codes may be required, including but not limited to Responsibility (subcontractors), Work Type, Work Restrictions, Bid Item, etc.
- D. Cost and resource loading shall be included in the Baseline Schedule, and subsequent monthly updates. Cost loading shall be identified by Bid Item and the Schedule of Values. Resources shall include manpower and manhours by craft as well as equipment.
- E. Each schedule submittal shall be accompanied by a written narrative describing assumptions, schedule changes, and the rationale for schedule changes, including but not limited to durations, logic, calendars, and added or deleted activities.
- F. Schedules shall include contractual milestones including Notice to Proceed, Substantial Completion, and Final Completion, and the activities representing all work required to complete the Work.
- G. The use of float suppression techniques, such as constraints, preferential scheduling, and resource leveling, is not allowed.

- H. During preparation of the preliminary Progress Schedule, Engineer will facilitate Contractor's efforts by being available to answer questions regarding sequencing issues, scheduling constraints, interface points, and dependency relationships.
- I. Prepare schedule utilizing Precedence Diagramming Method (PDM).
- J. Prepare schedule utilizing activity durations in terms of working days. Do not exceed 15 working day duration on activities except concrete curing, submittal review and equipment fabrication and deliveries. Where duration of continuous work exceeds 15 working days, subdivide activities by location, stationing, or other sub-element of the work. Contractor shall coordinate holidays to be observed with the City and incorporate them into the schedule as non-working days.
- K. Failure to include an activity required for execution of the Work does not excuse Contractor from completing the Work and portions thereof within specified times and at prices specified in Agreement. Failure of Contractor to include required schedule constraints, sequences or milestones in schedule shall not relieve Contractor of obligation to conform to requirements of Contract. Acceptance of schedule shall not waive Contract requirements.
 - 1. In event of conflict between accepted schedule and Contract requirements, terms of Contract shall always govern, unless requirements are waived in writing by the City.
- L. Reference schedule to working days with beginning of contract time as Day "1".
- M. Contract float is for the mutual benefit of both City and Contractor. Changes to the project that can be accomplished within this available period of float may be made by City without extending the Contract time, by utilizing float. No time extensions shall be granted nor delay damages owed until Work extends beyond currently accepted Contract completion date. Likewise, Contractor may utilize float to offset delays other than delays caused by City. Mutual use of float shall continue until all available float shown by schedule has been utilized by either City or Contractor, or both. At that time, extensions of the Contract time will be granted by City for valid City-caused or third party-caused delays which affect the planned completion date, and which have been properly documented and demonstrated by Contractor.
- N. Schedule Logic: Schedule shall be assembled to show order in which Contractor proposes to carry out Work, indicate restrictions of access, availability of Work areas, and availability and use of manpower, materials and equipment. Following criteria shall form basis for assembly of schedule logic.
 - 1. Which activities must be completed before subsequent activities can be started?
 - 2. Which activities can be performed concurrently?
 - 3. Which activities must be started immediately following completed activities?
 - 4. What major facility, equipment or manpower restrictions are required for sequencing these activities?
- O. Non-sequestering of Float: Pursuant to float sharing requirements of Contract, use of float suppression techniques such as preferential sequencing or logic, special lead or

lag logic restraints, extended activity durations or imposed dates shall be cause for rejection of any schedule submittal.

- P. Interim Milestone Dates, Operational Constraints: In event there are interim milestone dates and/or operational constraints set forth in Contract, Contractor shall show them on schedule as specified in Contract. Contractor shall not use a zero total float constraint or mandatory finish date on such Contract requirements.
- Q. Schedule Windows for City-furnished, Contractor-installed Equipment or Materials: Immediately after Award of Contract, Contractor shall obtain from Engineer anticipated delivery dates of City-furnished equipment or materials. These dates shall be shown on schedule in same manner indicated by Engineer.

1.06 SUBMITTAL OF PROGRESS SCHEDULES

- A. Submit preliminary and baseline schedule in accordance with the General Conditions of the Contract as modified by this Section.
- B. Submit, on a monthly basis, updated schedules as specified. Submit final schedule update as specified.
- C. Submit revised schedules and time impact analyses as specified.
- D. Submit schedules in the media and number of copies as follows.
 - 1. Three (3) sets of the CPM network and/or bar chart on D-size sheets.
 - 2. Three (3) sets of tabular reports listing all activities sorted numerically identifying duration, early start, late start, early finish, late finish, total float, and all predecessor/successor information.
 - 3. Flash drives containing the computerized CPM schedule data. Provide P6 XER files.
 - 4. Three (3) prints of the Summary Schedule.

1.07 PRELIMINARY SCHEDULE

- A. Contractor shall submit Preliminary Schedule within 10 calendar days after Notice of Award. Preliminary Schedule shall contain detailed plan of operations for first 90 calendar days of Work after receipt of Notice of Award.
- B. Engineer and Contractor shall meet within 7 calendar days after receipt of Preliminary Schedule to review and make necessary adjustments. Contractor shall submit revised preliminary schedule within 5 calendar days after meeting.
- C. Accepted Preliminary Schedule shall be incorporated unchanged, as first 90 calendar days of activity in Contractor's Baseline Schedule.
- D. Preliminary Schedule shall be updated monthly during first 90 calendar days after Notice to Proceed.

1.08 BASELINE SCHEDULE

- A. No more than 45 calendar days after Notice of Award, Contractor shall submit the Baseline Schedule for all work of the project. Baseline Schedule shall show sequence and interdependence of all activities required for complete performance of all Work, beginning with date of Notice to Proceed and concluding with date of final completion of Contract.
- B. Baseline Schedule shall conform to requirements of Paragraph 1.09 herein.
- C. Acceptance of the Baseline Schedule by the City is a condition precedent to making payments after the first 90 calendar days after Notice to Proceed.

1.09 RECOVERY SCHEDULE

- A. City may request a Recovery Schedule should Contractor fall 21 or more days behind any schedule milestone.
- B. Recovery Schedule shall show Contractor's plan and resource allocation to retain Contract completion dates.

1.10 NETWORK DETAILS AND GRAPHICAL OUTPUT

- A. Produce a clear, legible, and accurate calendar based, time scaled, graphic network diagram. Group activities related to the same physical areas of the work. Produce the network diagram based upon the early start of all activities.
- B. Include for each activity, the description, activity number, estimated duration in working days, total float and all activity relationship lines.
- C. Illustrate order and interdependence of activities and sequence in which Work is planned to be accomplished.
 - 1. Incorporate the basic concept of the precedence diagram network method to show how the start of one activity is dependent upon the start or completion of preceding activities and its completion restricts the start of following activities.
- D. Indicate the critical path for the project.
- E. Delineate the specified contract duration and identify the planned completion of the work as a milestone. The time period between the planned and Contract completion dates, if any, shall be shown on the schedule as an activity identified as project float unless a Change Order is issued.
- F. Identify system shutdown dates, system tie-in dates, specified interim completion or milestone dates and contract completion date as milestones.
- G. Include, in addition to Construction Activities:
 - 1. Submission dates and review periods for major equipment submittals and shoring submittals.

- 2. Any activity by the City or the Engineer that may affect progress or required completion dates.
- 3. Equipment and long-lead material deliveries over 8 weeks.
- 4. Approvals required by regulatory agencies or other third parties.
- H. Produce network diagram on 22-inch by 34-inch sheets with grid coordinate system on the border of all sheets utilizing alpha and numeric designations.
- I. Identify the execution of the following, omitting items not applicable to the Work, and adding items applicable to the Work:
 - 1. Mobilization.
 - 2. All required submittals and submittal review times showing 30 calendar day duration for such activities and equal amount of time for re-submittal reviews.
 - 3. Equipment and materials procurement/fabrication/delivery.
 - 4. Excavation.
 - 5. Sheet pile installation
 - 6. Shoring design and submission of detailed shoring submittals. Identify submission as a milestone.
 - 7. Shoring review, shoring materials procurement, shoring installation and shoring removal.
 - 8. Backfill and compaction.
 - 9. Dewatering.
 - 10. Grading, subbase, base, paving, and curb and gutters where applicable.
 - 11. Embankment fill and compaction.
 - 12. Fencing and landscaping, including irrigation and plantings.
 - 13. Concrete, including installation of forms and reinforcement, placement of concrete, curing, stripping, finishing and patching.
 - 14. Tests for leakage of concrete structures intended to hold water.
 - 15. Metal fastenings, framing, structures, and fabrications.
 - 16. Finishes including coating and painting.
 - 17. Trenching, pipe laying, and trench backfill and compaction.
 - 18. Backflow prevention valves and irrigation connections including identification of order lead time, installation and testing.
 - 19. Electrical Work including street lighting.
 - 20. Substantial completion. Substantial completion activity shall meet all requirements set forth in Section 01 13 00, Project Schedule.
 - 21. Punch list Work.
 - 22. Demobilization.

1.11 SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS

- A. After Preliminary Schedule has been submitted and accepted by City, Contractor shall submit a list of all shop drawings and sample submittals anticipated in first 90 calendar days after Notice to Proceed using early start dates.
- B. Submittal of this preliminary list shall be a condition precedent to making of progress payments during the first 90 calendar days after Notice to Proceed.
- C. After Baseline Schedule has been submitted and accepted by City, Contractor shall print out and submit list of all shop drawings and sample submittals for all Work using early start dates. This listing will contain all submittals required for the entire Work including those listed above.
- D. Submittal of final list shall be a condition precedent to making of progress payments after the first 90 calendar days after Notice to Proceed.
- E. These schedules shall conform to the requirements of the General Conditions, Section 00 72 00.

1.12 REVIEW AND ACCEPTANCE OF SCHEDULES

- A. Engineer will review Baseline Schedules, Schedule Updates, Schedule Revisions and Time Impact Analyses to ascertain compliance with specified project constraints, compliance with milestone dates, reasonableness of durations and sequence, accurate inter-relationships and completeness.
 - 1. Acceptance of a schedule is of general nature only and does not relieve the Contractor from performing all Work as shown on the plans and specified herein.
- B. Engineer and City will issue written comments following completion of review of Baseline Schedule within 21 calendar days after receipt. Written comments on review of Schedule Updates and Schedule Revisions and Time Impact Analyses will be returned to Contractor within 14 calendar days after receipt by Engineer.
- C. Revise and resubmit schedule in accordance with Engineer's comments within 7 calendar days after receipt of such comments or request joint meeting to resolve objections. If a meeting is requested the Contractor and all major subcontractors shall participate in the meeting with Engineer. Revise and resubmit schedule within 7 calendar days after meeting.
- D. When schedule reflects City's and Contractor's agreement of project approach and sequence, schedule will be accepted by City. Use accepted schedule for planning, organizing and directing the work and for reporting progress. Provide all items specified in Subsection 1.06, Submittal of Project Schedules.

1.13 UPDATING THE SCHEDULE

A. Update the schedule on a monthly basis, to match the pay application cutoff date of the 25th of each month. Provide an electronic P6 XER file.

- B. Submittal and acceptance of the monthly Schedule Update is a condition precedent to the making of any progress payments. Lookaheads shall be 4 weeks ahead with one week back showing actual progress. Identify the activity ID from the latest schedule submittal. Lookaheads shall be provided each week no later than 24 hours prior to each weekly progress meeting.
- C. Should monthly Schedule Update show project completion earlier than current Contract completion date Contractor shall show early completion time as schedule activity, identified as "Project Float".
- D. Should monthly Schedule Update show project completion later than current Contract completion date, Contractor shall prepare and submit a Schedule Revision in accordance with Paragraph 1.13 herein.

1.14 REVISIONS TO SCHEDULE

- A. Submit revised schedule within 5 calendar days:
 - 1. When delay in completion of any activity or group of activities indicates an overrun of the Contract time or milestone dates by 20 working days or 5 percent of the remaining duration, whichever is less.
 - 2. When delays in submittals, deliveries, or work stoppages are encountered making necessary the re-planning or rescheduling of activities.
 - 3. When the schedule does not represent the actual progress of activities.
 - 4. When any change to the sequence of activities, the completion date for major portions of the Work, or when changes occur which affect the critical path.
 - 5. When Contract modification necessitates schedule revision, submit schedule analysis of change order work with cost proposal.
- B. Submit revised schedule and materials as specified under Article, "Submittal of Progress Schedule".
- C. Make revisions on most recently accepted version of schedule.
- D. Schedule Revisions shall not be prepared or submitted with Schedule Updates. They shall be separate submittals and shall be noted as Schedule Revisions.
- E. Only upon acceptance of a revision by the City shall it be reflected in the next monthly Schedule Update.
- F. Schedule Revisions submitted for the purpose of mitigating a Contractor caused project delay (Recovery Schedule) shall not be implemented until the City reviews and accepts the Schedule Revision.

1.15 WEEKLY SCHEDULE

A. Submit to Engineer, on the last working day of every week, a progress schedule showing the activities completed during the previous week and the Contractor's schedule of activities for the following 2 weeks.

- B. The Weekly Schedule may be a CPM schedule or a bar chart but shall utilize the logic and conform to the status of the current progress schedule. In the event that the Weekly Schedule no longer conforms to the current schedule Contractor may be required to revise the schedule in accordance with Paragraph 1.13 herein.
- C. The activity designations used in the Weekly Schedule shall be consistent with those used in the Baseline Schedule and the monthly Schedule Updates.
- D. The format of the Weekly Schedule shall be as agreed upon between the Contractor and the Engineer.

1.16 SCHEDULE FOR PROJECT WINTERIZATION

- A. A Winterization Plan shall be submitted describing proposed activities that will begin or end after October 15.
- B. Describe erosion control measures specific to the winterization period in detail.
- C. Submit to Engineer for review no later than September 15 prior.

1.17 ADJUSTMENT OF CONTRACT TIMES

- A. If the Contractor believes that the City has impacted its Work, such that the project completion date will be delayed, the Contractor must submit proof demonstrating the delay to the critical path. This proof, in the form of a Time Impact Analysis, may entitle the Contractor to an adjustment of contract time.
 - 1. The Time Impact Analysis shall be submitted at the same time as the cost proposal so that the time component of each change can also be evaluated.
 - 2. Any after the fact time impacts will be evaluated using the as-built critical path method rather than a projected TIA.
- B. The Time Impact Analysis:
 - The Time Impact Analysis submitted by the Contractor shall utilize the accepted schedule update that is current relative to the time frame of the delay event (change order, third party delay, or other City-caused delay). The Contractor shall represent the delay event in the schedule by 1) inserting new activities associated with the delay event into the schedule, 2) revising activity logic, or 3) revising activity durations.
 - 2. If the project schedule's critical path and completion date are impacted as a result of adding this delay event to the schedule, a time extension equal to the magnitude of the impact may be warranted.
 - 3. The Time Impact Analysis submittal shall consist of 1) a fragment of the portion of the schedule affected by the delay event, 2) a narrative explanation of the delay issue and how it impacted the schedule, and 3) an electronic file containing the schedule file used to perform the Time Impact Analysis.
- C. Indicate clearly that the Contractor has used, in full, all project float available for the Work involved in the request, including any float that may exist between the Contractor's planned completion date and the Contract completion date.

- 1. Utilize the latest version of the Schedule Update accepted at the time of the alleged delay, and all other relevant information, to determine the adjustment of the contract time.
- D. Float shall be for the mutual benefit of the City and the Contractor. Adjustment of the Contract Times will be granted only when the Contract Float has been fully utilized and only when the revised date of completion of the work has been pushed beyond the contract completion date. Adjustment of the Contract Times will be made only for the number of days that the planned completion of the work has been extended.
 - 1. No compensation will be given for Change Order Work that extends the scheduled completion date, but not beyond the contractual completion date.
- E. Actual delays in activities which do not affect the critical path Work, or which do not move the Contractor's planned completion date beyond the Contract completion date, will not be the basis for an adjustment to the contract time.
- F. Notify Engineer of a request for contract time adjustment. Submit request in accordance with Article 11.03 of the General Conditions (Section 00 72 00). In cases where the Contractor does not submit a request for contract time adjustment for a specific change order, delay, or Contractor request within the specified period of time, then it is mutually agreed that the particular change order, delay, or Contractor request has no time impact on the Contract completion date and no time extension is required.
- G. The Engineer will, within 30 calendar days after receipt of a contract time adjustment, request any supporting evidence, review the facts and advise the Contractor in writing.
- H. The new Progress Schedule data, if accepted by the City, shall be included in the next monthly Schedule Update.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 32 31 INSPECTIONS OF ADJACENT PROPERTY

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: The Work in this Section includes requirements of the Contractor to perform pre- and post-construction inspections of all exterior structures, houses, buildings, retaining walls, driveways and walkways and other facilities located adjacent to the limits of construction activities:
 - 1. Each residential property that abuts or contains a public utility easement where Work is proposed.
 - 2. Public rights-of-way including roads, curbs, gutters, and sidewalks affected by the Work.
 - 3. Trees near to, but outside the limits of construction activities.
- B. The coverage of inspection shall accurately document the existing conditions within the zone of influence of the proposed construction.
 - 1. Interior documentation will only be performed in the event of a third-party claim.
 - 2. Do not enter private property to complete the work of this Section without the express permission of the City.
- C. Methods of documentation shall include photographs, video, and reports as described herein.
- D. This specification section does not cover acceptance and/or inspection of new Work.
- E. This Specification also includes the requirement of the Contractor to investigate, adjust and resolve third party claims due to damage allegedly caused by the Contractor's activities.
- F. For photographic documentation of construction progress, see Section 01 13 50.
- G. City will independently perform its own inspections of adjacent property.

1.02 SUBMITTALS

- A. The Contractor shall submit pre- and post-construction and third-party property claims Inspection Documentation Reports, interior and exterior, as described herein.
- B. All video and photographs shall be accompanied by a notarized statement verifying the original unedited quality of the media.
- C. Identification: Identify each photograph with label or image caption on the front side, lower left corner with the date taken, project name and location, orientation, and description of view.

- D. Video Logs: Displayed on the storage case of each video shall be a log of the contents. The log shall describe the various segments of coverage contained within the video in terms of the names and sides of the streets or easements, coverage beginning and end points, directions of coverage, and video counter numbers.
 - 1. A cumulative alphabetical index correlating the various segments of coverage to their corresponding video shall be supplied to the Engineer.
 - 2. Digital files shall be organized according to the following convention:
 - a. Site/Date/Filename
 - b. -Folder Level 1- Site:
 - c. -Folder Level 2- Subject:
 - d. -Folder Level 3- Date: YYYY.MM.DD folder name format
- E. Samples and Forms: At least 30 days prior to construction submit the following:
 - 1. A sample video of a route similar to this project to verify video and audio quality. When approved, this video will be the standard on which quality will be based and judged.
 - 2. A sample construction photographs of three (3) different projects to verify image quality. When approved, these photographs will be the standard on which quality will be based and judged.
 - 3. The planned format and outline of a typical report.
 - 4. Documentation of a Criminal Offender Record Information (CORI) check completed within the past six months for each inspector that performs interior inspections.

1.03 PRE-CONSTRUCTION DOCUMENTATION

- A. The Contractor shall prepare and deliver to the Engineer 14 days prior to the start of construction, three (3) bound copies of each of the pre-construction inspections containing:
 - 1. Submittal index detailing contents and extent of coverage
 - 2. All field notes taken,
 - 3. Sketches and diagrams prepared,
 - 4. Copies of all images/digital files obtained,
 - 5. DVDs of video surveys recorded,
 - 6. Descriptions and reports, all signed and witnessed by those taking part in the inspection.

1.04 PROGRESS DOCUMENTATION

A. If documentation is required for an inspection and/or re-inspection resulting from a damage complaint, three (3) copies of all data obtained by the Contractor from each inspection and/or re-inspection shall be promptly delivered to the Engineer within three days of re-inspection.

1.05 POST-CONSTRUCTION DOCUMENTATION

- A. The Contractor shall prepare and deliver to the Engineer after completion of construction at each site, three (3) bound copies of each of the post-construction inspections containing:
 - 1. Submittal index detailing contents and extent of coverage
 - 2. All field notes taken,
 - 3. Sketches and diagrams prepared,
 - 4. COs of all image digital files obtained,
 - 5. DVDs of video surveys recorded,
 - 6. Post-con field survey
 - 7. Descriptions and reports, all signed and witnessed by those taking part in the inspection.

1.06 INSPECTION DOCUMENTATION REPORT

- A. The report shall include the following for each property adjacent to the Project alignment:
 - 1. Location and description of site generally referenced to Project control.
 - 2. Results of visual inspection.
 - 3. Color video and photographs.
 - 4. Descriptive sketches.
 - 5. the general age of each structure, trees, shrubs, utilities, pavement and all other details pertinent to the replacement of each item should be documented.
 - 6. Any non-solicited interviews with the property owner regarding existing conditions and structural faults, with dates and extent of recent repairs.
 - 7. Record the property owner's non-solicited permission to access the property.
- B. The absence of deficiencies shall also be recorded.
- C. Points where exterior deterioration has occurred shall be noted and color photographs taken on all sides of the buildings and structures visible from the Project alignment or other public rights-of-way to existing conditions and any deterioration or other deficiencies.
- D. The reports for each of the structures shall be signed by the Contractor's Representative that was present during the examination of each property. The Engineer will examine said reports and may indicate additional information that is required.

1.07 QUALIFICATIONS

A. The inspections and recordings shall be performed by a professional firm with at least two years of experience.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Only high-quality video and photographs will be considered acceptable during the initial submittals to develop the project standard. It is the Contractor's responsibility to maintain, repair, replace, and/or update the equipment such that the quality standard is achieved throughout the project duration.

2.02 PHOTOGRAPHS

A. Digital photographs shall contain a minimum of ten (10) million pixels.

2.03 VIDEO

- A. All video recordings must be in high-definition and must, by electronic means display continuously and simultaneously generated, transparent, alpha-numeric information to include the following:
 - 1. Video Tape Index Number
 - 2. Project Title
 - 3. General Project Location.
- B. Each video tape shall begin with a single, multi-line alpha-numeric display indicating the video tape index number, project title, and general location of the project.
- C. Time and Date: During the entire duration of the recordings, the time and date.
- D. Camera Position: During the entire duration of the recordings, the position of the camera, accurately referenced and displayed in terms of the Project stationing or coordinates, shall be displayed (in standard stationing format) in the lower left-hand corner of the picture. Where no stationing or coordinates appear on the drawings near an adjacent property that is inspected, an appropriate system acceptable to the Engineer, shall be established and utilized.

PART 3 EXECUTION

3.01 **RESPONSIBILITIES**

A. Nothing contained herein shall relieve the Contractor of responsibility for claims arising alleged to arise from its construction operations. Failure to inspect any structure, whether required by these Contract Documents, or inadequacy of the inspections shall not relieve the Contractor of its responsibility. The Contractor shall indemnify the City, Construction Manager, and the Engineer from such claims.

3.02 RE-INSPECTIONS

A. The Contractor shall be responsible for re-inspection as often as necessary in the opinion of the Engineer to verify the adequacy of its construction methods for

prevention of damage and to obtain sufficient evidence to adjust and resolve all claims for damage from third parties.

B. Contractor shall also inspect and/or re-inspect all homes where homeowners claim that damage is occurring as a result of the Contractor's construction operations.

3.03 TIME OF EXECUTION

- A. The Contractor shall coordinate the inspections with the construction schedule so that those portions of the construction that will be completed first will be recorded first.
- B. The inspections shall be performed prior to the placement of any construction materials or equipment on the proposed construction site.
- C. Visibility: All recordings shall be performed during times of good visibility. No recording shall be done during periods of significant precipitation, mist, or fog. The recording shall only be done when enough sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

3.04 NOTIFICATION

A. Dates for pre-construction survey at the site shall be coordinated with the Engineer.

3.05 PRIVATE PROPERTY

- A. When planning on entering private property outside the limits of the Project rights-ofway or easements, the Contractor shall provide a minimum of 48 hours' notice to the Engineer and owner of such property to obtain access permission prior to entry. If any property owner denies access for the survey of structures and facilities within the specified limits:
 - 1. The Contractor shall immediately notify the Engineer, and then notify such property owner, by certified mail, on the intent of the survey.
 - 2. If after two (2) weeks, access is still denied, the Contractor shall notify the property owner once again by certified mail, stating that this is final notification.
 - 3. Submit to the Engineer copies of all correspondences between the Contractor and the property owner(s). The City will obtain the right to enter the property through the legal powers vested in the City as a public entity.
 - 4. The Contractor is fully responsible for claims and damage arising from his construction operation regardless of being denied access permission from the owner making such claim.

3.06 DOCUMENTATION

A. The number of pre-construction photographs required will be the amount necessary to document the scope of the Work as described herein.

- B. To reduce the number of recording edits and increase the continuity of the coverage, the coverage shall not consist of a group of recordings at various positions along a proposed construction area, but shall consist of a single, continuous, unedited recording which begins at one end of the particular area and continues to the other end. However, where coverage is required in areas not accessible by conventional wheeled vehicles and smooth transport of the recording system is not possible, such coverage shall consist of an organized, interrelated sequence of recordings at various positions along that proposed area.
- C. The subject or purpose of the photograph shall be made obvious to the viewer without leaving permanent markings on the facility being photographed.
- D. Close-up, detailed color photographs shall be taken of all cracks, deterioration and other observable effects in the exterior portions of all buildings and other property improvements including, but not limited to, landscaping, fences, retaining walls, driveways and sidewalks.
- E. When conventional wheeled vehicles are used as conveyances for the recording system, the distance between the camera lens and the ground shall not be less than 8 feet. The camera shall be firmly mounted, such that transport of the camera during the recording process will not cause an unsteady picture.
- F. Camera pan, tilt, zoom-in, and zoom-out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during videotape playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, chroma, white balance, and electrical focus, shall be properly controlled or adjusted to maximize recorded picture quality.

3.07 VIEWER ORIENTATION TECHNIQUES

- A. The audio and video portions of the recording shall maintain viewer orientation. To this end, overall establishing views and visual displays of all visible house and building addresses shall be utilized. In easements where the proposed construction location will not be readily apparent to the videotape viewer, highly visible yellow flags shall be placed in such fashion as to clearly indicate the proposed limits of construction.
- B. Reach Name and Side of Street or Easement: During the entire duration of the recordings, the levee reach name and side of the street or easement being recorded must appear across the bottom of the picture.
- C. Buildings: Identified visually by house or building number, when possible, in such a manner that the progress of the taping and the proposed system may be located by reference to the buildings.
- D. Audio shall accompany the video recording and shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator, shall assist in the maintenance of viewer orientation and in any needed identification, differentiation, clarification, or objective descriptive of the structures being shown in the video portion of the recording.

3.08 SCOPE OF INSPECTION COVERAGE

- A. Furnish video tapes of all exterior surfaces of buildings either specifically identified by the Engineer or those within the zone of influence of the Contractor's operations. Such buildings may include houses, condos, garages, sheds, and other structures close to the Work area.
- B. Coverage shall include, but not be limited to doors, windows, siding, roofing, visible foundations, exterior walls, porches, trim, decks, patios, landscaping, and other visual external features of the property.
- C. Color photographs showing visually evident external structural cracks and damage. Document the location and width of existing cracks in each structure.
 - 1. Notify Engineer if evident external cracks or damage appears sufficient to warrant a closer inspection on the property itself.
- D. Visible utilities features including but not limited to power poles, overhead lines, service connections and fire hydrants.

3.09 ZONE OF INSPECTION COVERAGE

A. The recordings shall contain coverage of all surface features located within the construction's zone of influence. The construction's zone of influence shall be defined as the limit of construction depicted on the Plans, and an offset of 25 feet. The of influence may be increased if deemed necessary by the Engineer.

3.10 COMPLETION

- A. Upon completion of all Work, the Contractor shall make similar examination of any properties, structures, and conditions where complaints of damage have been received or damage claims have been filed.
- B. Give notice to all interested parties so that the parties may be present during the final examination. Records of the final examination shall be signed and distributed.

3.11 THIRD PARTY PROPERTY DAMAGE CLAIMS

- A. The Contractor is responsible for investigating, adjusting and resolving any thirdparty claim of property damage alleged to be the result of the Contractor's construction activities or other conduct.
- B. The Contractor agrees to indemnify the City for any third-party claim of property damage alleged to be the result of the Contractor's construction activities or other conduct.
- C. Upon the Contractor's receipt of a claim of property damage, whether submitted by the claimant ("Claimant") or the City, alleged to be the result of the Contractor's construction activities or other conduct (the "Claim"), the Contractor's shall immediately commence an investigation into the Claim. In addition, the Contractor shall immediately send the City notice of the Claim, including a copy of the Claim if it was submitted in writing.

- D. The Contractor shall investigate the Claim, regardless of whether the Contractor believes that the Claim has merit or that the damages were caused by the City, a utility company, their contractors and agents or some other third party.
 - 1. Regardless of whether the Contractor or its insurance carrier undertakes the investigation, the Contractor is ultimately responsible for the adequacy and completeness of the investigation of the Claim.
- E. The Contractor shall provide the City and Claimant with the contact information for the Contractor's claims handling representative, including names, telephone numbers, and email addresses.
- F. Upon completing its investigation into the Claim, the Contractor shall notify the Claimant and the City in writing of the Contractor's determination with respect to the Claim.
- G. The Contractor will keep the City and the Claimant informed as to the status of the Claim through the resolution of the Claim.
- H. The Contractor shall fully cooperate with the City should the City choose to conduct an independent investigation of the Claim parallel to the Contractor's investigation.
- I. If within forty-five (45) days from the date of notification to Contractor of the Claim, the Contractor fails to deny or accept, in whole or in part, the Claim, the City may, at its sole judgment, independently investigate and adjust the Claim.
- J. Any adjustment made by the City upon the Contractor failure to independently investigate, adjust and resolve the Claim shall be presumed fair and reasonable unless rebutted by a preponderance of the evidence.
- K. The Contractor shall be responsible for any costs incurred by the City, including any sums paid to the Claimant in settlement of the Claim, investigation costs, and reasonable attorneys' fees.
 - 1. Such costs may be deducted from amounts otherwise due and owing the Contractor by the City.

3.12 THIRD PARTY PROPERTY DAMAGE CLAIMS INVESTIGATION DOCUMENTATION

- A. The Contractor shall prepare and deliver to the City after completion of investigation of each property damage claim the following:
 - 1. All field notes taken.
 - 2. Sketches and diagrams prepared.
 - 3. Copies of all correspondence between the Contractor and Claimant.
 - 4. Copies of all adjuster or engineering reports with regarding the Claim.
 - 5. A third-party damage claim investigation report.

- B. Third-party damage claim investigation reports shall include:
 - 1. Location and description of property.
 - 2. Results of visual inspection.
 - 3. Color video and photographs.
 - 4. Interview of Claimant regarding alleged property damage.
 - 5. The basis for any causation opinion by the Contractor.
 - 6. A written determination of damages payable to Claimant.
 - 7. A written notice of settlement and resolution of the Claim.
- C. The reports for each of the Claims shall be signed by the Contractor's Representative that was present during the investigation of each claim. The City shall examine said reports and may indicate additional information that is required.

END OF SECTION

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SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements and procedures for submitting Shop Drawings, Product Data, Samples, other submittals relating to products, and as specified in individual sections.
- B. Related Sections:
 - 1. Section 01 30 00 Shop Drawings, Product Data and Samples
 - 2. Section 01 32 16 Progress Schedules and Reports.
 - 3. Section 01 60 00 Product Requirements.

1.02 **DEFINITIONS**

- A. Manufacturer's Instructions: Instructions, stipulations, directions, and recommendations issued in printed form by the manufacturer of a product addressing handling, installation, erection, and application of the product; Manufacturer's Instructions are not prepared especially for the Work.
- B. Shop or Fabrication Drawings: Drawings, diagrams, schedules, and other data specially prepared for the Work to illustrate some portion of the work in detail sufficient for actual fabrication.
- C. Design Calculations: Detailed calculations relating to structural, mechanical or electrical design as called for in the relevant technical specification section, or as necessary for the preparation of detailed fabrication drawings.
- D. Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information to illustrate materials, products, or equipment for some portion of the Work.
- E. Mill Certificates: Documents that provide testing data regarding the fabrication and strength of metal products. Mill certificates shall be less than one year old.
- F. Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- G. Special Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged and will be incorporated in the Work.

1.03 SUBMITTAL LIST AND FORMAT

- A. Furnish a schedule and list of all required submittals to the Engineer, in accordance with Section 01 32 16, including required submittals by all subcontractors.
- B. Provide all required submittals, other than physical samples, to the Engineer in Portable Document Format (pdf) for distribution.

1.04 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- A. Submit Shop Drawings, Product Data, Samples, and other pertinent information in conformance with Section 01 30 00.
- B. The Contractor shall maintain at the site of the Project, always, a complete file of approved Shop Drawings and manufacturers' data for this Project.
- C. Check, verify, and revise submittals as necessary to bring them into conformance with Contract Documents and actual field conditions.
 - 1. Determine and verify quantities, dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.
 - 2. Coordinate submittal with other submittals and with the requirements of the Contract Documents.
- D. After completion of checking, verification, and revising; stamp, sign and date submittals indicating review and approval; and submit to Engineer.
 - 1. Stamp and signature indicate Contractor has satisfied shop drawing review responsibilities and constitutes Contractor's written approval of shop drawing.
 - 2. Shop drawings without Contractor's written approval will be returned for resubmission.
- E. Product Data and Manufacturer's Instructions:
 - 1. Excise or cross out non-applicable information and clearly mark applicable information with citations to and terminology consistent with Contract Documents.
 - 2. Show clearly all standard options
 - 3. Show dimensions and clearances required
 - 4. Show performance characteristics and capacities
 - 5. Show wiring diagrams and controls and necessary rough-in requirements for utility services and connections (where applicable).
- F. Identify each item of Product Data by reference to sheet and detail numbers of Drawings and/or specific reference to Section/Paragraph of Specification.
- G. Samples: Submit two (2) samples labeled with reference to applicable Contract Documents. Label will be returned with reviewer's selection when appropriate, comments and stamp. Samples will not be returned unless return is requested in writing and additional sample is submitted.

- H. Special Samples: Submit one (1) sample labeled with reference to applicable Contract Documents. Sample and one label will be returned for installation in the Work.
- I. Construction, fabrication, or ordering of materials shall not begin until Contractor has received submittals reviewed by Engineer governing all aspects of the intended Work. Contractor shall assume risk of expense and delays when proceeding with Work related to required submittals without review and acceptance.

1.05 MANUFACTURER'S INSTRUCTIONS

- A. Submit manufacturer's instructions whenever made available by manufacturers and when installation, erection, or application in accordance with manufacturer's instructions is required by the Specifications.
- B. Submit manufacturer's instructions prior to installation, erection, or application of equipment and other project components. Submit manufacturer's instructions in accordance with requirements for Product Data, Section 01 30 00.

1.06 CERTIFICATES OF COMPLIANCE

- A. Certificates of Compliance should provide the following information:
 - 1. Name of supplier.
 - 2. Type of material being supplied and quantity of material available.
 - 3. A statement that material being supplied complies in all respects with the requirements of the specifications.
 - 4. Copies of test results from a qualified testing laboratory which supports the statement provided above.
- B. All materials used based on a Certificate of Compliance may be sampled and tested at any time by the Engineer. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Drawings and Specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

1.07 ENGINEER'S REVIEW

- A. Engineer's review of submittals shall not release Contractor from Contractor's responsibility for performance of requirements of Contract Documents. Neither shall Engineer's review release Contractor from fulfilling purpose of installation nor from Contractor's liability to replace defective Work.
- B. Do not consider submittals as Contract Documents. Purpose of submittals is to demonstrate how Contractor intends to conform to the design concepts.
- C. Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents.

- 1. Engineer's review does not extend to:
 - a. Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
 - b. Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Plans, or required by Contract Documents.
 - c. Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.
- D. Except as may be provided in subsequent specifications, a submittal will be returned within 30 days with appropriate comments if required.
 - 1. When a submittal cannot be returned within that period, Engineer will, within a reasonable time after receipt of the submittal, give notice of the date by which that submittal will be returned.
- E. Engineer shall be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a submittal whether a stamp or seal is required by Contract Documents or Laws and Regulations.
- F. Costs incurred by City as a result of additional reviews of a submittal after the second time it has been reviewed shall be borne by Contractor. Reimbursement to City will be made by deducting such costs from Contractor's subsequent partial payments.

1.08 MINOR OR INCIDENTAL PRODUCTS AND EQUIPMENT SCHEDULES

- A. Shop Drawings of minor or incidental fabricated products will not be required, unless requested.
- B. Submit tabulated lists of minor or incidental products showing the names of the manufacturers and catalog numbers, with Product Data and Samples as required to determine acceptability.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SUBMITTAL PROCEDURES

- A. Deliver submittals to Engineer as designated during the Preconstruction Conference.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

- C. Submit submittals in ample time for each to serve submittals' intended purpose. Make submittals promptly in accordance with an approved submittal schedule, as put forth by the Contractor, and in such sequence as to cause no delay in the Work or in the work of any other contractor.
- D. Submit submittals which are specified or reasonably required for construction, operation, and maintenance of the Work.
- E. All submittals shall be accompanied by the standard "CONTRACTOR'S SUBMITTAL TRANSMITTAL" form (Section 3.02). Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, or are incorrectly completed, may be returned at the Engineer's discretion for resubmittal.
- F. Submittals shall additionally contain:
 - 1. Field dimensions clearly identified as such (as necessary).
 - 2. Relation to adjacent or critical features of work or materials.
 - 3. Applicable standards, such as ASTM or Federal Specifications numbers.
 - 4. Identification of deviations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 - 5. Identification of revisions on resubmittals.
- G. For shop drawing review, allow 15 days excluding delivery time to and from the Contractor.
- H. Submit the number of samples required by individual specification sections.
- I. Provide or furnish products and execute the Work in accordance with accepted submittals, unless in conflict with Contract Documents.
- J. When minor deviations from Contract Documents are accepted, modify Contract Documents in accordance with the Conditions of the Contract.
- K. Resubmittal Requirements:
 - 1. Make any corrections or changes in the submittals required by the Engineer and resubmit.
 - 2. Shop Drawings and Product Data:
 - a. Revise initial drawings or data and resubmit as specified for the initial submittal.
 - b. Indicate any changes which have been made other than those requested by the Engineer.
 - 3. Samples: Submit new Samples as required for initial submittal.

3.02 SUBMITTAL FORM

A. Transmit each submittal with approved form.

- B. Each submittal transmittal form shall identify:
 - 1. Submittal date.
 - 2. Project title and number.
 - 3. Contract identification
 - 4. The names of:
 - a. Contractor.
 - b. Manufacturer
 - c. Subcontractor and major supplier, when appropriate.
 - 5. Identification of product with reference to Contract Documents by Plan, Detail, and/or Specification section numbers, as appropriate.
 - 6. Provide approximately 8-inch x 3-inch or larger blank space for Contractor and Engineer stamps.
 - 7. Contractor's stamp, initialed or signed, certifying review of submittal, verification of products, field measurements, and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents
 - 8. Variations from Contract Documents when variations are included in submittal.
- C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates a review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be bound, as appropriate, prior to transmittal to the Engineer.
- D. All submittal forms and submittals shall be in English.

3.03 SUBMITTAL REVIEW PROCEDURES

- A. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the Engineer by the second submission of a submittal item. The City reserves the right to withhold moneys due the Contractor to cover additional costs of the Engineer's review beyond the second submittal. Submittal will be returned to the Contractor with one of five (5) review designations:
 - 1. If a submittal is returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.
 - If a submittal is returned to the Contractor marked "MAKE CORRECTIONS NOTED" formal revision and resubmission of said submittal will not be required. This denotation indicates the submittal is in conformance with the Contract Documents other than the minor corrections noted.
 - 3. If a submittal is returned to the Contractor marked "REVISE AND RESUBMIT," there are significant discrepancies between the submitted information and the Contract Documents. The Contractor shall revise said submittal in its entirety and resubmit to the Engineer.

- 4. If a submittal is returned to the Contractor marked "REJECTED-RESUBMIT," the submitted information or product data are deficient and in non-conformance with the Contract Documents. Contractor shall revise said submittal and shall resubmit said revised submittal to the Engineer.
- 5. If a submittal is returned to the Contractor marked "FOR RECORD ONLY," a formal review of the information submitted is not required by the Contract Documents. Revision and resubmission of said submittal will not be required.
- B. All Work for which Shop Drawings are required shall be performed in accordance with the reviewed and approved copies. Fabrication of an item shall not commence before the Engineer has reviewed the pertinent submittal and returned the copies to the Contractor marked either "NO EXCEPTIONS TAKEN," "MAKE CORRECTIONS NOTED," or "FOR RECORD ONLY." Revisions indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for claims for extra Work.
- C. All Contractor submittals shall be carefully reviewed by an authorized representative of the Contractor prior to submission to the Engineer. Each submittal shall be dated, signed, and certified by the Contractor as being correct and in strict conformance with the Contract Documents. No consideration for review by the Engineer of any Contractor's submittal will be made for any items which have not been so certified by the Contractor. All noncertified submittals will be returned to the Contractor without action taken by the Engineer, and any delays caused thereby shall be the total responsibility of the Contractor.
- D. Should the Shop Drawings or manufacturers data (for submittals required by these Specifications) show variations from the Contract requirements, the Contractor shall make specific mention of such variations in the letter of transmittal, in order that, if acceptable, suitable action may be taken for proper adjustment of the Contract; otherwise the Contractor will not be relieved of the responsibility for executing the Work in accordance with the Contract Documents, and the approved submittals.

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SECTION 01 35 26 HEALTH AND SAFETY PLAN

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Development of and adherence to a Health and Safety Plan.

1.02 REFERENCES

- A. California Labor Code, Section 6401.7.
- B. Occupational Health and Safety Administration (OSHA).

1.03 CONSTRUCTION SAFETY PLAN

- A. Detail the Methods and Procedures to comply with California Labor Code Section 6401.7, Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Include the following:
 - 1. Identification of the certified or licensed safety consultant who will prepare, initiate, maintain and supervise safety programs, and procedures.
 - 2. Procedures for providing workers with an awareness of safety and health hazards expected to be encountered in the course of construction.
 - 3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, and safety equipment used in multi-level structures.
 - 4. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
 - 5. Procedures for reporting safety or health hazards.
 - 6. Procedures to follow to correct a recognized safety and health hazard.
 - 7. Procedures for investigation of accidents, injuries, illnesses and unusual events that have occurred at the construction site.
 - 8. Periodic and scheduled inspections of general work areas and specific workstations.
 - 9. Training for employees and workers at the jobsite.
 - 10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
- B. Assume responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of subcontractors, suppliers, and other persons on the jobsite.
 - 1. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.

C. Transmit to City and Engineer copies of reports and other documents related to accidents or injuries encountered during construction.

1.04 EMERGENCY ACCESS PLAN

- A. Prior to the start of construction, prepare a plan to ensure that sufficient access for emergency vehicles, including fire engines and trucks, and emergency evaluation is maintained at all times construction activity takes place at a fire access road or evacuation route.
- B. Define notification procedures for informing the Police and Fire Departments when existing fire access roads and evacuation routes are blocked and replaced with temporary detours.
- C. EAP shall outline procedures for notification and placement of signage to inform the public of the temporary bypasses for emergency response and evacuation routes.
- D. Submit plan to City for review by the Police and Fire Departments.

1.05 CONFINED SPACE ENTRY

- A. Confined Space Entry Program
 - The Contractor shall be responsible for implementing, administering and maintaining a confined space entry program (CSEP) in accordance with Sections 5156, 5157 and 5158, Title 8, California Code of Regulations (CCR).
 - 2. Prior to starting the Work, the Contractor shall prepare and submit its comprehensive CSEP to the Engineer. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces, including personnel training, personal protective equipment required for confined space entry, ventilation, atmospheric testing, controlled access, and rescue plan provisions.
 - The Contractor's submittal shall include the names of its personnel, including subcontractor personnel, assigned to the project, who will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.
- B. Permit-Required Confined Spaces
 - Entry into permit-required confined spaces, as defined in Section 5157, Title 8, CCR, may be required as ancillary to the Work. All maintenance holes, tanks, vaults, pipelines, excavations, or other enclosed or partially enclosed spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise.
 - 2. The Contractor shall implement a permit space program prior to performing any Work in a permit-required confined space. A copy of the permit shall always be available for review by Contractor and City personnel at the Work site.
1.06 COVID-19 PROTOCOLS

- A. As long as San Mateo County Health Department guidelines for large construction projects remain in place, Contractor shall follow said guidelines, and provide COVID-19 construction practice protocols as part of the Health and Safety Plan specified herein.
- B. Contractor shall provide a COVID-19 Safety Compliance Officer (SCO) at the jobsite whenever there are five or more workers present, or as amended by San Mateo County.
- C. All Work necessary to comply with COVID-19 guidelines in place at the time of bid shall be included in the Contract Price.

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SECTION 01 35 29 HAZARDOUS MATERIALS PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Description of existing site conditions.
 - 2. General requirements and procedures for Work in the presence of hazardous materials.
 - 3. Development and implementation of the Contractor's Hazardous Materials Site-Specific Health and Safety Plan (HMSSHASP).
 - 4. Requirements for personal protective equipment, training, and monitoring.
- B. Requirements of this section apply to the Work or any portion thereof which involves disturbance of or exposure to hazardous materials.

1.02 DEFINITIONS

- A. As used herein, the term "Hazardous Materials" or "Hazardous Substances" shall mean: (a) any substances defined, regulated or listed (directly or by reference) as "hazardous substances," "hazardous materials," "hazardous wastes," "toxic waste," "pollutant" or "toxic substances" or similarly identified as hazardous to human health or the environment, in or pursuant to (i) the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. '9601 et seq. ("CERCLA"); (ii) the Hazardous Materials Transportation Act, 49 U.S.C. '1802 et seq.; (iii) the Resource Conservation and Recovery Act, 42 U.S.C. '6901 et seq.; (iv) the Clean Water Act, 33 U.S.C. '1251 et seq.; (v) California Health and Safety Code Sections 24115, 25122.7, 25117, chemicals listed pursuant to 25249.8, 25281, 25316, and those wastes listed pursuant to 25140; and (vi) the Clean Air Act, 42 U.S.C. '7901 et seq.; and (vii) California Water Code '13050; (b) any amendments to such enumerated statutes or acts; and (c) any other hazardous or toxic substance, material chemical, waste or pollutant identified as hazardous or toxic or regulated under any other applicable federal, state or local environmental laws.
- B. Personal Protective Equipment (PPE): Individually donned equipment and clothing used in conjunction with appropriate work practices to protect project workers from unacceptable risk related to the handling of soil, building material, or groundwater impacted with hazardous materials.
- C. Hazardous Materials Site-Specific Health and Safety Plan (HMSSHASP): A sitespecific plan which addresses the safety and health hazards of each phase of site operations and includes the requirements and procedures for employee protection.

- D. Contaminated Materials:
 - 1. Contaminated Soil: Soil that cannot be disposed of at a State-regulated Class III landfill/disposal site.
 - 2. Contaminated Water: Ground water from dewatering operations containing constituents at measured levels in excess of regulatory permit thresholds for discharge into the storm drainage system or San Francisco Bay.
 - 3. Site materials, whether existing or new, other than soil or water that cannot be disposed of at a State-regulated Class III landfill/disposal site shall also be considered as contaminated material.

1.03 SUBMITTALS

- A. General:
 - 1. Prepare and submit in accordance with the applicable provisions of Section 01 33 00.
 - 2. Submit permission to dispose of material from landfill/disposal site owner prior to disposing of any material off-site. Include name, address, and telephone number of disposal site and of owner. Submit weigh tickets or volume calculations, as appropriate, for all disposed materials to the Engineer.
 - 3. Submit waste material classifications.
 - 4. The Contractor shall complete the required federal waste manifest forms and submit copies of these forms to the City for their signature as the "generator" of such waste.
- B. Hazardous Materials Site-Specific Health and Safety Plan (HMSSHASP): Submit for acceptance by the Engineer within 21 days after Notice to Proceed.
 - 1. Amendments: Submit amendments to the HMSSHASP for review and acceptance by the Engineer as they occur.

1.04 EXISTING SITE CONDITIONS

- A. The Work sites are situated adjacent to the Foster City Bayfront, which is located within an urban area proximate to potential current and historic sources of hazardous material impacts to soil and groundwater.
- B. Reference is made to Section 00 31 32, Paragraph 2.03, for information regarding site surveys of potential hazardous material that might be encountered during Work.
 - 1. Reference material containing preliminary hazardous materials screening for the project sites completed with CEQA documentation for the Project is available upon request from the City.

1.05 GENERAL REQUIREMENTS

A. No Work that disturbs existing structures, soil, or groundwater containing hazardous materials shall be performed until the Hazardous Substance Site-Specific Health and Safety Plan is reviewed and accepted by the Engineer.

- B. Documentation:
 - 1. Maintain logs on-site of monitoring equipment calibration.
 - 2. Maintain logs on-site of the results of field monitoring measurements.
 - 3. Maintain copies on-site of any laboratory analytical results associated with health and safety monitoring.
- C. Contractor shall comply with the following general practices:
 - 1. Do not smoke, chew gum, apply cosmetics or consume food and beverages in areas where hazardous materials are being handled.
 - 2. Wash hands thoroughly before eating, smoking, or drinking.
 - 3. Do not store food in areas where it may come in contact with hazardous materials, including soil and dusts.
 - 4. To the extent practical, stay upwind from operations that emit vapors, gases or particulates.
 - 5. Clean clothing and footwear upon leaving jobsite and prior to entering any vehicle, mobile equipment, or office.
 - 6. Clean vehicle interiors and hand held tools as needed to prevent accumulation of particulates.
- D. Follow guidelines for the selection and use of proper personal protective equipment as outlined in the applicable job safety or task hazard analysis from the Hazardous Material Site Specific Health and Safety Plan. At a minimum all Contractor personnel that may come into contact with site soils shall be suitably dressed to perform their work in a safe manner that minimizes exposure to soil and does not interfere with their hearing, vision or free use of their hands or feet. The following minimum PPE shall be worn by all Contractor employees who may contact site soils:
 - 1. Waist length shirts with sleeves.
 - 2. Trousers covering the entire leg.
 - 3. Work boots.
 - 4. Eye protection meeting the latest American National Standard for Occupational and Educational eye and face protection.
 - 5. Work gloves when handling soil or hand tools in contact with soil.
 - 6. Additional equipment may modify this minimum requirement and, if required, will be outlined in the Hazardous Material Site Specific Safety and Health Plan as part of the job safety or task hazard analysis.
- E. Use equipment, in addition to the minimum outlined herein, if listed in the Hazardous Material Site Specific Safety and Health Plan as part of the job safety or task hazard analysis.

1.06 HAZARDOUS MATERIALS SITE-SPECIFIC HEALTH AND SAFETY PLAN

- A. Prepare a Hazardous Materials Site-Specific Health and Safety Plan (HMSSHASP) for all site personnel in accordance with the federal OSHA, and Cal/OSHA regulations.
 - 1. The Plan shall include:
 - a. Provisions specific to handling soils and ballast containing elevated concentrations of petroleum hydrocarbons, poly-nuclear aromatic hydrocarbons, and the metals lead and arsenic.
 - b. Additional information or procedures as determined necessary by the Contractor for safe performance of Work in the presence of hazardous materials.
- B. Implement the HMSSHASP, including use of engineering controls, providing its site personnel with the appropriate training and monitoring and personal protective equipment (PPE) based upon the type of Work to be performed and the associated hazard, and ensuring proper use of PPE and compliance with safe Work practices. The Contractor shall perform all monitoring necessary to determine the ongoing appropriate level of PPE for the Work.
- C. The Engineer will have the authority to stop Work if, in the opinion of the Engineer, the level of PPE selected by the Contractor is not appropriate or site personnel are not complying with the requirements of the HMSSHASP.

1.07 UNKNOWN HAZARDOUS MATERIALS

- A. When the presence of hazardous materials are not indicated in the Contract Documents and the Contractor encounters materials, including groundwater, which the Contractor reasonably believes to be hazardous and the hazardous materials have not been rendered harmless, the Contractor shall immediately cease Work in the affected area and report the condition to the Engineer in writing. The Contractor may continue Work in unaffected areas reasonably believed to be safe.
- B. The Engineer will direct the Contractor as to sampling, testing, disposal and/or remedial work that might take place either through the Contractor's forces or City's own forces or an authorized agent. If the consequent delay of work in the affected area delays a current controlling operation, the delay will be considered in accordance with Article 10 of the General Conditions as modified by Special Provisions.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 HAZARDOUS MATERIAL AND WASTE MANAGEMENT

- A. Storage: The Contractor shall label and store all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; in accordance with the City of Foster City Hazardous Materials Storage Ordinance and all applicable State and Federal regulations.
 - 1. The Contractor shall store all hazardous materials and all hazardous wastes in accordance with secondary containment regulations, and it is recommended that these materials and wastes be covered, as needed, to avoid potential management of collected rainwater as a hazardous waste.
 - 2. The Contractor shall keep an accurate, up-to-date inventory, including, but not limited to, Material Safety Data Sheets (MSDSs) of hazardous materials and hazardous wastes stored on-site, to assist emergency response personnel in the event of a hazardous materials incident.
- B. Usage: When rain forecast within 24 hours or during wet weather, the Engineer may prevent the Contractor from using chemicals in outside areas. The Contractor shall follow material manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- C. Disposal: The Contractor shall arrange for regular hazardous waste collection to comply with time limits on storage of hazardous wastes. The Contractor shall dispose of hazardous waste only at authorized and permitted Treatment, Storage, and Disposal Facilities, and use only licensed hazardous waste haulers to remove the waste off-site, unless quantities to be transported are below applicable threshold limits for transportation specified in State and Federal regulations. Contractor shall ensure that City receives a copy of the Uniform Hazardous Waste Manifest form completed by the hazardous waste facility that accepted said materials.

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SECTION 01 41 00 REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Regulatory requirements applicable to the Work.
- B. Required provisions under the Local Agency Disputes Act.
- C. Required references under Federal law.

1.02 GENERAL

- A. Compliance with Laws:
 - 1. The Contractor shall perform the Work in accordance with all applicable codes, rules, regulations, laws, ordinances, permits and permit conditions, whether or not specifically mentioned in this Section, elsewhere in the Contract Documents or Specifications, shown on the Plans, or furnished to the Contractor (collectively, "Regulatory Requirements").
 - a. Codes, laws, ordinances, rules, regulations and ordinances (together, Regulatory Requirements) are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements.
 - 2. Specific reference in the Specifications to codes and regulations or requirements of regulatory agencies shall mean the latest printed edition of each adopted by the regulatory agency in effect at the time of the opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
 - 3. Any listing of Regulatory Requirements for hazardous waste abatement work in the Contract Documents is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable Regulatory Requirements having application to the Work. Where conflict among the Regulatory Requirements or with these Specifications occurs, the most stringent requirements shall be used.
- B. Where conflict among the Regulatory Requirements occurs or the Regulatory Requirements conflict with the Plans and Specifications, the Contractor shall notify the Engineer and comply with the more stringent requirements, unless notified by the Engineer and the Contractor shall not proceed with the Work until the Engineer has so ordered.

1.03 REGULATORY REQUIREMENTS

- A. Applicable Building Code Requirements. Codes and requirements that apply to the Work and are incorporated into the Contract Documents include all codes applicable to building and construction including, without limitation, the following:
 - 1. City of Foster City "Standard Specifications for Public Works Construction".

- 2. City of Foster City Municipal Code.
- 3. California Building Code (CBC), 2019, as amended by applicable local ordinances
- 4. CAL-OSHA (Occupational and Safety Code).
- 5. California Fire Code and other State Fire Marshall requirements, as amended by applicable local ordinances.
- 6. California Electrical, Plumbing and Mechanical Codes, as amended by applicable local ordinances.
- 7. State Energy Standards Title 24.
- 8. California Administrative Code Titles 15, 19 and 24 (with California amendments), and Americans with Disabilities Act (ADA) accessibility guidelines, whichever is more stringent.
- All State laws and City and County Ordinances, rules of the State or City or County Health Departments, rules of the National Board of Fire Underwriters and National Fire Protection Associations, and local power company regulations for mechanical and electrical work.
- 10. All other codes and regulations that may be noted in the technical sections of the Specifications.
- B. Regulatory Permits and Conditions of Approval. City has secured the following regulatory agency permits and authorizations whose terms and conditions govern construction of the Project and prosecution of the Work and which are hereby incorporated into the Contract Documents as Appendices 1 through 7 (collectively, "Regulatory Permits"):
 - 1. Bay Conservation and Development Commission, Permit No. 2018.005.00.00, December 2, 2019.
 - 2. California Department of Fish and Wildlife, Temporary Entry Permit, October 2, 2019.
 - 3. National Marine Fisheries Service Biological Opinion, August 8, 2019.
 - San Francisco Regional Water Quality Control Board, Clean Water Act Section 401 Water Quality Certification, Regulatory Measure 425529, Amended November 26, 2019.
 - 5. State of California Lands Commission, Lease No. PRC 9539.9, September 19, 2019.
 - 6. U.S. Army Corps of Engineers, File No. 2015-00391S, January 6, 2020.
 - 7. U.S. Fish and Wildlife Service Biological Opinion, October 2, 2019.
- C. Mitigation Monitoring and Reporting Program. Construction of the Project and prosecution of the Work are subject to implementation and satisfaction of the mitigation measures set forth in the Mitigation Monitoring and Reporting Program adopted by the City and hereby incorporated into the Contract Documents as Appendix 8.

- D. Contractor shall be familiar with all applicable codes, permit conditions, authorizations, regulations, and necessary procedures and obtain and pay for any additional permits or authorizations required to prosecute any portion of the Work that is not authorized by the Regulatory Permits, and, upon issuance, whether obtained by the City or Contractor, shall be incorporated into the definition of Regulatory Permits.
- E. Contractor shall grant regulatory agency staff or authorized representatives, upon presentation of credentials and other documents as may be required by law, permission to:
 - 1. Enter upon Project sites where regulated activity is located or conducted, or where records are kept.
 - 2. Have access to and copy any records that are kept and are relevant to the Project or the requirements of a regulatory order.
 - 3. Inspect any regulated facilities, equipment, practices, or operations.
 - 4. Sample or monitor for the purposes of assuring regulatory compliance.
- F. Contractor shall provide a copy of each Regulatory Permit to any subcontractors working on the Project.
- G. Copies of the Regulatory Permits shall remain at the Project site for the duration of the Work.
- H. Contractor shall arrange all inspections, and secure necessary releases or signoff from all governing regulatory agencies and private utility companies required for the Work, including any inspections, releases and signoffs that are prerequisite to any utility service connection work.
- When conflicts or violations of law or codes are found during any inspection by the governing agencies, the Contractor shall request such allegation of code conflict or violation, or Request of Correction to be on a written form from the governing agencies. The Contractor shall furnish the Engineer and the Inspector each a duplicate copy of such written notice for review.
- J. Contractor hereby waives all claims against CDFW, its officers, agents, employees and contractors, for loss or damage caused by, arising out of, or in any way connected with the exercise of their Permit, and agrees to protect, save harmless and indemnify CDFW, its officers, agents, employees and contractors of and from any and all claims, losses, costs, expenses, damage or liability which may be suffered or incurred by CDFW, its officers, agents, employees and contractors, caused by, arising out of, or in any way connected with the exercise of the permission hereby granted, and the Work, except for those caused by the sole active negligence of CDFW. Contractor agrees that CDFW shall not be considered negligent and CDFW shall not be held liable for any loss, damage, or theft of property belonging to, or in the custody of Contractor, its officers, employees, agents or contractors if such loss, damage, or theft occurs on land owned by, or under the control or management of, CDFW unless caused by the sole active negligence of CDFW.

1.04 COMPLIANCE WITH LAWS, STATUES, RULES, AND REGULATIONS

- A. During prosecution of Work to be done under Contract Documents, Contractor shall comply with applicable laws, ordinances, rules and regulations including, without limitation, the following:
 - 1. Federal:
 - a. Americans With Disabilities Act of 1990
 - b. 29 CFR, Section 1910.1001, Asbestos
 - c. 40 CFR, Subpart M, National Emission Standards for Asbestos
 - d. Executive Order 11246
 - e. Federal Endangered Species Act
 - f. Clean Water Act
 - 2. State of California:
 - a. Code of Regulations, Titles 5, 8, 17, 19, 21, 22, 24 and 25
 - b. Public Contract Code
 - c. Health and Safety Code
 - d. Government Code
 - e. Labor Code
 - f. Civil Code
 - g. Code of Civil Procedure
 - h. CPUC General Order 95, Rules for Overhead Electric Line Construction
 - i. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
 - j. Cal/OSHA
 - k. California Endangered Species Act
 - I. Water Code
 - m. Fish and Game Code
 - 3. State of California Agencies:
 - a. State and Consumer Services Agency
 - b. Office of the State Fire Marshall
 - c. Office of Statewide Health Planning and Development
 - d. Department of Fish and Wildlife
 - e. Department of Transportation
 - f. All Air Quality Management Districts with jurisdiction
 - g. All Regional Water Quality Control Boards with jurisdiction

- 4. Local Agencies:
 - a. City of San Mateo encroachment permit that the Contractor shall obtain for no fee. (See Appendix 9)

1.05 CHANGE ORDERS AND CLAIMS

- A. The Public Contract Code including, without limitation, Section 7105(d)(2), and the California Government Code Section 930.2, et seq., apply to all contract procedures for changes, time extensions, change orders (time or compensation) and claims. Federal law (U.S. v. Holpuch 326 U.S. 234) shall supplement California law on the enforceability of these requirements.
- B. Any change, waiver, or omission to implement contract change order and claim procedures shall have no legal effect unless expressly permitted in a fully executed change order approved by Contractor and Owner and approved as to form by their respective legal counsel.

1.06 REQUIRED PROVISIONS ON CONTRACT CLAIM RESOLUTION

- A. Any claim arising under this contract which the Contractor wishes to assert against the City shall be governed by California Public Contract Code Section 9204. Claims which do not exceed three hundred seventy-five thousand dollars (\$375,000) are also subject to the provisions of Article 1.5 of the California Public Contract Code (commencing with Section 20104).
- B. Pursuant to California Public Contracts Code Section 9204, claims shall be resolved as follows:
 - 1. Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.
 - 2. The claimant shall furnish reasonable documentation to support the claim, pursuant to Document 00 7200 (General Conditions), Article 12.
 - 3. If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body 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 public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.
 - 4. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, Paragraph 10 shall apply.

- 5. If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.
- 6. 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 public entity shall provide the claimant 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 public entity 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 public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this Section.
- 7. 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.
- 8. Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.
- This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.
- 10. Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision 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 public entity'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 claimant.
- 11. Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.
- 12. If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or

lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

- C. A waiver of the rights granted by this Section is void and contrary to public policy, provided, however, that:
 - 1. Upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable.
 - 2. A public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this Section.
- D. Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

1.07 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

- A. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a Contractor, must be accessible to the disabled public. Notwithstanding the Contractor's ability to restrict all public access to active work sites, Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation.
- B. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under the Contract Documents and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns shall constitute a material breach of the Contract Documents.

1.08 COMPLIANCE WITH IRCA

- A. Contractor acknowledges that Contractor, and all subcontractors hired by Contractor to perform services under this Agreement, are aware of and understand the Immigration Reform and Control Act (IRCA).
- B. Contractor is and shall remain in compliance with the IRCA and shall ensure that any subcontractors hired by Contractor to perform services under this Agreement are in compliance with the IRCA.

C. In addition, Contractor agrees to indemnify, defend and hold harmless Owner, its agents, officers and employees, from any liability, damages or causes of action arising out of or relating to any claims that Contractor's employees, or employees of any subcontractor hired by Contractor, are not authorized to work in the United States for Contractor or its subcontractor and/or any other claims based upon alleged IRCA violations committed by Contractor or Contractor's subcontractors.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 42 00 REFERENCES AND DEFINITIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reference standards, abbreviations, symbols, and definitions used in Contract Documents.
- B. Full titles are given in this Section for standards cited in other Sections of Specifications.

1.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

- A. References
 - Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
 - 2. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, Contractor shall report it in writing at once to City's Representative and Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by City.
- B. Precedence
 - 1. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, CCD, or Supplemental Instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).
 - 2. No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of City, City's Representative, Construction Manager, Engineer, or Contractor, or any of their

subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to City, Engineer, or any of their consultants, agents, representatives or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

- C. **Referenced Grades, Classes, and Types:** Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Plans or in Specifications, provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.
- D. Edition Date of References:
 - When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Bids.
 - 2. All amendments, changes, errata and supplements as of the effective date shall be included.
- E. **ASTM and ANSI References:** Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.03 DEFINITIONS

A. **Meaning of Words and Phrases:** Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. Where abbreviations and symbols are used, such abbreviations and symbols shall be given their common meaning in the construction industry. In the Contract Documents, the neuter gender includes the feminine and masculine, and the singular number includes the plural.

While City has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:

- 1. <u>Addenda</u>: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-Bid Conference and/or Site Visit.
- 2. <u>Agreement</u> (Document 00 52 00): Agreement is the basic Contract Document that binds the parties to construction Work. Agreement defines relationships and obligations between City (Owner) and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract Documents.
- 3. <u>Alternate</u>: Work added to or deducted from the base Bid, if accepted by City.

- 4. <u>Application for Payment</u>: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.
- 5. <u>Approved Equal</u>: Approved in writing by City as being of equivalent quality, utility and appearance.
- 6. <u>Asbestos</u>: Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by OSHA or Cal/OSHA.
- 7. <u>Bid</u>: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.
- 8. <u>Bidder</u>: One who submits a Bid.
- Bidding Documents: All documents comprising the Project Manual (including all documents and Specification Sections listed in Document 00 01 10 (Table of Contents), including documents supplied for bidding purposes only and Contract Documents.
- 10. <u>Business Day</u>: Any Day other than Saturday, Sunday, and the following days that have been designated as holidays by City. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday.
 - a. New Year's Day, January 1
 - b. Martin Luther King Jr.'s Birthday, third Monday in January
 - c. Presidents' Day, third Monday in February
 - d. Memorial Day, last Monday in May
 - e. Independence Day, July 4
 - f. Labor Day, first Monday in September
 - g. Veterans' Day, November 11
 - h. Thanksgiving Day, as designated by the President
 - i. The Day following Thanksgiving Day
 - j. Christmas Eve Day, December 24
 - k. Christmas Day, December 25
 - I. New Year's Eve Day, December 31
- 11. By City: Work that will be performed by City or its agents at the City's expense.
- <u>By Others</u>: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by City, other contractors, or other means.
- 13. <u>Change Order</u>: A written instrument prepared by City and signed by City and Contractor, stating their agreement upon all the following:
 - a. a change in the Work.
 - b. the amount of the adjustment in the Contract Sum, if any.
 - c. the amount of the adjustment in the Contract Time, if any.

- 14. <u>City</u>: The City of Foster City, California. Also, <u>Estero Municipal Improvement</u> <u>District</u>. Also, <u>Owner</u>.
- 15. <u>Code Inspector</u>: A local or state agency responsible for the enforcement of applicable codes and regulations. Also, <u>Inspector</u>.
- 16. <u>Concealed</u>: Work not exposed to view in the finished Work, including within or behind various construction elements.
- 17. <u>Construction Change Directive (CCD)</u>: A written order prepared and signed by City, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. Also, <u>Construction Change</u> <u>Order (CCO)</u>.
- 18. <u>Contract Amount</u>: a change order price, line item price, Contract Sum, or other price assigned to a scope of work.
- 19. <u>Contract Conditions or Conditions of the Contract</u>: Consists of two parts: General Conditions and Supplementary Conditions.
 - a. General Conditions are general clauses that are common to the City Contracts, including Section 00 72 00 (General Conditions).
 - b. Supplementary Conditions modify or supplement General Conditions to meet specific requirements for Contract Documents, including Section 00 73 00, et seq. (Supplementary Conditions).
- 20. <u>Contract Documents and Contract</u>: Contract Documents and Contract shall consist of the documents identified as the Contract Documents in Document 00 52 00 (Agreement), plus all changes, Addenda, and modifications thereto.
- 21. Contract Modification:
 - a. a written amendment to Contract signed by Contractor and City
 - b. a Change Order
 - c. a Construction Change Directive
 - d. a written directive for a minor change in the Work issued by City
- 22. <u>Contract Sum</u>: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by City to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.
- 23. <u>Contract Time</u>: The number or numbers of Days or the dates stated in the Agreement to achieve Substantial Completion of the Work or designated Milestones; and/or to achieve Final Completion of the Work so that it is ready for final payment and is accepted.
- 24. <u>Contractor</u>: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neutral in gender. The term "Contractor" means the Contractor or its authorized representative.
- 25. <u>Contractor's Employees</u>: Persons engaged in execution of Work under Contract as direct employees of Contractor, as Subcontractors, or as employees of Subcontractors.

- 26. <u>Council</u>: The governing body of the City.
- 27. County: The County in which City is located. San Mateo County, California.
- 28. <u>Day</u>: One calendar day of 24 hours measured from midnight to the next midnight, unless the word "day" is specifically modified to the contrary.
- 29. <u>Defective</u>: An adjective which, when modifying the word "Work," refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including, without limitation, approval of Samples and "or equal" items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by City). Unapproved substitutions are defective. City is the judge of whether Work is Defective.
- 30. Engineer: If used elsewhere in the Contract Documents, "Engineer" shall mean a person (or that person's firm) holding a valid license to practice engineering in the State of California, representing the City in the administration of the Contract Documents. Engineer may be an employee of or an independent consultant to City. When Engineer is referred to within the Contract Documents and not an employee of City, Engineer shall be construed to include employees of Engineer, and employees of subconsultants that Engineer has retained for the purpose of observing the Work. When the designated Engineer is an employee of Owner, his or her authorized representatives on the Project will be included under the term Engineer. If Engineer is an employee of City, Engineer and employees and indemnities.
- 31. <u>Equal</u>: Equal in opinion of City. Burden of proof of equality is responsibility of Contractor.
- 32. <u>Final Acceptance or Final Completion</u>: City's acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Acceptance/Final Completion include, but are not limited to:
 - a. Final cleaning is completed.
 - b. All systems having been tested and accepted as having met requirements of Contract Documents.
 - c. All required instructions and training sessions having been given by Contractor.
 - d. All Project Record Documents having been submitted by Contractor, reviewed by City, and accepted by City.
 - e. All punch list Work, as directed by City, having been completed by Contractor.
 - f. Generally all Work, except Contractor maintenance after Final Acceptance/Final Completion, having been completed to satisfaction of City.
- 33. <u>Force Account</u>: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.

- 34. <u>Exposed</u>: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.
- 35. Furnish: Supply only, do not install.
- 36. Indicated: Shown or noted on the Plans.
- 37. Install: Install or apply only, do not furnish.
- 38. <u>Latent</u>: Not apparent by reasonable inspection including, without limitation, the inspections and research required as a condition to bidding under Section 00 72 00 (General Conditions).
- 39. <u>Law</u>: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions.
- 40. <u>Material</u>: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.
- 41. <u>Milestone</u>: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.
- 42. <u>Modification</u>: Same as Contract Modification.
- 43. <u>Not in Contract or "NIC"</u>: Work that is outside the scope of Work to be performed by Contractor under Contract Documents.
- 44. <u>Notice of Completion</u>: Shall have the meaning provided in California Civil Code Section 9204, and any successor statute.
- 45. Off-Site: Outside geographical location of the Project.
- 46. Owner: Owner is defined in Document 00 52 00 (Agreement). Also, City.
- 47. <u>Owner-Furnished</u>, <u>Contractor Installed</u>: Items furnished by Owner at its cost for installation by Contractor at its cost under Contract Documents.
- 48. <u>Owner's Representative(s)</u>: See Document 00 52 00 (Agreement). Also <u>City's</u> <u>Representative(s)</u>.
- 49. <u>Partial Utilization</u>: Use by City of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.
- <u>Phase</u>: A specified portion of the Work (if any) specifically identified as a Phase on the Plans, in Document 00 52 00 (Agreement), or in Section 01 11 00 (Summary of Work).
- 51. <u>Plans</u>: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams. May also be referred to herein as "Drawings."
- 52. <u>Product Data</u>: That information (brochures, catalog sheets, manufacturer's cut sheets, etc.) supplied by vendors having technical and commercial characteristics of the supplied equipment or materials and accompanying commercial terms such as warranties, instructions, and manuals.

- 53. <u>Progress Report</u>: A periodic report submitted by Contractor to City with progress payment invoices accompanying progress schedule. See Section 00 72 00 (General Conditions) and Section 01 32 16 (Progress Schedules and Reports).
- 54. <u>Project</u>: Total construction of the Foster City_Levee Protection Planning and Improvements Project (CIP 301-657) and any other items shown to be constructed on the Plans and as described in and pursuant to the Contract Documents (listed in Document 00 52 00 Section 5.01), including the Specifications..
- 55. <u>Project Manual</u>: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, Drawings, and Specifications.
- 56. <u>Project Record Documents</u>: All Project deliverables required under the Contract Documents, including without limitation, as built drawings; Installation, Operation, and Maintenance Manuals; and Machine Inventory Sheets.
- 57. Proposal: A Bid.
- 58. Provide: Furnish and install.
- 59. <u>Request for Information (RFI)</u>: A document prepared by Contractor requesting information regarding the Project or Contract Documents. The RFI system is also a means for City to submit Contract Document clarifications or supplements to Contractor.
- 60. <u>Request for Proposals (RFP)</u>: A document issued by City to Contractor whereby City may initiate changes in the Work or Contract Time as provided in Contract Documents.
- 61. <u>Request for Substitution (RFS)</u>: A document prepared by Contractor requesting substitution of materials as permitted and to the extent permitted in Contract Documents.
- 62. <u>RFI-Reply</u>: A document consisting of supplementary details, instructions, or information issued by City that clarifies or supplements Contract Documents, and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by City. RFI-Replies will be issued through the RFI administrative system.
- 63. <u>Samples</u>: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- 64. <u>Shop Drawings</u>: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- 65. Shown: As indicated on Plans.
- 66. <u>Site</u>: The particular geographical location of Work performed pursuant to the Contract Documents, which is generally located within the footprint of the approximately 43,000-linear-foot (8 miles) existing levee system and San Francisco Bay Trail that surrounds Foster City along the bayfront and includes six proposed construction staging areas.

- 67. <u>Specifications</u>: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards, and workmanship for the Work; performance of related services.
- 68. <u>Specified</u>: As written in Specifications.
- 69. <u>Subcontractor</u>: A person or entity that has a direct contract with Contractor to perform a portion of the Work at the Site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term Subcontractor does not include a separate contractor or subcontractors of a separate contractor.
- 70. <u>Substantial Completion</u>: The Work (or a specified part thereof) has progressed to the point where, in the opinion of City as evidenced by a notice or certificate of Substantial Completion, the Work is sufficiently complete, in accordance with Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended, and unperformed or incomplete work elements are minor in nature; or if no such certificate is issued, when the Work (or specified part) is complete and ready for final payment as evidenced by written recommendation of City for final payment. The terms "Substantially Complete" and "Substantially Completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- 71. <u>Supplemental Instruction</u>: A written directive from City to Contractor ordering alterations or Modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications.
- 72. <u>Technical Specifications</u>: Specification Sections included within Division 02 and above.
- 73. <u>Testing and Special Inspection Agency</u>: An independent entity engaged to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.
- 74. <u>TIE: Time Impact Evaluation</u>; see Section 01 26 00 (Payment for Changes and Extra Work). May also be referred to as Time Impact Analysis (TIA).
- 75. <u>Underground Facilities</u>: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials: electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.
- <u>Unit Price Work</u>: Shall be the portions of the Work for which a unit price is provided in Document 00 52 00 (Agreement) or Section 01 29 73 (Schedule of Values).
- 77. <u>Work</u>: The performing or furnishing of all project management, labor, materials, tools, equipment, documents and services necessary for and incidental to the construction and completion of the entire Project, or the various separately identifiable parts thereof, pursuant to the Plans and Specifications and all other Contract Documents within the Contract Time (collectively, "Work").

- 78. Wherever the word "work" is used, rather than the word "Work," it shall be understood to have its ordinary and customary meaning.
- B. **Other Defined Terms**: The following terms are not necessarily identified with initial caps; however, they shall have the meaning set forth below:
 - Wherever words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood that direction, requirements, or permission of City is intended. Words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in judgment of City. Words "approved," "acceptable," "satisfactory," "favorably reviewed," or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by City.
 - 2. Wherever the word "may" or "ought" is used, the action to which it refers is discretionary. Wherever the word "shall" or "will" is used, the action to which it refers is mandatory.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 01 42 16 ABBREVIATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Abbreviations and meanings.

1.02 INTERPRETATIONS

A. Interpret abbreviations by context in which abbreviations are used.

1.03 ABBREVIATIONS

A. Abbreviations used to identify Reference Standards:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ABC	Associated Air Balance Council
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ADC	Air Diffusion Council
ABMA	American Bearing Manufacturers' Association
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers' Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
AMG	Arizona Masonry Guild
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ARI	Air Conditioning and Refrigeration Institute
ASAHC	American Society of Architectural Hardware Consultants
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International (American Society for Testing and Materials)
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association

AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWSC	American Welding Society Code
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
BSI	Building Stone Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPSC	U.S. Consumer Product Safety Commission
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSI	Construction Specifications Institute
CTI	Ceramic Tile Institute
DHI	Door and Hardware Institute
EIFS	Exterior Insulation and Finish System
EJCDC	Engineers Joint Contract Documents Committee
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual
FS	Federal Specifications
FTI	Facing Tile Institute
GA	Gypsum Association
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
MAG	Maricopa Association of Government
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MS	Military Specifications
NAAMM	National Association of Architectural Metal Manufacturers
NAPA	National Asphalt Pavement Association
NBHA	National Builders Hardware Association
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NETA	International Electrical Testing Association
NETA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIST	National Institute of Standards and Technology

	NMWIA NPCA NRCA NTMA NWMA	National Mineral Wood Insulation Association National Paint and Coatings Association National Roofing Contractors Association National Terrazzo and Mosaic Association National Woodwork Manufacturer's Association
	OSHA	Occupational Health and Safety Administration
	PCA PCI PDCA PDI PEI PS	Portland Cement Association Prestressed Concrete Institute Paint and Decorating Contractors of America Plumbing and Drainage Institute Porcelain Enamel Institute Product Standard
	RTI	Resilient Tile Institute
	SAE SCPA SDI SIGMA SJI SMACNA SSPC	Society of Automotive Engineers Structural Clay Products Association Steel Door Institute Sealed Insulating Glass Manufacturers Association Steel Joist Institute Sheet Metal and Air Conditioning Contractors National Association Steel Structures Painting Council
	TCA	Tile Council of America
	UBC UL USDA	Uniform Building Code (ICBO) Underwriters Laboratories, Inc. United States Department of Agriculture
	VA	Vermiculite Association
	WCLA WCLIB WPA WPOA WRC WSCPA WWPA	West Coast Lumberman's Association West Coast Lumber Inspection Bureau Western Pine Association Western Plumbing Officials Association Welding Research Council Western States Clay Products Association Western Wood Products Association
В.	Abbreviations	used in Specifications:
	a A am ac ac-ft atm AWG	year or years (metric unit) ampere or amperes ante meridian (before noon) alternating current acre-foot or acre-feet atmosphere American Wire Gauge

bbl BCDC bd bhp bil gal BOD Btu Btuh bu	barrel or barrels Bay Conservation and Development Commission board brake horsepower billion gallons biochemical oxygen demand British thermal unit or units British thermal units per hour bushel or bushels
C cal cap cd CPA cfm Ci cm cmu CO CO Co. CO2 COD Corp. counts/min cu cu cm	degrees Celsius calorie or calories capita candela or candelas City of Palo Alto cubic feet per minute curie or curies centimeter or centimeters concrete masonry unit carbon monoxide Company carbon dioxide chemical oxygen demand Corporation counts per minute cubic cubic centimeter or centimeters
cu ft cu ft/day cu ft/hr cu ft/min cu ft/sec cu in cu m cu yd	cubic foot or feet cubic feet per day cubic feet per hour cubic feet per minute cubic feet per second cubic inch or inches cubic meter or meters cubic yard or yards
d day db DB dc diam DO DS	day (metric units) day (English units) decibels dry bulb (temperature) direct current diameter dissolved oxygen dissolved solids
emf	electromotive force
fpm F ft fc	feet per minute degrees Fahrenheit feet or foot foot-candle or foot candles

ft/day	feet per day
ft/hr	feet per hour
ft/min	feet per minute
ft/sec	feet per second
g G gal/day gal/day gal/min gal/sec g/L gpd gpd/ac gpd/cap gpd/cap gpd/sq ft gph gpm gps	gram or grams gravitational force gallon or gallons gallons per day gallons per minutes gallons per second grams per liter gallons per day gallons per day per acre gallons per day per capita gallons per day per square foot gallons per hour gallons per minute gallons per second
h	hour or hours (metric units)
ha	hectare or hectares
hp	high point
hp	horsepower
hp-hr	horsepower-hour or horsepower-hours
hr	hour or hours (English units)
Hz	hertz
ID	inside diameter
ihp	indicated horsepower
Inc.	Incorporated
inch	inch
inches	inches
inches/sec	inches per second
J	joule or joules
JTU	Jackson turbidity unit or units
k	kips
K	kelvin
kcal	thermal conductivity
kcmil	kilocalorie or kilocalories
kg	thousand circular mils
km	kilogram or kilograms
kN	kilometer or kilometers
kN	kilonewton or kilonewtons
kPa	kilopascal or kilopascals
ksi	kips per square inch
kV	kilovolt or kilovolts
kVA	kilovolt or kilovolts
kVA	kilovolt-ampere or kilovolt-amperes
kW	kilowatt or kilowatts

kWh	kilowatt hour
L Ib/1000 cu ft Ib/acre-ft Ib/ac Ib/cu ft Ib/day/cu ft Ib/day/acre Ib/sq ft Iin Iin ft Im Iog In Ix	liter or liters pounds per thousand cubic foot pounds per acre-foot pounds per acre pounds per cubic foot pounds per day per cubic foot pounds per day per acre pounds per square foot linear, lineal linear foot or feet lumen or lumens logarithm (common) logarithm (natural) lux
m M mA max mCi meq μF MFBM mfr mg mgd/ac mgd/ac mg/L μg/L μg/L μm mile mil. gal miles min	meter or meters molar (concentration) milliampere or milliamperes maximum millicurie or millicuries milliequivalent microfarad or microfarads thousand feet board measure manufacturer milligram or milligrams million gallons per day per acre million gallons per day per acre milligrams per liter micrograms per liter micrometer or micrometers mile million gallons miles minimum
min MLSS MLVSS mm mol wt mol wt mol Mpa mph MPN mR Mrad mV MW	minute or minutes mixed liquor suspended solids mixed liquor volatile suspended solids millimeter or millimeters molecular weight mole megapascal or megapascals miles per hour most probable number milliroentgen or milliroentgens megarad or megarads millivolt or millivolts megawatt or megawatts
NMFS	National Marine Fisheries Service

N N No. NRC	newton or newtons normal (concentration) number numbers noise reduction coefficient
oc OD ORP OT OTA oz oz/sq ft	on center outside diameter oxidation-reduction potential ortho-tolidine ortha-tolidine-arsenite ounce or ounces ounces per square foot
Pa pl pm ppb ppm ppt pr psf/hr psf psi psia psia psig PVC	pascal or pascals plate or property line post meridiem (afternoon) parts per billion parts per million parts per thousand pair pounds per square foot per hour pounds per square foot pounds per square inch pounds per square inch absolute pounds per square inch gauge polyvinyl chloride
qt	quart or quarts
R R rad RH rpm rps	radius roentgen or roentgens radiation absorbed dose relative humidity revolutions per minute revolutions per second
SFRWQCB s SDI sec SI sp sp gr sp ft sq cm ² or sq cm sq ft sq inch sq inches	San Francisco Regional Water Quality Control Board second (metric units) Siemens (mho) sludge density index second (English units) International System of Units static pressure specific gravity specific heat square square centimeter or centimeters square feet or foot square inch square inches

km ² or sq km	square kilometer or kilometers
m ² or sq m	square meter or meters
sq yd	square yard or yards
SS	suspended solids
STC	Sound Transmission Class
SVI	sludge volume index
SLC	State Lands Commission
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TLM	median tolerance limit
TOC	total organic carbon
TOD	total oxygen demand
TOW	top of weir
TS	total solids
TSS	total suspended solids
TVS	total volatile solids
U U UNS US USACE	U Factor/U Value Coefficient of Heat Transfer heat transfer coefficient Uniform Numbering System United States United States Army Corps of Engineers
V	volt or volts
VA	volt-ampere or volt-amperes
W	watt or watts
WB	wet bulb
wg	water gauge
wk	week or weeks
wt	weight
yd	yard or yards
yr	year or years (English unit)

C. Abbreviations used on Drawings: As listed on Drawings or in Specifications.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 45 00 QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Quality control requirements and procedures for products and workmanship and includes the following:
 - 1. Sampling and testing of materials.
 - 2. Testing of equipment.
 - 3. Requirements for testing laboratories.
 - 4. Procedures and limitations of inspection.
- B. The City will employ one or more testing laboratories that will provide materials testing services during construction.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. E 329 Standard for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.03 PRODUCTS AND WORKMANSHIP

- A. When specified, products will be tested and inspected either at point of origin or at Work site.
 - 1. Notify Engineer in writing well in advance of when products will be ready for testing and inspection at point of origin.
 - 2. Do not construe that satisfactory tests and inspections at point of origin is final acceptance of products. Satisfactory tests or inspections at point of origin do not preclude retesting or reinspection at Work sites.
- B. Do not ship products which require testing and inspection at point of origin prior to testing and inspection.

1.04 AUTHORITY AND DUTIES OF CITY'S REPRESENTATIVE OR INSPECTOR

- A. City's Representative or Inspector employed or retained by City or Engineer is authorized to inspect the Work.
- B. Inspections may extend to entire or part of the Work and to preparation, fabrication, and manufacture of products for the Work.
- C. Deficiencies or defects in the Work which have been observed will be called to Contractor's attention.

- D. Inspector Will Not:
 - 1. Alter or waive provisions of Contract Documents.
 - 2. Inspect Contractor's means, methods, techniques, sequences, or procedures for construction.
 - 3. Accept portions of the Work, issue instructions contrary to intent of Contract Documents, or act as foreman for Contractor. Supervise, control, or direct Contractor's safety precautions or programs; or inspect for safety conditions on Work sites, or of persons thereon, whether Contractor's employees or others.
- E. Inspector Will:
 - 1. Conduct on-site observations of the Work in progress to assist Engineer in determining when the Work is, in general, proceeding in accordance with Contract Documents.
 - 2. Report to Engineer whenever Inspector believes that Work is faulty, defective, does not conform to Contract Documents, or has been damaged; or whenever there is defective material or equipment; or whenever Inspector believes the Work should be uncovered for observation or requires special testing.
- F. The Inspector shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of these specifications, regardless of whether the defect in such articles or materials are detected at the point of manufacture or after completion of the Work at the site.
 - If the Engineer or the Inspector, through an oversight or otherwise, has not rejected materials or work which is defective or which is contrary to the specifications, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected by the Inspector upon discovery.
 - 2. The Contractor shall promptly remove rejected articles or materials from the site of the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.
- G. The presence of the Engineer or the Inspector shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents.
 - Compliance is a duty of the Contractor and said duty shall not be avoided by any act or omission on the part of the Engineer or the Inspector. If the Contractor fails to replace any defective or damaged Work or material after reasonable notice, the Engineer may withhold progress payment for the Work or material, reserve the right to notify the Contractor's Bond and Insurance Companies, and/or may cause such Work or materials to be replaced.
 - 2. The replacement shall be deducted from the amount to be paid to the Contractor, otherwise the Contractor shall pay the City if there remains insufficient or no amount to be paid by the City to the Contractor.
1.05 INSPECTION

- A. Material and equipment, and workmanship shall be subject to inspection and rejection when not in conformance with Contract Documents.
- B. Remove defective work and products from Work sites, whether in place or not, and replace or renew with Work, material or equipment in conformance with Contract Documents.
- C. Questions concerning acceptability of materials, classification of materials, and execution of the Work will be decided by Engineer.
- D. Facilitate inspection by maintaining proper facilities and providing safe access to the work, to shops where products are in preparation, and to warehouses and storage yards where products are stored.
- E. Engineer's observation of Work that will be covered up:
 - 1. When directed to allow observation of Work before it is covered up, provide timely notification of Work readiness and allow Engineer reasonable time to observe such Work before covering it up.
 - 2. Uncover, at Contractor's cost, Work covered up for which Engineer was not given timely notification or reasonable time to conduct observations.
 - 3. Engineer may specify time requirements for timely notification and for performing observations.
- F. Whenever the Contractor intends to carry on the Work of this Contract on a Sunday, or more than eight (8) hours a day on Monday through Saturday, or any variation in the time of the workday as set forth in the General Conditions and Special Provisions; length of the workday and work week notification shall be given to the Inspector and the Engineer of such intention at least forty-eight (48) hours in advance so that inspection may be arranged.

1.06 FINAL INSPECTION

- A. At the completion of Work, after completion of all corrections, a final inspection will be made by the Inspector, the Engineer, and the Contractor, as applicable. The Inspector will provide a Final Inspection Correction List itemizing all Work necessary to complete the Project satisfactorily.
 - 1. Due to the length of Project, Contractor may request Final Inspection for identifiable completed segments of Work where no additional Work will take place.
- B. When the correction Work is found to comply with the Contract Documents, and the Project is complete in its entirety, the construction Work will be considered complete and the Contract Time will stop. The Contractor shall then proceed with the plant maintenance Work identified by the Contract. If the correction Work is found to be non-compliant with the Contract Documents, the Contract Time shall be continued to be assessed until the correction is satisfactorily made and accepted by the City.

1.07 SAMPLING AND TESTING

- A. General:
 - 1. Prior to delivery and incorporation in the Work, submit listing of sources of materials, when specified in Sections where materials are specified.
 - 2. When specified in Sections where products are specified,
 - a. Submit sufficient quantities of representative samples of character and quality required of materials to be used in the Work for testing or examination.
 - b. Test materials in accordance with standards of national technical organizations.
- B. Sampling:
 - 1. Furnish specimens of materials when requested.
 - 2. Do not use materials which are required to be tested until testing indicates satisfactory compliance with specified requirements.
 - 3. Specimens of materials will be taken for testing whenever necessary to determine quality of material.
 - 4. Assist Engineer in preparation of test specimens at sites of Work, such as soil samples and concrete test cylinders.
- C. Test Standards:
 - 1. Perform sampling, specimen preparation, and testing of materials in accordance with specified standards, and when no standard is specified, in accordance with standard of nationally recognized technical organization.
 - 2. Physical characteristics of materials not particularly specified shall conform to standards published by ASTM, where applicable.
 - 3. Standards and publication references in Contract Documents shall be the edition or revision in effect on date of initial bid advertisement.

1.08 TESTING LABORATORY SERVICES

- A. Qualification of Laboratories:
 - 1. Meets "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.
 - 2. Meets requirements of ASTM E329.
 - 3. Has authorization to operate in California.
 - 4. Will submit copy of report of inspection of facilities made by Materials Reference Laboratory of NBS during most recent tour of inspection, with memorandum of remedies of deficiencies reported by inspection.
 - 5. Has testing equipment calibrated at reasonable intervals by devices of accuracy traceable to NBS or accepted values of natural physical constants.

- B. Laboratory Duties:
 - 1. Cooperate with Engineer and Contractor.
 - 2. Provide qualified personnel.
 - 3. Notify Engineer and Contractor, in writing, of response time needed to schedule testing or inspections after receipt of notice.
 - 4. Perform specified inspections, sampling and testing of materials and methods of construction in accordance with specified standards to ascertain compliance of materials with requirements of Contract Documents.
 - 5. Promptly notify Engineer and Contractor of observed irregularities or deficiencies of construction.
 - 6. Promptly submit written report of each test and inspection; one copy each to Engineer, City, Contractor, and one copy to file of Project Record Documents. Each report shall include:
 - a. Date issued.
 - b. Project title and number.
 - c. Testing laboratory name, address and telephone number.
 - d. Name and signature of laboratory inspector.
 - e. Date and time of sampling or inspection.
 - f. Record of temperature and weather conditions.
 - g. Date of test.
 - h. Identification of product and Specification section.
 - i. Location of sample or test in Project.
 - j. Type of inspection or test.
 - k. Results of tests and compliance with Contract Documents.
 - I. Interpretation of test results, when requested by Engineer.
- C. Limitations of Authority of Testing Laboratory: Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept portion of Work.
 - 3. Perform duties of Contractor.

1.09 CONTRACTOR'S RESPONSIBILITIES:

- A. Cooperate with laboratory personnel and provide access to construction and manufacturing operations.
- B. Secure and deliver to laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.
- C. Provide to laboratory preliminary mix design proposed to be used for concrete, and other materials mixes which require control by testing laboratory.

- D. Furnish copies of product test reports.
- E. Furnish Incidental Labor and Facilities:
 - 1. To provide access to construction to be tested.
 - 2. To obtain and handle samples at Work site or at source of product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify laboratory in advance of when observations, inspections and testing is needed for laboratory to schedule and perform in accordance with their notice of response time.

1.10 MANUFACTURER'S FIELD SERVICES

- A. Prior to the startup of the facility, an experienced, competent, and authorized representative of the manufacturer of each item of equipment incorporated into the work, for which field services are indicated in specified equipment sections, shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.
- B. In each case, the representative shall revisit the jobsite as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of the Engineer.
- C. Each manufacturer's representative shall furnish to the Engineer and the Inspector a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.
- D. All costs for these services shall be included in the Contractor's Bid.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 45 33 SPECIAL TESTS AND INSPECTIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: This Section describes the requirements for providing special tests and inspections required by Laws and Regulations.
- B. Related Sections:
 - 1. Section 01 45 00 Quality Control.

1.02 REFERENCES

- A. International Code Council (ICC):
 - 1. International Building Code (IBC), latest governing edition.
- B. California Building Standards Commission (CBSC):
 - 1. California Building Code (CBC), latest governing edition.

1.03 DESCRIPTION

- A. This Section describes special tests and inspections of structural assemblies and components to be performed in compliance with Uniform Building Code, Chapter 17 Structural Tests and Inspections, Section 1701-Special Inspections.
- B. These special tests and inspections are in addition to the requirements specified in Section 01 45 00, Quality Control, and by the individual Sections in Division 2 through Division 35.
- C. The City will employ one or more inspectors who will provide special inspections during construction.

1.04 INSPECTION

- A. Duties of Special Inspector:
 - General: Required duties of the Special Inspector are described in IBC Chapter 17 - Structural Tests and Inspections, Section 1704-Special Inspections, Subsection 1704.3.

1.05 TESTS

- A. Testing Laboratory: Special tests will be performed by the City's testing laboratory as specified in Section 01 45 00, Quality Control.
- B. Selection of the material required to be tested shall be by the City's testing laboratory and not the Contractor.

1.06 SPECIFIC TESTS AND INSPECTIONS

- A. The following types of work which require special inspection as described in UBC Section 1701.5 includes the following:
 - 1. Cast-in-place concrete.
 - 2. Bolts installed in concrete which require special inspection as indicated on the Drawings.
 - 3. Reinforcing steel and prestressing steel tendons.
 - 4. Structural welding.
 - 5. High strength bolting.
 - 6. Structural masonry which requires special inspection as indicated on the Drawings.
 - 7. Special grading, excavating and filling.
 - 8. Piling, drilled piers, and caissons.
 - 9. Shotcrete.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, project sign, field offices and sheds, and removal after construction.
- B. Related Sections:
 - 1. Section 01 14 00 Work Restrictions.

1.02 TEMPORARY UTILITIES

- A. Temporary Electrical Power:
 - 1. Arrange with Pacific Gas and Electric (PG&E) to provide adequate temporary electrical service.
 - 2. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
 - 3. Provide, maintain, and pay for electric power for performance of the work.
 - a. When using permanent facilities, provide separate meter and reimburse City for power used in connection with performance of the work.
- B. Temporary Electrical Lighting:
 - 1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
 - 2. When available, permanent lighting facilities may be used in lieu of temporary facilities.
 - a. Prior to Substantial Completion of the work, replace bulbs, lamps, or tubes used by Contractor for lighting.
- C. Temporary Heating, Cooling, and Ventilating:
 - 1. Heat and ventilate work areas to protect the work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
 - 2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.

- D. Temporary Water:
 - 1. Pay for and construct facilities necessary to furnish potable water for human consumption and use during construction.
 - 2. Remove temporary piping and connections and restore affected portions of the facility to original condition before Completion.
 - 3. Pay for water used for construction prior to Completion.
 - 4. The Contractor shall provide and maintain adequate drinking water facilities at locations easily accessible to workers during working hours.
 - 5. The Contractor may obtain water from City fire hydrants. The Contractor shall obtain a fire hydrant water meter and shall be solely responsible for all deposits, fees and charges associated with its use. Contact the Foster City Department of Public Works for instructions.
 - 6. The Contractor shall not use residential or business water services for any purpose.
- E. Temporary Sanitary Facilities:
 - 1. Provide suitable and adequate sanitary facilities that comply with applicable Laws and Regulations.
 - 2. Fixed or portable chemical toilets shall be provided for the use of the Contractor's employees. These accommodations shall be maintained in a neat and sanitary condition. Toilets at construction sites shall conform to the requirements of Title 8, California Code of Regulations.
 - 3. Wastewater conveyance and disposal shall not be interrupted. Should the Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.
 - 4. The Contractor shall establish a regular schedule for collection of all sanitary and organic waste. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Inspector and in accordance with all laws and regulations pertaining thereto. Disposal of all such wastes shall be at the Contractor's expense.
 - 5. At completion of the work, remove sanitary facilities and leave site in neat and sanitary condition.
- F. Temporary Fire Protection: Provide enough fire extinguishers of the type and capacity required to protect the work and ancillary facilities.
- G. First Aid: Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.
- H. Utilities in Existing Facilities: See Section 01 14 00 Work Restrictions.

1.03 CONSTRUCTION AIDS

- A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.
- B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.
- C. Design temporary supports with adequate safety factor to assure adequate load bearing capability.
 - 1. When requested, submit design calculations by professional registered engineer prior to application of loads.
 - 2. Submitted design calculations are for information and record purposes only.
- D. Accident Prevention:
 - 1. Exercise precautions throughout construction for protection of persons and property.
 - 2. Observe safety provisions of applicable Laws and Regulations.
 - 3. Guard machinery and equipment and eliminate other hazards.
 - 4. Make reports required by authorities having jurisdiction, and permit safety inspections of the work.
 - 5. Before commencing construction Work, take necessary action to comply with provisions for safety and accident prevention.
- E. Barricades:
 - 1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
 - 2. Provide barriers with flashing lights after dark.
 - 3. Keep barriers in place until excavations are entirely backfilled and compacted.
 - 4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.
- F. Warning Devices and Barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers.
 - 1. Devices shall conform to minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.
- G. Hazards in Public Right-of-Way:
 - 1. Mark at reasonable intervals, trenches and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours.
 - a. During hours of darkness, provide markers with torches, flashers, or other adequate lights.

- 2. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades.
 - a. During hours of darkness, provide warning lights at close intervals.
- H. Hazards in Protected Areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.
- I. Above Grade Protection: On multi-level structures, provide safety protection that meets requirements of OSHA and State agency which administers OSHA regulations where Project is located.
- J. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.
- K. Fences:
 - 1. Enclose site of the Work with fencing adequate to protect the Work against acts of theft, violence and vandalism.
 - 2. Enclose temporary offices and storage areas with fence adequate to protect temporary facilities against acts of theft, violence and vandalism.
 - 3. When entire or part of site is to be permanently fenced, permanent fence may be built to serve for both permanent and temporary protection of the Work sites, provided that damaged or defaced fencing is replaced prior to Substantial Completion.
 - 4. Protect temporary and permanent openings and close openings in existing fences to prevent intrusion by unauthorized persons. Bear responsibility for protection of plant and material on site of the Work when openings in existing fences are not closed.
 - 5. During night hours, weekends, holidays, and other times when no Work is performed at site, provide temporary closures or enlist services of security guards to protect temporary openings.
 - 6. Fence temporary openings when openings are no longer necessary.

1.04 SECURITY

A. Make adequate provision for protection of the Work areas against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.05 ACCESS ROADS

A. Site access shall be as indicated on the Plans. Additional temporary access roads shall be created only upon the written approval of the Engineer.

1.06 TEMPORARY CONTROLS

- A. Dust Control:
 - 1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
 - 2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.
- B. Noise Control:
 - 1. Perform operations in manner to minimize noise and remain in conformance with City of Foster City ordinances.
 - 2. Take special measures to suppress noise during night hours.
- C. Mud Control:
 - 1. Prevent mud nuisance caused by construction operations, unpaved roads, excavation, backfilling, demolition, or other activities.

1.07 PROJECT SIGNS

- A. Provide and maintain project identification signs consisting of painted 8 foot wide by 4 foot high exterior grade plywood and minimum 10 foot long 4 by 4 lumber posts, set in ground at least 3 feet, with exhibit lettering by professional sign painter using no more than 5 sign colors.
 - 1. List at least the title of the Project, and names of the City, Design Engineer and Contractor and approximate duration of construction.
 - 2. Assume a total of five (5) signs to be located as directed by the Engineer.
- B. Provide and post a sign at all entrances to the construction site upon commencement of construction, for the purpose of informing all contractors and subcontractors, their employees, agents, materialmen and all other persons at the construction site, of the basic requirements of the City's Noise Ordinance (Foster City Municipal Code Chapter 17.68.030).
 - 1. Said signs shall be posted as directed in the field, and shall be of a white background, with black lettering, which lettering shall be a minimum of one and one-half inches in height.
 - 2. Said signs shall read as follows:

CONSTRUCTION HOURS (Includes Deliveries) MONDAY – FRIDAY......8:00 a.m. to 5:00 p.m. SATURDAY......9:00 a.m. to 5:00 p.m. SUNDAY/HOLIDAYS.....Construction prohibited.

Violation of this Ordinance is a misdemeanor punishable by a maximum of six months in jail, \$1,000 fine, or both.

Violators will be prosecuted. F.C.M.C. §17.68.030.

1.08 CONTRACTOR'S FIELD OFFICE

- A. Maintain on Project site weathertight space in which to keep copies of Contract Documents, progress schedule, shop drawings, and other relevant documents.
- B. Provide field office with adequate space to examine documents, and provide lighting, heating, air conditioning, and telephone service in that space.
- C. Field office shall be constructed with proper foundation or anchorage, in conformance with applicable codes for temporary buildings. Provide connections for utility services and steps and landings at entrance doors.
 - 1. The Contractor shall provide janitorial services to clean its field office trailer(s) and trash pick-up services weekly. Contractor's janitorial services shall include all entrances and other trailer common areas.
 - 2. Contractor's field office(s) shall be located within the construction staging areas shown on the Plans, subject to approval by the Construction Manager.
- D. Contractor shall be responsible of making payment for all the bills including, but not limited to, the monthly payments of the following:
 - 1. Field Office Trailer and toilet facilities
 - 2. All Utilities
 - 3. Internet Connection
 - 4. Drinking Water
 - 5. Janitorial Services
 - 6. Insurances
- E. Full compensation of all materials and labor necessary to setup, install, secure, connect, maintain and remove the Contractor's field office trailer(s), including all required equipment and supplies, shall be included in the lump sum bid item of Mobilization, and no additional payment will be made therefore.

1.09 CONSTRUCTION MANAGER'S OFFICE

- A. **General:** The Contractor shall provide a field office, equipment, and services specified herein for the Construction Manager and Owner at the project site during the entire time of construction beginning at the commencement date stated in the Notice to Proceed until the acceptance of the Project.
 - 1. Once the project is accepted, the Contractor shall be responsible for the removal and cancellation of all field offices, equipment, and services.
 - 2. **Schedule:** The required field office, equipped as specified herein, shall be provided at the site, ready for use by the Construction Manager within seven (7) days after the commencement date stated in the Notice to Proceed.
 - 3. Unless released earlier by the Construction Manager in writing, said field office shall be maintained in full operation at the site with all utilities connected and operable until the Notice of Completion has been executed or recorded.

- B. Submittals: The Contractor shall submit, for the Construction Manager's review, diagrams, descriptions and product information for the field office, parking area, utilities, and furnishing in accordance with Section 01 30 30, Shop Drawings, Product Data and Samples. The submittal shall include a site diagram that clearly shows the location of the field office, the type and extent of fencing to be used, the parking area with grading and surfacing access stairway(s) and porch(es). Additional dimensioned details shall show finished interior dimensions of all rooms, including the locations of all doors, windows, heating and air conditioning units, electrical outlets and a functional, conceptual floor plan indicating the locations of all furnishings and fixtures. Detailed information on all furnishings, fixtures, utilities, and the security system shall be included with the submittal.
- C. **Location:** The Construction Manager's field office shall be located within the Project Site, subject to approval by the Construction Manager. A suggested location is included on Sheet G-05 of the Plans.
- D. **Payment** for the Construction Manager's field office shall be included as a part of the payment for Mobilization. No payment for Mobilization, or any part thereof, will be approved for payment under the Contract until all field office facilities specified herein, have been provided.
- E. The Contractor shall provide and maintain for the exclusive use of the Construction Manager, at a point convenient to the construction operations, one separate, well lighted, air conditioned, electrically heated field office with a toilet room, containing a kitchen area with a sink, as well as a water closet and lavatory with outdoor-venting fan partitioned off from the working area. The water closet may be of the chemical type; provided, that it is a flush type with an approved holding tank. The toilet room door shall be provided with a latch set.
 - 1. The Contractor shall provide all furnishings, services, and equipment specified herein. The office shall have an outside dead bolt type door lock and shall be furnished with steps meeting IOSHA/OSHA requirements at each doorway.
 - 2. Said office shall be of the portable trailer type unless otherwise specifically authorized by the Construction Manager in writing and shall be a separate unit, not attached or connected to any other structures. The area of said field office shall be not less than 1,000 square feet.
 - 3. The field office shall be equipped with a minimum of two (2) private offices, one (1) conference room, a kitchen/break area, and a lavatory/water closet. The private offices shall be ten (10) feet by ten (10) feet minimum and be provided with two (2), opening 12-square foot windows. The conference room shall be ten (10) feet by fifteen (15) feet minimum with two (2), opening 12-square foot windows. The lavatory/water closet room shall be five (5) feet by six (6) feet minimum and have one (1), opening, 4-square foot frosted glass window in addition to the vent fan.
 - 4. A minimum of four (4) 110V AC duplex electric convenience outlets shall be provided in each office and in the conference room and common area. At least one (1) such outlet shall be located on each wall. The electric distribution panel shall service not less than two (2) 110V, 30-amp, 60 Hz circuits.

- 5. Where inside toilet facilities are not connected to outside plumbing, a flush-type chemical toilet with holding tank shall be provided. All such sanitary waste material shall be regularly pumped out and the chemicals recharged. A continuous supply of toilet paper and paper towels shall be furnished for each toilet facility.
- 6. Provide internet connection service and Wi-Fi router with a minimum 100 Mbps speed for the exclusive use of the Construction Manager.
- 7. **Field Office Furnishings:** The Contractor shall provide the following listed items in good condition for the field office:
 - a. (5) each Standard 30x60-inch desk(s) with not less than three (3) drawers.
 - b. (2) each Vertical file cabinets, legal size, 4-5 drawer with lock and three (3) keys, double suspension, complete with Pendaflex suspension racks for each drawer.
 - c. (5) each Office chairs, standard armrest type, adjustable, swivel, tilt-back with castes.
 - d. (1) each Metal lockable two-door storage cabinet 48-inch wide x 72-inch high x 18-deep with five sets of keys.
 - e. (5) each Office chairs, stiff-leg type, no armrest.
 - f. (1) each Conference Table, 42 x 108 inches.
 - g. (10) each Conference Table chairs, swivel, tilt back with castes.
 - h. (3) each White board 36 x 42 inches.
 - i. (2) each White board 40 x 72 inches.
 - j. (4) each Bookcases.
 - k. (1) each Bottled water dispenser unit (supplying both hot and cold water) and bottled water service.
 - I. (2) each 26 x 60-inch folding table.
 - m. (2) each 36 x 72-inch folding table.
 - n. (1) each Refrigerator, 42 cu. ft. minimum.
 - o. (1) each Microwave oven.
 - p. (2) each First aid kit.
 - q. (2) each Fire extinguisher.
 - r. (2) each Carbon monoxide detectors.
 - s. (2) each Smoke detectors.
 - t. (10) each Folding chairs.
 - u. (1) each Copier/Printer/Scanner Document Machine, new, capable of printing, copying and scanning in color up to 11 inches by 17 inches paper size and copying 35 ppm.
 - 1) Contractor shall provide copier service contract for supplies and maintenance.

- F. **Field Office Services:** The Contractor shall provide all necessary electrical wiring, plumbing, toilet and lavatory fixtures, air conditioning and heating equipment, and shelving, and shall furnish all necessary light, heat, water, and weekly janitorial services in connection with all field offices specified herein, for the duration of the Project; and shall remove said offices and appurtenant facilities within fourteen (14) days after the execution or recordation of the Certificate of Substantial Completion or Notice of Completion.
 - 1. Each field office required hereunder shall be provided with sufficient lighting to provide not less than 50 foot-candles at desk top height at each desk location. Exterior lighting shall be provided over the entrance door.
 - 2. Regular weekly janitorial service shall be furnished outside of working hours each day. Offices shall be swept, dusted and waste receptacles emptied. Toilet facilities shall be sanitized and cleaned daily.
- G. **Parking:** The field office shall be adjoined by a minimum of six (6) full-sized parking spaces for the exclusive use of the Construction Manager and the Owner. The parking area and access to the trailer shall be gravel surfaced or paved and graded and maintained to drain without ponding.
- H. **Security:** The Contractor shall be responsible for the security of the field office. At a minimum, deadbolt locks keyed on both sides of the doors, security floodlights and security bars on all windows shall be provided. The field office shall be provided with a movement-activated alarm configured to notify the police in the event of an alarm condition.

1.10 REMOVAL

- A. Remove temporary buildings and furnishings before inspection for Substantial Completion or when directed.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Remove underground installations to minimum depth of 24 inches and grade to match surrounding conditions.
- D. Restore existing facilities used during construction to specified or original condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 55 00 TRAFFIC REGULATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: All labor, material, equipment, tools and services used in the regulation of construction traffic to and from the Project Site as well as public and private vehicular and pedestrian traffic within the Project limits.
 - 1. Bay Trail detour Work shown on the Plans is included in this Section.
 - 2. Traffic control for construction staging and haul routes shown on the Plans is included in this Section.
- B. The Contractor shall always provide for the protection of the traveling public, pedestrians and workers within the area covered by the limits of construction.
- C. The Contractor shall conduct his operations to cause the least possible obstruction and inconvenience to the public and area residents, while conforming to the Contract Documents.
- D. Related Sections
 - 1. Section 01 11 00 Summary of Work.
 - 2. Section 01 33 00 Submittal Procedures.
 - 3. Section 01 50 00 Temporary Facilities and Controls.
 - 4. Section 32 17 23 Pavement Markings.
- E. All cost and expense for traffic control shall be included in the related items of Work, and no special compensation shall be allowed.

1.02 REFERENCES

- A. City of Foster City Department of Public Works traffic control requirements.
- B. State of California, Department of Transportation (Caltrans) Standard Specifications, 2015, Section 12: Temporary Traffic Control.
- C. State of California, Department of Transportation (Caltrans) Manual of Traffic Controls for Construction and Maintenance Work Zones, current edition (Chapter 5 of Caltrans' Traffic Manual).
- D. In addition to compliance with this specification, the Contractor shall comply with all applicable requirements of the latest editions of the following:
 - 1. California Vehicle Code.
 - 2. Other applicable government regulations.

1.03 SUBMITTALS

- A. The Contractor shall submit a traffic control plan prepared by a California Registered Engineer and shall provide sufficient information and details to show operations for construction of the Work, typical lane closures, channelizing, all traffic control devices and proposed detours or street closures; locations and usage of flagmen, typical construction zone signing, provisions for vehicular, pedestrian and bicycle traffic for each street and location of Work. The traffic control plan shall show in detail the proposed sequencing of the Work together with the proposed traffic control system for each Work task.
- B. The Engineer will review the proposed traffic control plan and return it to the Contractor for any necessary revisions or corrections. The Contractor shall revise and resubmit the plan to the Engineer, and this process shall be repeated until the proposed traffic control plan is accepted by the Engineer. The Contractor will not be permitted to perform any lane closures or implement any part of the traffic control plan until it has been accepted by the Engineer.

1.04 REQUIREMENTS

- A. These requirements are the minimum and do not limit the Contractor's responsibility of doing all that is practical and necessary to ensure the safety of workers, pedestrians, bicyclists, and motorists. The Contractor shall conform to the following traffic control conditions which are generally applicable to most common situations. Based on the nature of a job, additional labor, material, conditions, or exceptions to the following conditions may be necessary.
- B. The Contractor shall conduct operations and schedule cleanup to cause the least possible obstruction and inconvenience to traffic, pedestrians, cyclists, and adjacent property owners. All paved Work areas shall be swept clean at the end of each day's Work and at other times when directed by the City. A mobile street sweeper shall be used wherever practical and as required by the Construction Manager, and dust shall be suppressed to the satisfaction of the City. The Contractor shall remove all debris from the job site at the end of each workday.
- C. Temporary pavement markings shall be in place prior to allowing traffic to use the street. This includes all markings (STOP bars, crosswalks, arrows, and lane line striping).
- D. Damage done by the Contractor during the Work to City property shall be repaired and restored to "like-new" condition or as the Project Manager shall direct, at the Contractor's expense. This includes the repair of traffic loop detectors, striping, signing, curb markings, etc. Unless otherwise authorized by the City Inspector, all construction and restoration including striping, signing, curb markings, etc. shall be completed within one week of work completion. Loop detectors shall be repaired within 72 hours of damage.
- E. No stockpiling of materials or parking of equipment during non-working hours will be allowed on City property, i.e., streets, alleys, parking lots, sidewalks, etc. unless specifically approved by the Engineer. While storing equipment and materials on the street, storage area shall be properly barricaded and shall not block traffic.

- 1. Materials shall be placed in such a manner that they do not impede the flow of water to the storm drains and shall be covered to avoid run-off during rain.
- F. The Contractor shall notify the abutting property owners at least 72 hours prior to commencing Work at their specific locations. Contractor shall maintain access to all driveways except when constructing within the driveway boundaries, at which time partial access will be maintained unless alternate arrangements are made with the property owners or tenants in advance. If the driveway to any garage or parking area must be closed for construction Work, this notice shall state the approximate time it will be reopened.
- G. "No Parking Tow-Away" signs shall be posted a minimum of 72 hours in advance of all Work requiring that cars be not parked on the street. Contractor will be provided with City of Foster City "No Parking" signs. These signs shall be filled out completely, including the date and time of the parking restriction, and contact number for questions. Signs shall be posted a maximum of 50 feet on center and removed immediately after the Work is completed.
- H. The Engineer shall have the right to limit the amount of trench which may be opened or partly opened at any time. No more than 100 feet of trench shall be left open at any one time.
 - 1. All open trench and excavations must be backfilled and paved with temporary asphaltic concrete or steel-plated at the end of each workday with non-skid plates properly secured to prevent sliding and/or excessive noise. The Contractor shall place cold cutback around the edges of non-skid steel plates and elsewhere as necessary to eliminate vertical edges. For ADA compliance all cutback on sidewalks shall be placed and compacted so there will be a firm, stable12:1 slope to allow disabled access.
- I. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at the Contractor's expense.
- J. Compliance with the City of Foster City Truck Route Regulations is always required.
 - 1. Contractor shall obtain a Foster City Annual Transportation Permit, and renew the permit as often as required to complete the Work. Permit fees will be waived.
- K. Contractor shall obtain a permit from Caltrans for any vehicle that exceeds weight or dimensions prescribed in California Vehicle Code.
 - 1. Contractor shall obtain the required Caltrans permit(s) for construction access through their rights-of-way and conform to the permit conditions.
- L. The contractor shall use only Caltrans-approved traffic control devices. The Contractor shall supply, place, and maintain all necessary traffic control devices in accordance with the State of California "Manual of Traffic Controls for Construction and Maintenance of Work Zones".
- M. Traffic Control Plans shall include a schedule of construction showing each phase of work and the anticipated method of handling traffic for each phase. Traffic control plans shall be readable, drawn to scale and include all street characteristics which

affect vehicle and pedestrian travel patterns including adjacent intersections, driveways, sidewalks, lane geometrics and traffic control devices.

- N. The plan shall clearly indicate the location at which the Work is to be performed. The plan shall be site-specific; a "typical" traffic control plan will be accepted only if it accurately represents the actual conditions at the site.
 - 1. A north arrow shall be included, and the traffic control plan shall be to scale.
 - 2. The traffic control plan shall clearly label all pertinent dimensions, including taper lengths, sign spacings, lane widths, work zone length and width, etc. The speed limit shall be indicated on the plan.
 - 3. Provide traffic control plans for each anticipated haul route. Coordinate with the City regarding message boards and additional traffic control devices.
- O. In general, Contractor shall maintain all vehicular, pedestrian, and bike movements. If possible, the Contractor shall always maintain one lane of traffic in each direction on all streets. The clear width of the lane shall be a minimum of 10 feet. Contractor shall always maintain emergency vehicle access to and through the Work area.
- P. Flashing arrow boards shall always be used when shifting traffic lanes, and as otherwise required in the approved traffic control plan.
- Q. All warning signs and cones for night lane closures shall be illuminated or retroreflective. Retro-reflection of 28-inch cones shall be provided by a 6" white band and a 4" white band. Flashing warning lights shall be used for all night lane closures.
- R. Contractor shall use "Bike Lane Closed Ahead" and "Bike Lane Ends" signs when necessary to close bike lanes. Detour signs shall be provided for any Class I bike path closure.
- S. Work shall not restrict visibility of any traffic control device.
- T. A minimum four feet (clear) sidewalk shall be maintained unless the Work makes closure unavoidable, in which case the sidewalk may be closed while working, subject to the approval of the Engineer. During sidewalk closures, R96 "No Pedestrian" signs shall be posted at the site and R49M "Sidewalk Closed Use Other Side" signs posted on both sides of the site at the nearest corners. If the other side of the street is not available or practical for pedestrian use, an alternate pedestrian facility shall be provided for the duration of the closure. The alternate facility shall conform to construction requirements of the Uniform Building Code (UBC) and the Americans with Disabilities Act (ADA). At intersections, Work will be permitted at one corner at a time, so pedestrian movements can be maintained through the intersection.
- U. Each pedestrian crosswalk, when crossed by construction excavation, shall be provided with a safe pedestrian crossing platform with handrails.
- V. If Work will impact transit stops or transit routes, contractor shall be required to contact San Mateo County Transit District and other affected transit companies to address relocation of facilities or rerouting of buses prior to submitting traffic control

plan. Traffic control plan should indicate what actions are being taken regarding transit services.

- W. Any Work within 150 feet of any signalized intersection shall be coordinated with the City of Foster City Traffic Signal Supervisor at (650) 522-7300.
- X. The contractor shall place barricades 50 feet on center at the gutter joints and provide one working flasher for each barricade and shall insure that each flasher is maintained in working condition while in use. The Contractor shall not remove the barricades in the street at any given location until the asphalt concrete patching adjacent to the gutter and/or gutter overlay has been done and the hazard to bicyclists and motorists no longer exists.
- Y. Flaggers shall be equipped with a hard had, an orange vest, and a C28 "STOP/SLOW" paddle on a 5-foot staff. Additional advance flaggers may be required when traffic queues develop. Flagger stations for Work at night shall be illuminated as noted in Section 5-04.6 of the Manual of Traffic Control for Construction and Maintenance Zones.
- Z. If the resultant traffic control setup does not conform to the approved traffic control plan, the Foster City Police Department may take over the traffic control at the Contractor's expense.

PART 2 PRODUCTS

2.01 TRAFFIC CONTROL DEVICES

- A. Cones: 28" high and conforming to Section 12-3.10 of the Caltrans Standard Specifications.
- B. Barricades: Type II and III conforming to Section 5-05.6 of the Caltrans Traffic Control Manual. Each barricade shall be equipped with a Type A low intensity flashing warning light conforming to Section 5-05.8 of the Caltrans Traffic Control Manual.
- C. Signs: Portable signs and bases conforming to Section 12-3.06 of the Caltrans Standard Specifications and Section 5-05.2 of the Caltrans Traffic Control Manual.
- D. Flashing Arrow Sign: Solar and/or battery powered and conforming to Section 5-05.4 of the Caltrans Traffic Control Manual.
- E. Flagger Equipment: Conforming to Sections 5-04.3 and 5-04.4 of the Caltrans Traffic Control Manual.

2.02 TEMPORARY PLATING

A. Steel plate bridging shall be steel plate designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual.

- B. The Contractor shall maintain on the steel plate a non-skid surface having a minimum coefficient of friction equivalent to .35 as determined by Caltrans Test Method 342. If a different test method is used, the Contractor may utilize standard test plates with known coefficient of friction available from each Caltrans District Materials Engineer to correlate skid resistance results to California Test Method 342.
- C. Steel plates used for bridging must extend a minimum 18 inches beyond the edges of the trench.
- D. Steel plate bridging shall be installed to operate with minimum noise. Plates shall be pinned, wedged, tack welded or otherwise properly secured as necessary. Temporary paving with cold asphalt concrete shall be used to feather the edges of the plates. Fine graded asphalt shall be compacted to form ramps with a minimum 18-inch taper to cover all edges of the steel plates. The Contractor shall be responsible for maintenance of the steel plates, and asphalt concrete ramps.
- E. Unless specifically noted, steel plate bridging shall not remain in place at a location for a period in excess of seven (7) consecutive working days.
- F. A Rough Road sign (W33) with black lettering on an orange background shall be used in advance of steel plate bridging. This is to be used along with any other required construction signing.
- G. The following Table shows the required minimal thickness of steel plate bridging required for a given trench width:

Trench Width	Minimum Plate Thickness
1.0'	1/2"
1.5'	3/4"
2.0'	7/8"
3.0'	1.0"
4.0'	1-1/4"

H. For spans that are greater than four (4) feet, a structural design shall be prepared by a Civil or Structural Engineer registered in California and approved by the City of Foster City.

PART 3 EXECUTION

3.01 PROVIDE TRAFFIC CONTROL.

A. The Contractor shall supply, place, and maintain all necessary traffic control devices during construction in accordance with the applicable requirements of the City of Foster City, Caltrans Manual of Traffic Controls, APWA's Traffic Control Handbook (8th Ed.) and the traffic control plans as submitted and approved by the City.

- B. The Contractor shall provide all construction signs in accordance with the traffic control plans.
- C. The Contractor assumes sole and complete responsibility for the job and site conditions during construction, including the safety of all persons and property. The requirement shall apply continuously 24 hours/day and shall not be limited to normal working hours.
- D. Attention is directed to Section 7-1.08, PUBLIC CONVENIENCE, Section 7-1.09, PUBLIC SAFETY, and Section 12, CONSTRUCTION AREA TRAFFIC CONTROL DEVICES, of the Caltrans Standard Specifications.
- E. Traffic Control Plans:
 - 1. The Contractor shall prepare traffic control plans for each specific traffic control type listed in this Section.
 - 2. The traffic control plans shall conform to the applicable requirements of this Section and the Caltrans Traffic Control Manual. The plans shall show a detailed layout of Work areas and all traffic control devices required to control vehicle, bicycle, and pedestrian traffic.

3.02 GENERAL TRAFFIC CONTROL REQUIREMENTS

- A. The Contractor cannot start the Work or shall stop working until the approved traffic control plans are followed in the field. The Contractor shall resume working upon the approval of the Engineer.
- B. The Contractor shall designate a traffic control coordinator who shall be responsible for traffic control daily. The Contractor shall notify the City in writing of the designated traffic control coordinator.
- C. The Contractor shall furnish, place and maintain all necessary traffic control devices during construction in conformance with the applicable requirements of this Section, the Caltrans Traffic Control Manual and the traffic control plans approved by the Engineer. The Project superintendent shall not be designated as the traffic control coordinator.
- D. The Contractor shall notify the City of Foster City Police Department at (650) 286-3300 and the City of Foster City Fire Department at (650) 286-3350 daily of significant traffic control measures.
- E. The Contractor shall not close any lane between 7:00 a.m. and 9:00 a.m., and between 4:00 p.m. and 6:00 p.m. except as allowed under Section 01 14 00 of these Specifications or as permitted by the Engineer.
- F. Until the pavement structural section is restored, all open trench and excavations shall be backfilled and temporarily paved with asphalt concrete or steel-plated at the end of each workday. If the temporary paving option is selected, the Contractor shall use hot mix asphalt concrete; use of cutback asphalt for temporary paving of trenches will not be allowed. All plates shall be skid-resistant per Part 2 of this Specification section. All plate edges shall have at a minimum 18-inch wide

temporary asphalt ramp to provide a smooth transition to the existing pavement. At all crosswalks, temporary ramps shall be 3 feet wide. Cutback asphalt may be used to place ramps around trench plates.

3.03 SPECIFIC TRAFFIC CONTROL TYPES

- A. <u>Partial street closure, maintain two-way traffic, provide flaggers and one traffic lane</u>: This type of traffic control may be used for partial closures extending either the full length or a portion of the length of a street. Part of the street shall be coned off, leaving a minimum width of twelve feet open for traffic. The Contractor shall maintain two-way traffic on this street by utilizing at least two flaggers. The flaggers shall allow one direction of traffic at a time to travel in the one remaining twelve-foot lane. Traffic control signs shall be placed in appropriate locations both at, and in advance of, the closure. Cones shall be used to separate the traffic from the construction operation.
- B. <u>Partial street closure, maintain two-way traffic, provide two traffic lanes:</u> This type of traffic control may be used for partial closures extending either the full length or a portion of the length of a street. Part of the street shall be coned off, and two-way traffic shall always be maintained by dividing the remainder of the street into two ten feet wide traffic lanes. Traffic control signs shall be placed in appropriate locations both at, and in advance of, the closure. Cones shall be used to separate the traffic from the construction operation.
- C. <u>Full lane closure on multilane street, maintain two-way traffic, provide two traffic</u> <u>lanes minimum</u>: This type of traffic control may be used for lane closure on multilane street extending either the full length or a portion of the length of a street. The lane shall be coned off, and a flashing arrow sign and cone taper used to shift traffic into the adjacent lane. Traffic control signs shall be placed in appropriate locations both at, in advance of and after the closure. Cones shall be used to separate the traffic from construction.

3.04 INSTALLATION OF SIGNS, SIGNALS, AND DEVICES

- A. Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices", of the State Standard Specifications. The Contractor shall notify USA at least five (5) working days, but not more than fourteen (14) calendar days, prior to commencing any excavation for construction area signposts.
- B. All excavations required to install construction area signs shall be performed by hand methods, without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.
- C. K-rail or water-filled barriers used on the project shall be in good condition, free of significant damage. Significant damage will consist of large cracks, spalls, chips, or structural failure.
 - 1. K-rail barrier sections shall be painted white. The Contractor shall maintain the white paint while concrete K-rail barriers are in use.
 - 2. Water-filled barriers shall be orange.

- 3. All graffiti shall be painted over or otherwise removed immediately, within 24 hours of its appearance. The Engineer will be the sole judge of the acceptability of individual barrier sections.
- D. Flashing beacons, portable changeable message signs and warning lights shall be installed and used as directed by the Engineer.
- E. All existing traffic control signs and street signs shall be maintained in visible locations during construction unless prior written approval is obtained from the Engineer. The Contractor shall restore any striping or signing damaged during construction operations, including raised pavement markers to the satisfaction of the Engineer.
- F. The use of delineators shall be done in accordance with Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones, current edition.

3.05 FLAG PERSONS

- A. Flag person equipment shall be in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices", of the Caltrans Standard Specifications.
- B. Flag persons shall be appropriately attired in accordance with the provisions set forth in the "Manual of Traffic Controls for Construction and Maintenance Work Zones", current edition.
- C. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.06 TRAFFIC CONTROLS

- A. Contractor shall maintain adequate separation between pedestrians, bicyclists, vehicular traffic, truck traffic, and the Work site during construction by providing adequate barricades with at least one working flasher on each, pedestrian bridges, ramps, reflectors, cones, guard rails, fencing and any other warning devices as required.
- B. Redirecting traffic: All channelizing, shifting of traffic lanes, and barricading of traffic in connection with the project will be subject to approval of the City. Existing local standards for signing and marking of construction areas will apply in addition to the requirements of Caltrans' Standard Specifications, Section 12.
- C. Temporary closing: Prior to temporary closing to traffic part of any street, sidewalk, or other access, obtain approval from the City and comply with imposed conditions, at least two weeks before such enclosures or changes are made. Deviations will be for an emergency condition affecting life and property only, and the Contractor will immediately notify the Inspector and the City of any such emergency changes.
- D. Contractor shall maintain all traffic control devices installed in the field. This shall include patrolling the devices to ensure that they are in the correct locations and in good repair. This shall include keeping all construction signs clean and readable. Contractor shall not remove barricades or any other traffic control devices until final

paving repair has been completed and the hazard to pedestrians, bicyclists and motorists no longer exists.

- E. Contractor shall designate in writing a representative in charge of all traffic control on the project site. This representative shall be responsible for the care and maintenance of all devices.
- F. Access to driveways adjacent to the construction work zone shall always be maintained as possible. Additional cones or delineators and flaggers may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveways, unless prior written approval is obtained from the Engineer.
- G. Traffic control requirements for various construction phases are also shown on the Plans.

3.07 CONSTRUCTION OPERATIONS UNDER TRAFFIC

- A. When in traffic lanes, all vehicles and equipment shall be operated at normal traffic speeds. If this is not practicable, a slow-moving vehicle emblem shall be displayed in accordance with the Motor Vehicle Code. Construction equipment shall not be parked in any lane intended for use by normal traffic. Equipment parked or stored at the Work site shall be behind a guard rail, barrier, curb or other protective device.
- B. One-way traffic: No construction equipment shall be operated in traffic lanes, except in the designated direction of travel for respective lanes. Flag persons controlling this operation shall be fitted with two-way radios to assist in coordinating their efforts.
- C. No construction equipment other than that designated and used for general highway transportation shall be moved on streets during hours of darkness or periods of adverse weather conditions which reduce normal activity.
- D. Any construction equipment or material required in construction which exceeds the maximum vehicle dimensions enumerated in the Motor Vehicle Code, shall be moved only in accordance with the established State and local regulations. No such oversize load shall be moved over the streets of the local jurisdictional agency without first obtaining the approval of the appropriate agency.
- E. Adequate queue storage space for construction vehicles should be provided within the project facility to prevent queuing outside of the facility.
- F. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at his expense.

3.08 CONSTRUCTION PARKING CONTROL

A. Parking on private property shall not be allowed. Parking on public roads shall be in accordance with the vehicle code, municipal code and posted parking controls. It shall be the responsibility of the Contractor to notify employees of the appropriate employee parking lots and the appropriate route of travel for employees.

B. Monitor parking of construction personnel's vehicles. Vehicular access to and through parking areas should be maintained. Prevent parking on or adjacent to access roads or in non-designated areas.

3.09 HAUL ROUTES

- A. Contractor shall provide daily vacuum street sweeping of all local streets used by construction vehicles to remove any debris generated by construction activities.
- B. Contractor shall submit to the City for approval of proposed haul routes. Material men bringing material to the site shall have copies of approved haul routes.
- C. Pre-approved haul routes are shown on the Plans.

3.10 TRAFFIC SIGNS AND SIGNALS

- A. The Contractor shall actively work with City traffic signal operations and maintenance operations of the traffic signals affected by the Work, including haul routes.
- B. The Contractor shall restore all traffic signal equipment damaged or removed by construction operations within 48 hours of removal of traffic control in the area. The Contractor shall not wait until the end of all construction to restore traffic signal loops.
- C. Contractor shall not use spray paint or tape to create signs used for traffic control. All signs shall be constructed of high-performance reflective sheeting meeting the standards for permanent roadway signing.
- D. Five (5) days prior to commencing any Work within the immediate vicinity of a traffic signal-controlled intersections, the contractor shall contact USA North 811 (800-642-2444) and the City Traffic Engineer. This prior notice will allow the location and marking of underground traffic signal conduit and traffic signal loop detectors prior to construction. Damage to traffic signal equipment shall be repaid within 24 hours at the Contractor's expense, per the Engineer's satisfaction.
- E. At traffic signal controlled intersections where construction efforts necessitate the removal of one or more traffic signal loop detectors, the Contractor will work with the Engineer to ensure that an appropriate signal timing plan is developed and implemented during the period in which the loop detectors are out of service. Upon completion of construction at the intersection, the Contractor will restore the loop detectors and restore the intersection to its previous operating state within 72 hours.
- F. The Contractor will ensure that all turning lanes affected by his construction are accompanied by a downstream travel lane to receive the traffic. With the City's permission, the contractor shall have the right to close an exclusive turning lane.

3.11 REMOVAL

A. Remove temporary traffic control equipment and devices at the completion of the construction activities. The construction site and neighboring areas shall be returned to their original or better condition. This does not relieve the Contractor of any restoration of the pavement due to damage related to construction.

- B. Repair damage caused by installation.
- C. Remove post settings to a depth of 2 feet and fill holes to the surface.

END OF SECTION

SECTION 01 56 39 TREE CARE AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Requirements for protection of existing trees to remain during construction. These requirements apply to the performance of Work in the areas with existing trees that are to remain, and to all other locations affected by construction, including haul routes.
 - 2. Tree care work shall be performed by a qualified Tree Surgeon or certified Arborist.
- B. Related Sections:
 - 1. Review the Contract Documents for additional requirements and information that apply to work under this section

1.02 REFERENCES

- A. Reference Data:
 - 1. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual, or test designation in effect the date the Notice to Proceed with the work is given.

1.03 SUBMITTALS

- A. Statement of Qualification for Tree Care Work.
- B. List of materials to be used by Tree Surgeon/Arborist for Tree Care Work.
- C. Tree Surgeon's/Arborist's Field Reports.

1.04 QUALITY ASSURANCE

A. Tree Surgeon or Arborist must have minimum supervisory experience of five (5) years, crew experience of two (2) years average in work similar to that required for this Project, and be listed by at least two (2) cities in Alameda, San Francisco, San Mateo or Santa Clara County as approved for tree care work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

- 1. Manufacturers of materials are listed to set a standard for product performance.
- 2. Products of manufacturers not listed may be proposed for substitution, if they are equal in product performance. It is the responsibility of the contractor to provide supporting evidence that product is equal.

2.02 FERTILIZER

A. Romeo 6-25-25, and 22-14-14

PART 3 EXECUTION

3.01 OPERATIONS

- A. Notify City Arborist 48 hours before excavating within the driplines of trees scheduled to remain and to verify the Contractor has met all tree protection requirements.
- B. Install 6-foot high chain link temporary protective fencing at driplines of existing trees to remain, or as directed by the City Arborist.
 - 1. Near construction activities it may be necessary to protect tree trunks from equipment with 2x4x8-foot studs attached with plastic snow fencing wrapped around the trunks in place of chain link fencing.
 - 2. At sidewalk conditions, temporary fencing shall be set in as large a triangle as possible along the sidewalk with the point set away from the street.
 - 3. All trunk protection and temporary protection fencing shall be reviewed and approved by the City Arborist prior to start of construction.
- C. Continuously supervise excavating, grading, filling and subsequent construction operations of all Sections to protect trees.
- D. Trenching within tree dripline is not permitted without approval. Route pipes and utilities around drip-line areas when possible.
- E. All excavation, including trenching for utilities within driplines of trees shall be by hand only. Tunnel under roots 2 inches and larger in diameter, and cleanly cut roots ³/₄-inch to 2 inches in diameter.
- F. Operate no machinery, including trucks, etc., which may compact soils at planting areas to remain.
- G. Construct fills to prevent disturbance to root zones of existing trees.
- H. Store no materials, including topsoil, under tree canopies.
- I. Park no vehicles under trees; do not allow construction access or roads under tree canopies.
- J. Washing of equipment such as paint sprayers, concrete chutes or pumping equipment, hand tools for concrete work, paint brushes, etc. shall not be allowed within driplines of, or uphill from trees.

K. The Contractor shall provide adequate protection for all existing trees "to remain" and is responsible for the maintenance of tree protection barriers during construction. Tree trunks' damage will result in fines based on square inches of damaged bark to be paid by the Contractor. Any repairable damage done to a tree shall be treated by a qualified tree surgeon at no cost to City. The death of a tree due to damage during construction shall result in the Contractor replacing the tree with another of comparable size. In the event the tree is, due to large size or unique structure, unable to be duplicated, a fair value as determined by a certified arborist or the "Guide for Establishing Value of Trees" (Council of Tree and Landscape Appraisers) will be charged to the Contractor.

3.02 TREE CARE

- A. Arrange and pay for the following tree care work to be performed by a qualified tree surgeon/arborist on all trees impacted by construction.
 - 1. Under City Arborist's observation, trim and remove tree limbs to ISA standards to provide for continuing health, and to maintain adequate clearance for equipment during construction operations. Provide guy wire support to trees if needed.
 - 2. Prior to beginning of construction and weekly thereafter inspect field conditions, health of trees and note any adverse impact to trees by construction operations. Perform pesticide spraying when needed, and watering and folar feeding as stated below. Submit report to City Arborist at each inspection.
 - 3. Spray water on all trees in construction area minimum once per week between start of work and onset of rainy season to remove dust from leaves.
 - 4. Folar feed each protected tree in construction area as follows. Fall: Fertilize trees with spray of Romeo's or equal 6-25-25 fertilizer at five pounds per 100 gallons of water. Spring: Romeo's 22-14-14 at five pounds per 100 gallons.

END OF SECTION

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SECTION 01 57 00 ENVIRONMENTAL CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This Section sets forth requirements for environmental control and waste management during the prosecution of the Work.
- B. Related Sections:
 - 1. Section 01 35 29 Hazardous Materials Procedures.
 - 2. Section 01 57 23 Storm Water Pollution Prevention.
 - 3. Section 01 55 00 Traffic Regulation

1.02 IDEMNIFICATION

A. The Contractor shall indemnify and hold harmless the City from any and all fines, penalties or damages incurred by the City for violation of any environmental mitigation measures or permit caused by the Contractor's failure to comply with environmental mitigation measures of this Section, the Special Provisions, General Conditions, Plans, or Regulatory Permits held by the City.

1.03 SPECIAL ENVIRONMENTAL RESTRICTIONS

- A. Environmental Compliance
 - 1. All Contractor and Subcontractor personnel working at the site shall attend a 30minute environmental protection training session prior to the commencement of Work.
 - a. Personnel will be required to sign an attendance sheet provided by the City.
 - b. Notify Engineer when new personnel are assigned to work at the site. City will provide additional training.
 - 2. The Contractor shall designate a representative(s) (e.g. the foreman) who will stop Work and contact the Engineer and Biologist if a listed endangered species is found within or adjacent to a Work area.
 - 3. Any dead or injured animal will be left alone until the Department of Fish and Wildlife arrives.
- B. Measures Specific to Ridgway's Rail.
 - 1. Contractor shall notify Biologist at least 48 hours prior to any plant clearing activities.
 - 2. Hand tools shall be utilized to remove vegetation in all areas subject to ground disturbing activities within Ridgway's rail habitat. These areas shall be cleared prior to the start of construction activities under the supervision of the Biologist.

- 3. All plant materials removed from rail habitat sites shall be collected and disposed of at an appropriate off-site location.
- 4. If a Ridgway's rail is killed or injured by workers under the Contractor's control, or a dead or injured Ridgway's rail is discovered during the course of the Contractor's operations, the Contractor shall cease all work at that site and immediately notify the Engineer and Biologist.

1.04 REGULATORY REQUIREMENTS

- A. These specifications reflect regulatory permit requirements known at the time of bidding.
- B. Permits obtained by the City and available for review contain additional constraints on the Contractor's work sequence and timing. These constraints shall be incorporated into the Contractor's schedule and Work.
- C. If there is a conflict with any provision of the Contract Documents and permit requirements, the more stringent requirement shall govern the prosecution of Work. Contractor shall call significant differences between permit conditions and these specifications to the attention of the Engineer.
- D. Representatives of the regulatory agencies that have issued permits shall be allowed access to all parts of the Work.
- E. Contractor shall adhere to all related requirements set forth in the State Water Resources Control Board NPDES General Permit Requirements (Order No. 2009-0009-DWQ) for Risk Level 2 sites. Permit requirements (Order No. 2009-0009-DWQ) are available for download on the State Water Resource Control Board's website (<u>http://www.waterboards.ca.gov</u>).

1.05 SUBMITTALS

- A. Submit a list of off-road construction equipment to be used on the project, including the following information:
 - 1. Equipment type and manufacturer.
 - 2. Equipment identification number (required by CARB).
 - 3. Year of engine manufacture.
 - 4. Tier rating.
- B. Provide a certification statement that the Contractor agrees to comply fully with the applicable Tier 3 or higher emission standards for all off-road diesel equipment and acknowledge that a significant violation of this certification would constitute a material breach of contract.

PART 2 PRODUCTS

2.01 ENVIRONMENTALLY SENSITIVE AREA (ESA) FENCING

- A. Contractor shall install ESA fence as shown on the Plans and as directed by the Biologist to ensure that construction is restricted to the intended Work area and that adjacent native vegetation is protected from potential construction related damage.
- B. Fabric shall consist of 4-foot tall orange plastic construction fencing. Where not able to be supported by existing fencing, ESA fence support posts shall be steel T-posts (#133) 6 feet minimum in length. Heavyweight plastic ratchet ties shall be used to fasten the ESA fabric to the posts or existing fencing where weaving of fabric over the post is not possible or practical.

2.02 SILT FENCING

- A. Contractor shall install silt fences as shown on the Plans and as directed by the Engineer to ensure that construction is restricted to the intended Work area and that soils eroded from the Work area are not transported off-site via run-off.
- B. Fabric shall be prefabricated woven geotextile fabric manufactured for siltation fencing. Where not supported by existing fencing as shown on the Plans, stakes shall be oak and a minimum of 1.125 inches square by 52 inches long. Fabric and stakes are available from Reed & Graham, Inc. Geosynthetics or equal as approved by the Biologist.

PART 3 EXECUTION

3.01 SITE PROTECTION

- A. All site protection measures described herein, including stormwater pollution prevention and habitat protection as described in the Special Provisions, shall be maintained in place continuously for the duration of construction.
- B. Contractor shall always maintain controlled and stable Work areas. Contractor is responsible to take those measures needed to control site runoff and soil disturbance, including the placement of temporary aggregate base course at Work sites to prevent soil erosion during construction as required.

3.02 ENVIRONMENTAL MITIGATION

- A. Mitigate the adverse environmental impacts associated with the Work.
- B. The measures that the Contractor shall take to mitigate environmental impacts include, but are not limited to the following:
 - 1. Implement a Fugitive Dust and Erosion Control Plan (FDECP) that meets or exceeds BAAQMD requirements and the CITY'S FDECP for this Site.

- 2. Comply with the State of California General Permit for Discharge of Storm Water Associated with Construction Activity and the Storm Water Pollution Prevention Plan for this Site.
- Protect sensitive habitats and species through the use of fencing, to prohibit construction personnel access to adjacent habitat areas, and with dust control measures of the FDECP, and such other measures that may be called for by the Mitigated Negative Declaration prepared for this Project.
- C. Comply with the following emission control measures to minimize construction activity emissions, at no additional cost to the City:
 - 1. Stop construction activities during Stage II smog alerts which will be announced to the Contractor by the Engineer.
 - 2. Reduce construction equipment emissions by shutting off equipment not in use.
 - 3. Reduce construction-related traffic congestion.
 - 4. Provide rideshare incentives for construction personnel.
 - 5. Tune and maintain construction equipment properly.
 - 6. Use low sulfur/low nitrogen fuel for construction equipment, if available.
 - 7. Provide transit incentives for construction personnel.
- D. Configure construction parking to minimize traffic interference.
- E. Comply with the requirements of the current City noise ordinances, which may include:
 - 1. Compliance with time restrictions for construction activity, as specified herein.
 - 2. Construction of noise barriers.
 - 3. Use of low-noise-generating construction equipment.
 - 4. Maintenance of mufflers and ancillary noise abatement equipment.
 - 5. Use of vibration pile or hydraulic press drivers and other techniques that result in less noise than impact pile drivers.
 - 6. Scheduling high noise producing activities during periods that are least sensitive.
 - 7. Routing construction related truck traffic away from noise-sensitive areas.
 - 8. Reducing construction vehicle speeds.

3.03 INSTALLATION OF ESA AND SILT FENCING

- A. ESA and silt fencing materials shall be as specified herein.
- B. ESA fencing and habitat protection shall be as specified herein.
- C. The Engineer will monitor silt fencing for effectiveness. Should the installed silt fencing prove to be an ineffective means of runoff pollution control as measured below, the Contractor shall replace silt fencing as required until adequate pollution control is achieved.
3.04 REMOVAL OF SEDIMENT CONTROLS

- A. The Contractor shall remove ESA and silt fencing at the end of construction.
- B. All spoil material trapped behind sediment controls shall be disposed of off-site in conformance with all applicable regulatory requirements.

3.05 USE OF EXPLOSIVES

A. The use of explosives for blasting purposes on the Work shall not be permitted.

3.06 FUGITIVE DUST AND SMOKE CONTROL

- A. Furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance as defined by the Engineer.
 - 1. The Contractor shall be responsible for any damage resulting from any dust originating from its operations.
 - 2. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.
 - 3. No separate payment shall be allowed for dust abatement measures and all costs thereof shall be included in the Contractor's Bid.
 - 4. The use of water to clean streets, sidewalks, driveways, shall not be permitted as a substitute for sweeping or other methods of dust control.
- B. Fugitive dust control measures shall include at a minimum:
 - 1. Watering associated with on-site construction activity shall take place between the hours of 8 a.m. and 7 p.m. and shall include at least one late-afternoon watering to minimize the effects of blowing dust.
 - 2. Streets shall be cleaned by street sweepers or by hand as often as deemed necessary by the Engineer.
 - 3. All public streets and medians soiled or littered due to construction activity shall be cleaned and swept daily during the workweek to the satisfaction of the Engineer.
 - 4. Water all active construction areas at least twice daily and more often during windy periods; active areas adjacent to existing sensitive land uses shall always be kept damp or shall be treated with non-toxic stabilizers to control dust.
 - 5. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
 - 6. Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
 - 7. Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.

- 8. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- 9. Blowing dust shall be reduced by timing construction activities so that paving and building construction begin as soon as possible after completion of grading, and by landscaping disturbed soils as soon as possible.
- 10. All portions of the site subject to blowing dust shall be watered as often as deemed necessary by the City in order to ensure proper control of blowing dust for the duration of the project.
- 11. All vehicle speeds on unpaved roads shall be limited to 15 mph.
- 12. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible.
- C. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
 - 1. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations (CCR). Clear signage shall be provided for construction workers at all access points.
- D. Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.
- E. The Contractor shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority.
- F. Comply with the requirements of Title 8, California Code of Regulations, concerning handling of asbestos dust.

3.07 EXHAUST EMISSIONS DURING CONSTRUCTION

A. Off-road construction equipment with a 25-horsepower diesel engine or greater shall meet EPA Tier 3 or higher emission standards.

3.08 NOISE CONTROL

- A. The City will provide written notice of construction activity to residences and landowners within 60 feet of the activity.
 - 1. Provide 14 days' notice to the Engineer before beginning any construction activity in any location.
 - 2. Indicate duration of planned activity.
 - 3. Provide anticipated maximum noise levels at the limit of construction.

- B. Submit a Construction Noise Management Plan, prepared by a qualified acoustical consultant before beginning any construction, haul, or staging activity within 60 feet of a residential or commercial property. Plan shall address:
 - 1. Maximum noise levels anticipated based on the equipment to be used in the Work.
 - 2. Site-specific noise attenuation measures potentially including the use of mobile sound barriers within the project footprint.
 - a. Equipment shall be properly adjusted and maintained and equipped with mufflers conforming to Cal/OSHA standards.
 - b. Place noise-generating stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the location of such equipment.
 - 3. Demonstration that Foster City Noise Ordinances will be met throughout construction.
- C. Designate a Noise Disturbance Coordinator who shall be responsible for responding to local complaints about construction noise, either directly from the public or through the City.
 - Noise disturbance coordinator shall be responsible for identifying the cause of the noise complaints, and whether the Contractor is in violation of Foster City Noise Ordinances.
 - 2. Coordinator shall be responsible for the resolution of noise complaints to the City's satisfaction, which will not be unreasonably withheld.
 - 3. Coordinator's contact information including telephone number and email shall be provided to the City for posting on its construction-related website, and conspicuously be posted at all entrances to the construction site.

3.09 VIBRATION CONTROL

- A. Contractor shall retain a qualified professional to prepare a vibration impact assessment for residences located within 15 feet of the Project limits, or within 5 feet of any potential staging area.
- B. Vibration assessment shall account for project-specific equipment and means for completing the work, and the soil conditions to be encountered while prosecuting the work.
- C. If the assessment finds that the Contractor's means of conducting the work, or the equipment to be used in conducting the work is likely to cause damage to nearby structures, the means and methods of construction shall be changed to avoid the potential damage.
- D. Do not proceed with activities likely to cause vibration, including sheet pile installation, until the vibration assessment is favorably reviewed by the Engineer.
- E. No vibration shall be permitted so as to cause a noticeable tremor, measurable without instruments, at a private property lot line.

- F. The following criteria shall be used to establish whether vibration resulting from a Construction activity at any Work site or offsite must be modified to meet the specified criteria.
 - 1. Vibration Criteria to Prevent Disturbance. The measured root mean square (RMS) vibration decibel (VdB) shall not exceed:
 - a. 72 for frequent events defined as more than 70 vibration events of the same kind per day.
 - b. 75 for occasional events defined as between 30 and 70 vibration events of the same kind per day.
 - c. 80 for infrequent events defined as fewer than 30 vibration events of the same kind per day.
 - 2. Vibration Criteria to Prevent Damage to Structures. These criteria are based on the following defined building categories for adjacent structures, as determined by the Engineer, using the Peak Particle Velocity (PPV) as the maximum instantaneous peak of a vibration signal and RMS VdB:

Building Category	PPV (in/sec)	RMS (VdB)
Reinforced concrete, steel or timber (no plaster)	0.5	102
Engineered concrete and masonry (no plaster)	0.3	98
Non-engineered timber and masonry buildings	0.2	94
Buildings extremely susceptible to vibration damage	0.12	90

3.10 RUBBISH CONTROL

- A. Through all phases of construction, including suspension of work and until final acceptance of the Project, keep the worksites and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish and debris.
- B. Dispose of all rubbish and waste materials of any nature occurring at the worksites and shall establish regular intervals of collection and disposal of such materials and waste.
- C. Keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations.
 - 1. Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately, and the area cleaned by the Contractor.
- D. Equipment and material storage shall be confined to areas shown on the Plans or approved by the Engineer.
- E. Disposal of all rubbish and surplus materials shall take place off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and the requirements of the OSHA Safety and Health Standards for Construction.

F. All cleanup cost shall be included in the Contractor's Bid.

3.11 WEED ABATEMENT

- A. Infestations of noxious weeds within Work sites shall be removed prior to construction.
- B. Use construction equipment and materials such as fill and erosion control devices that are known to be weed-free.
- C. Power wash construction vehicles to remove mud, dirt and vegetative material before working in relatively weed free areas.

3.12 CHEMICALS

- A. The following paragraph does not relieve the Contractor from its responsibility for obtaining prior approval from the Engineer for chemical usage when otherwise required.
- B. Provide four (4) copies of the MSDS to the Inspector for all chemicals used during project construction or furnished for project operation, prior to bringing them on site, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, which shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer and with all other applicable laws and regulations.

3.13 ODOR CONTROL

A. Furnish all labor, materials, and equipment required and shall carry out effective measures whenever and as often as necessary to prevent the discharge of a nuisance odor from its operation into the atmosphere in such quantity as will violate the regulations of any legally constituted authority. During construction, notify the Engineer and the Inspector at least forty-eight (48) hours in advance when potential odor-causing activities are scheduled.

3.14 DRAINAGE CONTROL

A. Drainage control shall be in full conformance with the Plans and Section 01 57 23, Storm Water Pollution Prevention.

3.15 GRAFITTI CONTROL

A. Throughout all phases of work, including suspension of Work, and until final acceptance, keep all equipment, field offices, storage facilities and other facilities free of graffiti. Graffiti shall be painted over, masked or cleaned off within twenty-four (24) hours after notification by the Inspector.

3.16 VERMIN CONTROL

A. At the time of acceptance, Work shall be free of rodents, insects, vermin, and pests.

- B. Necessary extermination work shall be arranged and paid for by the Contractor as part of the Work within the Contract Time and shall be performed by a licensed exterminator in accordance with requirements of governing authorities.
- C. The Contractor shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

3.17 FERAL CATS

- A. Feral Cats currently occupy portions of the worksite.
- B. If feral cats unduly interfere with the prosecution of Work, notify the Engineer and contact the Peninsula Humane Society & SPCA at (650) 340-7022.
 - 1. Do not trap, harm, or feed feral cats.

3.18 INERT SOLIDS RECYCLING

- A. Asphalt concrete, Portland Cement Concrete and aggregate base material not recycled on site shall be removed from the Project Site, hauled to, and deposited at a recognized inert solids recycling facility.
- B. It is the Contractor's responsibility to conform the above material to an acceptable size and composition in order to enable the acceptance of this material at a recognized inert solids recycling facility.
- C. Recognized inert solids recycling facilities include, but are not limited to:
 - 1. Raisch Recycle Yard Sunnyvale, CA
 - 2. S.R.D.C. Redwood City, CA
 - 3. Harbor Sand and Gravel Redwood City, CA
 - 4. Reed and Graham, Inc. San Jose, CA
- D. All recycling facilities for Project off-haul are subject to the approval of the Engineer.
- E. Failure to submit recycling documents (i.e. weight tags) will result in a non-payment for such recycled items.
- F. This documentation shall include the following:
 - 1. Project Title
 - 2. Date & Time
 - 3. Truck Number
 - 4. Type of Material
 - 5. Weight of Material

- 6. Name of Recycling Facility
- 7. Certification by Recycling Facility

3.19 CONSTRUCTION AND DEMOLITION WASTE

- A. Contractor shall divert project-related construction and demolition waste from landfill by salvaging the materials or transporting them to an approved facility, as listed in the Debris Management Plan prepared for the project. Contractor shall comply with the provisions of the Debris Management Plan and shall report all proposed changes to the approved Plan to the Engineer for review and approval prior to exercising said changes.
- B. Contractor shall provide all weight tags and other documentation required to demonstrate compliance with the Debris Management Plan approved for the project.

3.20 DISPOSAL OF MATERIAL

- A. The Contractor shall dispose materials outside the Site and the Contractor shall pay all costs involved. The Contractor shall first obtain permission from the property owner on whose property the disposal is to be made and absolve the City from all responsibility in connection with the disposal of material on said property. When material is disposed of as provided above, the Contractor shall conform to all required codes pertaining to grading, hauling, and filling of earth.
- B. This provision also applies to any material stockpile and equipment storage area.
- C. During construction activities, all trash and debris shall be collected in trash receptacles with a tightly secured lid to prevent attracting predators to the site. All trash cans shall be removed and emptied at an appropriate facility once per week at minimum. If no garbage receptacles are available, all debris including food wrappers and drink containers shall be collected and removed from the area daily for disposal at an appropriate facility.

3.21 EQUIPMENT AND VEHICLE REFUELING

- A. Contractor shall prepare and implement a spill prevention and response plan for refueling equipment, machinery, and vehicles at the Project Site.
- B. Submit to Engineer for review prior to beginning any refueling activity.
- C. Machinery, vehicles, and construction equipment shall not be refueled within 60 feet of any aquatic habitat as identified by ESA fencing on the Plans.

3.22 TEMPORARY FLOOD PROTECTION

- A. Contractor shall provide temporary flood protection against inundation from high tides in San Francisco Bay whenever and wherever existing flood protection elevations are lowered below 11 feet NAVD.
- B. Where the elevation of existing flood protection structures is less than 11 feet NAVD; temporary flood protection to elevation 11 feet NAVD shall be provided whenever

and wherever the elevation of existing flood protection structures is lowered below existing elevations.

- C. Methods used to provide temporary flood protection during construction at the various Work sites are solely at the discretion of the Contractor, insofar as those methods are in accordance with relevant provisions of the Safety Orders, subject to the Engineer's review.
 - 1. Conform to flood barrier manufacturer's instructions when deploying commercial systems.
 - 2. Flood barriers shall not be deployed within environmentally sensitive areas identified on the Plans or fenced in the field.
 - 3. Flood barrier locations are subject to review and approval by the Engineer.
 - 4. All facilities constructed to protect excavations and/or provide a temporary flood barrier during construction are temporary, the property of the Contractor, and shall be removed from the project site upon completion of all work necessitating the barrier.
 - 5. The site of each temporary flood barrier shall be restored as directed by the Engineer.

3.23 SITE CONTROL DURING INCLEMENT WEATHER

- A. The Contractor is solely responsible for site protection during periods of inclement weather.
- B. All construction activity with the potential to cause erosion, sedimentation, or water pollution shall be suspended during periods of inclement weather.
 - 1. Inclement weather is defined as a rain event with a forecasted probability of 40% or greater of measurable (0.01 inch or more) rainfall.
 - 2. The Contractor is responsible for keeping track of upcoming inclement weather and must obtain the precipitation forecast information from the National Weather Service Forecast Office (http://www.nws.noaa.gov/).
 - 3. Contractor shall notify the Engineer 48 hours prior to forecast inclement weather.
 - 4. Contractor shall develop a Rain Event Action Plan (REAP) 48 hours prior to any likely precipitation event forecast of 40% or greater probability. The REAP shall be a written document, specific for each rain event and shall be designed to protect all exposed portions of the site.
 - REAP shall contain all information outlined in the State Water Resources Control Board NPDES General Permit Requirements (Order No. 2009-0009-DWQ) for Risk Level 2 sites.
 - d. Permit requirements are available for download on the State Water Resource Control Board's website. (http://www.waterboards.ca.gov).
 - 5. Contractor shall begin implementation and make the REAP available onsite no later than 24 hours prior to the likely precipitation event.

- 6. If a defined rain event is forecast for a weekend or holiday, all site protection shall be deployed and in place before the Contractor stops work prior to that weekend or holiday.
- 7. When there is a forecast of more than 40% chance of rain, or at the onset of unanticipated precipitation, the Contractor shall remove all equipment from waters of the State, implement erosion and sediment measures in accordance with the Plans and Specifications, and cease all construction activities.
- 8. The Contractor has discretion as to how he runs his operations while maintaining an adequately protected site at the onset of rainfall.

3.24 WATER POLLUTION MONITORING

- A. The City will monitor the Contractor's operations and site maintenance to ensure compliance with the NPDES General Construction Permit and other regulatory requirements.
- B. During discharge events the City will sample site runoff for the following constituents and compare to Regional Water Quality Control Board numeric effluent limits (NELs):
 - 1. Turbidity: Maximum turbidity measured in runoff leaving the construction sites will not be allowed to exceed 250 NTU (roughly equivalent to 750 mg/l).
 - pH: Measured pH runoff leaving the construction sites must be between 6.5 and 8.5 pH units.
- C. If effluent limits are exceeded during a discharge event, all Work shall cease, and the Engineer will direct the Contractor to employ other housekeeping and pollution control measures until compliance is reached.
- D. The Contractor is responsible for maintaining the identified effluent limits for all runoff leaving the construction site. No exceptions will be made for poor quality run-on water.

3.25 FINES FOR PERMIT VIOLATION

- A. Contractor is responsible for all permit violation fines and necessary corrective actions due to his negligence.
- B. Typical NPDES permit fines per violation are:
 - 1. Maximum of \$10,000/day and \$10/gallon over 1000 gallons discharged
 - 2. Minimum mandatory penalties of \$3,000 per violation

3.26 DOCUMENTATION

- A. Contractor shall retain storm water monitoring and control and BMP records on-site while construction is ongoing. Documentation shall be well organized and shall contain the following items at a minimum:
 - 1. Document all housekeeping BMPs in the SWPPP and REAP(s) in accordance with the nature and phase of the construction project.

- 2. Printed copies of all likely precipitation event forecast of 50% or greater probability during all phases of construction.
- 3. Copies of all storm water related inspection, sampling, and observation reports.
- 4. Records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.

3.27 ACCIDENTAL DISCOVERIES

- A. Significant historic and cultural resources are not known to exist at the project sites.
 - 1. In the event than a historic, cultural, archaeological, or paleontological resource is found during construction, all construction Work within a 50-foot radius of the find shall be halted, and the Engineer notified.
 - 2. A qualified archaeologist will be retained by the City to examine the find and a mitigation plan may be implemented.
 - 3. Any resulting changes in the scope of Work or time delays caused by the discovery of cultural resources shall be dealt with in conformance with these Contract Documents.
- B. If human remains are encountered during excavation or backfilling activities, there shall be no further disturbance until the County Coroner has made the necessary findings as to origin and disposition.
 - 1. Notify the Engineer immediately upon the discovery of possible human remains.
 - 2. Do not resume work until so directed in writing.
 - 3. If the remains are determined to be of Native American descent, the provisions of Section A above will apply.

3.28 REMOVAL OF MATERIAL, CLEANUP, AND DEMOBILIZATION

- A. Throughout all phases of construction, including suspension of Work, and until the Final Acceptance, the Contractor shall keep the site clean and free from rubbish and debris. The Contractor shall also abate dust nuisance by cleaning, sweeping and sprinkling with water, or other means as necessary. The use of water to clean public streets will not be permitted as a substitute for sweeping or other methods.
- B. Vehicles exiting the construction site shall have all dirt clods and mud removed from their tires and shall comply with all requirements of the site SWPPP.
- C. The Contractor shall furnish and operate a motorized street sweeper with spray nozzles at least once each working day for the purpose of keeping paved areas acceptably clean whenever construction, including restoration, is incomplete.
- D. Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials and rubbish to present a satisfactory clean and neat appearance.
- E. Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately, and the area cleaned.

- F. Enough material may remain for use as backfill if otherwise permitted by the Specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.
- G. Failure of the Contractor to comply with the Engineer's cleanup orders may result in an order to suspend Work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

END OF SECTION

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SECTION 01 57 23 STORM WATER POLLUTION PREVENTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - Requirements for implementation of a Storm Water Pollution Prevention Plan (SWPPP) prepared by the Contractor, and compliance with the State of California General Construction Activity Stormwater Permit.
 - a. The permit (Order No. 2009-0009-DWQ, NPDES No. CAS000002) authorizes the discharge of stormwater associated with construction activities from construction site.
 - b. The goal of these requirements is to prevent the pollution of storm water runoff on construction projects by keeping pollution out of storm drains, reducing the exposure and discharge of materials and wastes to storm water, and by reducing erosion and sedimentation. Storm drains discharge runoff directly to the Central Lagoon and San Francisco Bay without treatment.
 - 2. General Requirements:
 - a. Erosion control.
 - b. Non-hazardous material and waste management.
 - c. Hazardous material and waste management.
 - d. Spill prevention and control.
 - e. Vehicle and equipment maintenance.
 - f. Contractor training and awareness.
 - 3. Activity Specific Requirements:
 - a. Dewatering Operations.
 - b. Paving operations.
 - c. Saw cutting.
 - d. Contaminated soil management.
 - e. Concrete, grout, and mortar waste management.
 - f. Painting.
 - g. Earthwork.
- B. Related Sections:
 - 1. Section 01 35 29 Hazardous Materials Procedures.
 - 2. Section 01 50 00 Temporary Facilities and Controls.
 - 3. Section 31 10 00 Site Preparation.
 - 4. Section 31 00 00 Earthwork.

5. Section 32 01 16 - Pavement Restoration.

1.02 REFERENCES

- A. United States Code of Federal Regulation (CFR):
 - 1. 40 CFR Part 117.
 - 2. 40 CFR Part 302.
- B. State of California, State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB).

1.03 SUBMITTALS

- A. Pollution Prevention Plan:
 - 1. Submit to the Engineer a pollution prevention plan detailing the placement of physical Best Management Practices (BMPs) outlined in the Plans and required for the Work, and the methods used to comply with those BMPs directed at operational procedures, a Monitoring Program and Reporting Plan.
 - 2. The plan shall specifically address and detail changes from the alternatives called out in this Section. The Contractor's preferred techniques shall show how it will comply with the stated objectives of the program and relevant permit requirements.
- B. The Contractor shall submit a copy of the BMP Handbook with each BMP to be utilized check marked to show compliance or marked to show deviation.
- C. The entire plan shall be kept and maintained by the Contractor on the construction site during the duration of the Project.
- D. The Contractor shall be responsible for taking the proper actions to prevent contaminants and sediments from entering the storm sewer drainage system should any unforeseen circumstance occur. The Contractor shall take immediate action if directed by the Engineer, or if the Contractor observes contaminants and/or sediments entering the storm drainage system, to prevent further stormwater from entering the system.

1.04 REGULATORY REQUIREMENTS

- A. The Contractor shall comply with the SWRCB, RWQCB, County, City, and other local agency requirements regarding stormwater discharges and management.
- B. The Contractor shall comply with the following prohibitions and limitations, which are contained in the State of California General Construction Activity Stormwater Permit (General Permit):
 - 1. Discharge prohibitions:
 - a. Discharges of materials other than storm water, which are not otherwise regulated by a NPDES permit, to a separate storm water sewer system or water of the nation are prohibited.

- b. Storm water discharges shall not cause or threaten to cause pollution, contamination (including sediment) or nuisance.
- c. Storm water discharges regulated by this general permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and 40 CFR Part 302.
- 2. Receiving Water Limitations:
 - a. Storm water discharges to any surface or groundwater shall not adversely impact human health or the environment.
 - b. Storm water discharge shall not cause or contribute to a violation of any applicable water quality standards contained in the California Ocean Plan, Inland Surface Waters and Enclosed Bays and Estuaries Plan, or the applicable RWQCB's Basin Plan.
- C. Requirements:
 - To comply with the permit mandates, San Mateo County has developed a county-wide Water Pollution Prevention Program and summary of Best Management Practices (BMPs) that shall be utilized by the Contractor. BMPs are measures or practices used to reduce the amount of pollution entering surface water. BMPs may take the form of a process, activity, or physical structure. No additional compensation shall be made for implementation of BMPs.
 - 2. The San Mateo Countywide Water Pollution Prevention Program and Summary of BMPs are available for review at https://www.flowstobay.org/bmp.

1.05 STORM WATER POLLUTION PREVENTION PLAN IMPLEMENTATION

A. The Contractor shall implement all activities required by the General Permit and as detailed in its Storm Water Pollution Prevention Plan, Monitoring Program and Reporting Plan.

1.06 AMENDMENTS

- A. The Contractor shall amend the Storm Water Pollution Prevention Plan, Monitoring Program and Reporting Plan as needed whenever there is a change in construction or operations which may affect the discharge of pollutants to storm water.
- B. The Storm Water Pollution Prevention Plan may also be amended by the City if it is found to be in violation of any conditions of the general permit or has not achieved the general objective of reducing pollutants in storm water discharges.
- C. All Contractor initiated amendments shall be completed at no additional cost to the City.

1.07 ANNUAL SUMMARY

- A. The Contractor shall provide the City with enough information for the City to submit to the RWQCB an annual summary report that includes at a minimum:
 - 1. Construction activities.

- 2. Project status.
- 3. Documentation of non-stormwater discharge.

1.08 NOTICE OF TERMINATION

- A. The Contractor shall submit to the City, a Notice of Termination upon completion of all construction activities, in accordance with the General Permit.
- B. The Contractor shall file the Notice of Termination pursuant to the terms of the General Permit. The Contractor shall submit a copy of that Notice of Termination to the City.

PART 2 PRODUCTS

2.01 DUFF

- A. Duff shall consist of vegetation removed and collected from clearing and grubbing activities.
- B. Vegetation may include trees, shrubs, ground cover, bark, leaves, and roots with attached soil.
- C. Vegetation shall be processed into duff by tub grinding or chipping it into pieces not exceeding 6 inches in any dimension.

2.02 FIBER

- A. Fiber shall be wood fiber, cellulose fiber, alternate fiber, or a combination of these fibers.
- B. Wood fiber shall be a long-strand, whole-wood fiber thermo-mechanically processed from clean whole wood chips.
- C. Cellulose fiber shall be made from natural or recycled pulp fiber, such as wood chips, sawdust, newsprint, chipboard, corrugated cardboard, or a combination of these materials.
- D. Alternate fiber shall be a long-strand, whole natural fiber made from clean straw, cotton, corn, or other natural feed stock.
- E. Fiber shall:
 - 1. Disperse into a uniform slurry when mixed with water.
 - 2. Contain 3/8-inch fiber strands for at least 25 percent by total volume.
 - 3. Have at least 40 percent retained when passed through a No. 25 sieve.
 - 4. Have an initial moisture content of no more than 15 percent of its dry weight when tested under California Test 226. The moisture content shall be marked on the packaging.

- 5. Have a water holding capacity, by weight, of at least 1,200 percent when tested under ASTM D7367.
- 6. Be nontoxic to plants and animal life.
- 7. Be free of synthetic or plastic materials, lead paint, printing ink, varnish, petroleum products, seed germination inhibitors, and chlorine bleach.
- 8. Contain less than 250 ppm of boron.
- 9. Be colored to contrast with the area where it is to be applied. The coloring agent shall be able, nontoxic, and free from copper, mercury, and arsenic, and must not stain concrete or painted surfaces.

2.03 TACKIFIER

- A. Tackifier shall be:
 - 1. Free from growth or germination inhibiting factors.
 - 2. Nonflammable.
 - 3. Nontoxic to aquatic organisms.
 - 4. Functional for a minimum of 180 days.
- B. Tackifier shall be one of the following:
 - 1. Plant-based natural high-molecular-weight polysaccharide. Plant-based tackifier shall be a high viscosity hydrocolloid that is miscible in water, and labeled as either guar, psyllium, or starch, as follows:
 - a. Guar gum based tackifier shall be derived from the ground endosperm of the guar plant, *Cyanmopsis tetragonolobus*.
 - 1) It shall be treated with dispersing agents for easy mixing.
 - 2) It shall be able to be diluted at the rate of 1 to 5 pounds per 100 gallons of water.
 - b. Psyllium based tackifier shall be manufactured from the finely ground, mucilloid coating of *Plantago ovata* or *Plantago ispaghula* seeds and able to dry and form a firm but re-wettable membrane.
 - c. Starch based tackifier shall be a nonionic, water-soluble, granular material derived from corn, potato, or other plant-based source.
 - 2. Prepackaged liquid or dry powder polymeric emulsion blend. Prepackaged tackifier shall be an anionic formulation with a residual monomer content not exceeding 0.05 percent by weight. The tackifier shall contain and be labeled with one of the following as the primary active ingredients:
 - a. Acrylic copolymers and polymers.
 - b. Polymers of methacrylates and acrylates.
 - c. Copolymers of sodium acrylates and acrylamides.
 - d. Polyacrylamide and copolymer of acrylamide.
 - e. Hydrocolloid polymers.

2.04 STRAW

- A. Straw shall be stalks from wheat, rice, or barley furnished in air-dry condition with a consistency compatible for application with commercial straw-blowing equipment. Wheat and barley straw must be derived from irrigated crops.
- B. Straw shall be free of plastic, glass, metal, rocks, and refuse or other deleterious material.
- C. Straw shall not have been previously used for stable bedding.

2.05 BONDED FIBER MATRIX

- A. Bonded fiber matrix shall be a hydraulically applied material composed of fiber and tackifier.
- B. Fiber for bonded fiber matrix shall be 100 percent wood fiber and comply with the State Standard Specifications for fiber under section 21-2.02D, except that at least 50 percent is retained when passed through a no. 25 sieve.
- C. Tackifier for bonded fiber matrix shall:
 - 1. Be bonded to the fiber or prepackaged with the fiber by the manufacturer.
 - 2. Contain a minimum of 10 percent of the combined weight of the dry fiber, activating agents, and additives.
 - 3. Be an organic, high viscosity colloidal polysaccharide with activating agents or a blended hydrocolloid-based binder.

2.06 ROLLED EROSION CONTROL PRODUCTS

- A. Rolled erosion control products (RECP) shall be a long-term, degradable, openweave textile manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment, and protection of vegetation. RECP shall conform to the classification system established by the ECTC.
- B. Deliver RECP in suitable wrapping to protect against moisture and extended ultraviolet exposure occurring before placement.
- C. Jute mesh shall be ECTC Type 3B made of unbleached and undyed woven jute. Jute shall comply with the requirements shown in the following table:

Quality characteristic	Test Method	Requirement
Strands per foot (min, each direction)		14-20
Roll width (min, inches)		48
USLE C-Factor for a 1.5:1 (H:V) unvegetated slope		<u><</u> 0.25
Shear stress (max, psf)	ASTM D6460	2.0
Tensile strength (min, psf)	ASTM D5035	100
Functional longevity (months)		12

Quality characteristic	Test Method	Requirement
Average open area (%)		65 <u>+</u> 5
Weight of fabric (min, oz/sq yd)	ASTM D3776	14.4 – 19.2

D. Netting shall be ECTC Type 4 and made of 100 percent coconut fiber woven into a matrix. Netting shall comply with the requirements shown in the following table:

Quality characteristic	Test Method	Requirement		
		Туре А	Туре В	Туре С
Thickness (min, inch)	ASTM D6525	0.30		
Roll width (min, inches)		72 – 158		
USLE C-Factor for a 1:1 (H:V) unvegetated slope		<u><</u> 0.25		
Shear stress (max, psf)	ASTM D6460	2.25	4.4	4.6
Tensile strength (min, psf)	ASTM D5053	125		
Functional longevity (months)		36		
Average open area (%)		63 ± 5	48 ± 5	38 ± 5
Weight of fabric (min, oz/sq yd)	ASTM D3776	11.8	20	26

E. Erosion control blankets shall be ECTC Type 2D and made of processed natural fibers that are mechanically, structurally, or chemically bound together to form a continuous matrix that is surrounded by 2 natural nets. Erosion control blanket shall comply with the requirements shown in the following table:

Quality characteristic	Test Method	Requirement		
		Туре А	Туре В	Туре С
Roll width (min, inches)		72		
Matrix (%) Straw/coconut Woven coir (coconut fiber) Wood excelsior (≥ 6 inches)		70/30 	 100 	 80
USLE C-Factor for a 1:1 (H:V) unvegetated slope		<u><</u> 0.20		
Shear stress (max, psf)	ASTM D6460	1.75		
Tensile strength (min, psf)	ASTM D5053	75		
Functional longevity (months)		12		

2.07 FIBER ROLLS

- A. Fiber rolls shall be a premanufactured roll filled with rice or wheat straw, wood excelsior, or coconut fiber. Fiber rolls shall be covered with biodegradable jute, sisal, or coir fiber netting secured tightly at each end and must be one of the following:
 - 1. 8 to 10 inches in diameter and at least 1.1 lb/ft.
 - 2. 10 to 12 inches in diameter and at least 3 lb/ft.

B. Fiber rolls shall have a minimum functional longevity of one year.

2.08 FASTENERS

- A. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. The ends shall be pointed for driving into the ground. Notched stakes shall be at least 1 by 2 by 24 inches in size. Stakes without notches shall be at least 1 by 1 by 24 inches.
- B. Metal stakes shall be at least 1/2 inch in diameter and have tops bent at 90-degree angles or capped with an orange or red plastic safety cap that fits snugly onto the metal stake.
- C. Steel staples shall be a minimum of 11-gauge, 6-inch, U-shaped staples with a 1inch crown. Provide heavier gauge and greater length if required by the job site conditions. An alternative attachment device such as a 100 percent biodegradable fastener to install RECP instead of staples may be used.
- D. Rope to fasten fiber rolls shall be 1/4 inch in diameter and biodegradable, such as sisal or manila.

2.09 TOPSOIL

A. In conformance with Section 31 00 00 of these Specifications.

2.10 HYDROSEED

A. In conformance with Section 32 92 13 of these Specifications.

PART 3 EXECUTION

3.01 NONHAZARDOUS MATERIAL AND WASTE MANAGEMENT

- A. Designated Area: The Contractor shall propose designated areas of the Project Site, for approval by the Engineer, suitable for material delivery, storage, and waste collection that, to the maximum extent practicable, are near construction entrances and away from catch basins, gutters, drainage courses, and creeks.
- B. Granular Material
 - 1. The Contractor shall store granular material at least ten feet away from catch basin and curb returns.
 - 2. The Contractor shall not allow granular material to enter the storm drains or creeks.
 - 3. When rain is forecast within 24 hours or during wet weather, the Engineer may require the Contractor to cover granular material with visqueen and to surround the material with sandbags.

- C. Dust Control: The Contractor shall use reclaimed water to control dust daily or as directed by the Engineer.
- D. Street Sweeping: At the end of each working day or as directed by the Engineer, the Contractor shall clean and sweep roadways and on-site paved areas of all materials attributed to or involved in the Work.
 - 1. The Contractor shall not use water to flush down streets in place of street sweeping.
- E. Recycling: The Contractor shall recycle asphalt concrete and Portland cement concrete and reuse or recycle any useful construction materials generated during the project to the maximum extent practicable, per Section 01 57 00.
 - 1. At the end of each working day, the Contractor shall collect all scrap, debris, and waste material, and dispose of such materials properly.

3.02 HAZARDOUS MATERIAL AND WASTE MANAGEMENT

- A. Comply with all requirements of Section 01 35 29.
- B. Spill prevention and control: The Contractor shall keep a stockpile of spill cleanup materials, such as rags or absorbents, readily accessible on-site. The Contractor shall immediately contain and prevent leaks and spills from entering storm drains, and properly clean up and dispose of the waste and cleanup materials. If the waste is hazardous, the Contractor shall handle the waste as described in Section 01 35 29. The Contractor shall not wash any spilled material into streets, gutters, storm drains, or creeks and shall not bury spilled hazardous materials. The Contractor shall report any hazardous materials spill to City of Foster City Emergency Operations Center at (650) 286 3350.

3.03 VEHICLE AND EQUIPMENT MAINTENANCE

- A. The Contractor shall not perform vehicle or equipment cleaning on-site or in the street using soaps, solvents, degreasers, steam cleaning equipment, or equivalent methods. The Contractor shall perform vehicle or equipment cleaning, with water only, in a designated, bermed area that will not allow rinse water to run off-site or into streets, storm drains, or creeks.
- B. Vehicle and equipment maintenance and fueling:
 - The Contractor shall perform maintenance and fueling of vehicles or equipment over a drip pan that will not allow run-on of storm water or runoff of spills or take other reasonable measures to minimize spills and their effects. The Contractor shall use secondary containment, such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispensed, changed, or poured. The Contractor shall keep a stockpile of spill cleanup materials, such as rags or absorbents, readily accessible on-site.
 - 2. The Contractor shall clean up leaks and spills of vehicle or equipment fluids immediately and dispose of the waste and cleanup materials as hazardous waste, as described in Section 01 35 29. The Contractor shall not wash any

spilled material into streets, gutters, storm drains, or creeks and shall not bury spilled hazardous materials.

- 3. The Contractor shall inspect vehicles and equipment arriving on-site for leaking fluids and shall promptly repair leaking vehicles and equipment. Drip pans shall be used to catch leaks until repairs are made.
- 4. The Contractor shall recycle waste oil and antifreeze, to the maximum extent practicable. The Contractor shall comply with Federal, State, and City requirements for aboveground storage tanks.

3.04 CONTRACTOR TRAINING AND AWARENESS

- A. The Contractor shall train all employees /subcontractors on the storm water pollution prevention requirements contained in these Specifications.
- B. The Contractor shall inform subcontractors of the storm water pollution prevention contract requirements and include appropriate subcontract provisions to ensure that these requirements are met.
- C. The Contractor shall post warning signs in areas treated with chemicals.

3.05 ACTIVITY SPECIFIC REQUIREMENTS

- A. Dewatering Operations:
 - 1. Sediment Control:
 - a. The Contractor shall route excavation dewatering effluent through a control measure, such as a sediment trap, sediment basin, or Baker tank, to remove settleable solids prior to discharge to the Central Lagoon or San Francisco Bay.
 - b. Approval of the control measure shall be obtained in advance from the Engineer.
 - c. Filtration of the water following the control measure may be required on a case-by-case basis.
 - 2. If the Engineer determines that the dewatering operation would not generate an appreciable amount of settleable solids, the control measure requirement in 1) above may be waived.
 - 3. The Contractor shall reuse water for other needs, such as dust control or irrigation, to the maximum extent practicable.
 - 4. Contaminated Groundwater
 - a. If the prosecution of work is conducted within an area of known groundwater contamination, then water from dewatering operations shall be tested prior to discharge. If the water quality meets RWQCB standards, then it may be discharged to the storm drain. If the water quality meets Estero Municipal Improvement District Code Section 8.37.110 et seq., then it may be discharged to the sanitary sewer with prior approval from the City of Foster

City Director of Public Works. Otherwise, the water shall be treated or hauled off-site for proper disposal.

- b. If work is not within an area of known groundwater contamination, then monitoring shall only be required if directed by the Engineer. The Contractor shall follow Section 01 35 29 if contamination is found.
- c. If the project is found to be within an area of groundwater contamination not identified by the City in the Project Specifications, a change order will be negotiated to cover additional Work performed by the Contractor.
- B. Paving Operations:
 - Project site management: When rain is forecast within 24 hours or during wet weather, the Engineer may prevent the Contractor from paving. The Engineer may direct the Contractor to protect drainage courses by using control measures, such as earth dike, straw bale, and sandbag, to divert runoff or trap and filter sediment. The Contractor shall place drip pans or absorbent material under paving equipment when not in use. The Contractor shall cover catch basins and manholes when paving or applying seal coat, tack coat, slurry seal, or fog seal.
 - 2. Paving waste management: The Contractor shall not sweep or wash down excess sand (placed as part of a sand seal or to absorb excess oil) into gutters, storm drains, or creeks. Instead, the Contractor shall either collect the sand and return it to the stockpile or dispose of it in a trash container. The Contractor shall not use water to wash down fresh asphalt concrete pavement.
- C. Saw Cutting:
 - 1. The Contractor shall collect by wet vacuum and remove from the Work area all slurry and debris resulting from sawcut operations and/or exposed aggregate treatments prior to moving to the next location or at the end of each working day, whichever is sooner.
 - 2. The Contractor shall employ a two (2) person crew minimum for all sawcut operations. The crew shall always be equipped with a wet vacuum, sandbags and filter fabric.
 - 3. The Contractor shall not wash slurry into or allow slurry to enter catch basins and other components of the storm drainage system. The Contractor shall cover, or barricade catch basins using control measures, such as filter fabric or sandbags, to keep slurry out of the storm drain system. The Contractor shall shovel, absorb, or vacuum saw cut slurry and pick up the waste prior to moving to the next location or at the end of each working day, whichever is sooner. If saw cut slurry enters catch basins, the Contractor shall remove the slurry from the storm drain system immediately.
 - 4. The Contractor shall not allow slurry to pond or stand in sidewalks, driveways, gutters or other areas where it can be tracked by or present a hazard to vehicles, bicycles or pedestrians.
 - 5. The Contractor shall dispose of all slurry in conformance with all applicable Federal, State, and local laws and regulations.

- D. Contaminated Soil Management:
 - 1. The Contractor shall manage site soils so as not to discharge contaminated materials to the storm drain system or creek.
 - 2. The Contractor shall conform to Section 01 35 29-2.01 with respect to the handling of contaminated soil during the prosecution of its Work.
- E. Concrete, Grout, and Mortar Waste Management:
 - 1. Material management: The Contractor shall store concrete, grout, and mortar away from drainage areas and ensure that these materials do not enter the storm drain system or San Francisco Bay.
 - 2. Concrete truck and equipment wash out: The Contractor shall not wash out concrete trucks or equipment into streets, gutters, storm drains, or Bay. Perform washout of concrete trucks or equipment off-site or in a designated area on-site where the water will flow onto dirt or into a temporary pit in a dirt area. If a suitable dirt area is not available, then the Contractor shall collect the wash water and remove it off-site.
 - 3. Exposed aggregate concrete wash water and sweepings: The Contractor shall avoid creating runoff by draining water from washing of exposed aggregate concrete to a dirt area. If a suitable dirt area is not available, then the Contractor shall filter the wash water through straw bales or equivalent material before discharging to the storm drain.
- F. Painting:
 - Painting cleanup: (Designated area) The Contractor shall conduct cleaning of painting equipment and tools in a designated area that will not allow run-on of storm water or runoff of spills. The Contractor shall not allow wash water from cleaning of painting equipment and tools into streets, gutters, storm drains, or creeks.
 - a. Water-based paint: The Contractor shall remove as much excess paint as possible from brushes, rollers, and equipment before starting cleanup. The Contractor shall dispose of wash water from aqueous cleaning of equipment and tools to the sanitary sewer consistent with the Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) standards for General Permittees.
 - b. Oil-based paint: The Contractor shall remove as much excess paint as possible from brushes, rollers, and equipment before starting cleanup. The Contractor shall filter paint thinner and solvents for reuse consistent with the BAT and BCT standards for General Permittees. The Contractor shall dispose of waste thinner and solvent, and sludge from cleaning of equipment and tools as hazardous waste, as described in Section 3.01.B.2.
 - 2. Material and waste management: The Contractor shall dispose of excess thinners, solvents, oil-and water-based paint as hazardous waste. The Contractor shall dispose of dry, empty paint cans/buckets, rollers, rags, and drop cloths in the trash.

- G. Earthwork and Erosion Control: The Contractor shall maximize the control of erosion and sediment by using the best management practices for erosion and sedimentation in the California Storm Water Best Management Practice Handbook Construction Activity.
 - 1. Furnish tools, labor, materials, and transportation required to mark areas receiving erosion control treatments.
 - 2. Before applying erosion control materials, verify that finished grades comply with the specifications for grade, compaction, and finish in Section 31 00 00.
 - 3. Remove and dispose of trash, debris, and weeds in areas to receive erosion control materials.
 - 4. Remove and dispose of loose rocks larger than 2-1/2 inches in maximum dimension unless otherwise authorized.
 - 5. Protect the traveled way, sidewalks, lined drainage channels, and existing vegetation from overspray of hydraulically applied material.
 - 6. Apply erosion control materials within 24 hours after the final preparation of the erosion control areas. Do not apply hydraulically applied materials if:
 - a. Precipitation occurs.
 - b. Water is standing on or moving across the soil surface.
 - c. Soil is frozen.
 - d. Air temperature is below 40 degrees F during the tackifier curing period unless allowed by the tackifier manufacturer and authorized.
 - 7. **For duff:** Upon completion of the earthwork in an area, spread duff to a uniform thickness. Apply duff to the edge of the shoulder backing.
 - a. When shoulder backing is absent, do not apply duff within 3 feet of the edge of pavement.
 - b. Track walk duff with tracked equipment run perpendicular to slope contours. Water may be used to assist this process but must not cause erosion.
 - 8. **For Topsoil:** Place imported topsoil after all other earthwork in an area is complete.
 - a. Spread imported topsoil to a uniform thickness.
 - b. Track walk imported topsoil with tracked equipment run perpendicular to slope contours. Water may be used to assist the process but must not cause erosion.
 - 9. For Hydromulch and Hydroseed: Apply hydromulch with hydraulic spray equipment that mixes fiber, tackifier, fertilizer, and other erosion control materials specified. If applying hydroseed, add seed to hydromulch. Seed may be dry applied to small areas not accessible by hydroseeding equipment if authorized.
 - a. Add water to hydromulch and hydroseed materials as recommended by the manufacturer and mix sufficiently to ensure an even application. A dispersing agent may be added to the mixture if authorized.

- Equipment shall have a built-in continuous agitation and discharge system capable of producing a homogeneous mixture and a uniform application rate. The tank shall have a minimum capacity of 1,000 gallons, unless otherize authorized.
- c. Apply materials in locations, rates, and number of applications shown and as follows:
 - 1) Start application within 60 minutes after adding seed to the tank.
 - 2) Apply in successive passes as necessary to achieve the specified application rate.
 - 3) Apply all hydromulch or hydroseed materials shown for a single area within 72 hours.
- d. If hydromulch or hydroseed materials are applied to areas covered by RECP, apply hydromulch and hydroseed materials to the rolled product as follows:
 - 1) Verify the RECP is in uniform contact with the slope surface.
 - 2) Spray materials into the RECP perpendicular to the slope and integrate well.
 - 3) Do not displace or damage the RECP.
- e. After the final application, do not allow pedestrians or equipment on the treated areas.
- 10. **For Dry Seed:** Apply dry seed and fertilizer at the rates shown after job site preparation. Scarify areas to a minimum depth of 1 inch. Apply and incorporate materials into the soil to a maximum depth of 1/4 inch by dragging or raking.
- 11. For Drill Seed: Drill-seeding equipment shall be a rangeland drill seeder with a ring roller attached. The seeder shall be equipped with a fluffy seed box with agitators to prevent bridging and clogging. The seed box shall have metal row dividers and individual box adjustments to meter the seed flow. Drill seed in rows no greater than 8 inches apart and to a depth of 1/4 inch

3.06 NOTIFICATION

- A. Contractor shall notify the Construction Manager of any violations of the State water quality standards referenced herein, and the cause of such violations as soon as practicable, but no later than one working day after the violation occurs.
 - 1. Contractor shall correct the violation immediately.
 - 2. Notify Construction Manager once it becomes apparent that the violation cannot be corrected quickly.
- B. The City will report water quality violations, their cause, corrective actions, and status to the San Francisco Regional Water Quality Control Board, in compliance with the 401 Authorization referenced herein.
- C. Contractor shall notify the Engineer if there is any material change or proposed change to the character, location, or quantity of a waste discharge during the Work.
 - 1. Provide a minimum of 60 days' notice for proposed waste discharge changes.
 - 2. Proposed changes include:

- a. Soil disturbances not shown on the Plans, nor previously approved.
- b. Expansions of the Work limits shown on the Plans.
- c. Additional rates of waste discharge.
- d. Significant changes in the quality of waste discharge.

END OF SECTION

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SECTION 01 60 00 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Product requirements; product selection; products schedule; products substitution; execution; manufacturer's instructions; and delivery, handling, and storage.
- B. Related Sections
 - 1. Section 01 33 00 Submittal Procedures.

1.02 PRODUCT REQUIREMENTS

- A. Comply with Specifications and referenced standards as minimum requirements.
- B. Provide products by same manufacturer when products are of similar nature, unless otherwise specified.
- C. Provide identical products when products are required in quantity.
- D. Provide products with interchangeable parts whenever possible.
- E. Require each equipment manufacturer to have maintenance facilities meeting the following requirements:
 - 1. Minimum 3 years operational experience.
 - 2. Equipment and tools capable of making repairs.
 - 3. Staff qualified to make repairs.
 - 4. Inventory of maintenance spare parts.

1.03 PRODUCT SELECTION

- A. When products are specified by standard or specification designations of technical societies, organizations, or associations only, provide products which meet or exceed reference standard and Specifications.
- B. When products are specified with names of manufacturers but no model numbers or catalog designations, provide:
 - 1. Products by one of named manufacturers which meet or exceed Specifications.
 - 2. Accepted or-equals.
- C. When products are specified with names of manufacturers and model numbers or catalog designations, provide:

- 1. Products with model numbers or catalog designations by one of named manufacturers.
- 2. Accepted or-equals.
- D. When products are specified with brand or trade names, model numbers, or catalog designations by one manufacturer (or equal) only, provide:
 - 1. Products specified by brand or trade name, model number, or catalog designation.
 - 2. Products by named manufacturers proven in accordance with requirements for or-equals to meet or exceed quality, appearance and performance of specified brand or trade name, model number, or catalog designation.
 - 3. Accepted or-equals.

1.04 QUALITY ASSURANCE

- A. Employ entities that meet or exceed specified qualifications to execute the Work.
- B. Inspect conditions before executing subsequent portions of the Work. Accept responsibility for correcting unsatisfactory conditions upon executing subsequent portions of the Work.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.05 DELIVERY, HANDLING, AND STORAGE

- A. Prepare products for shipment by:
 - 1. Applying grease and lubricating oil to bearings and similar items.
 - 2. Separately packing or otherwise suitably protecting bearings.
 - 3. Tagging or marking products to agree with delivery schedule or Shop Drawings.
 - 4. Including complete packing lists and bills of material with each shipment.
 - 5. Packaging products to facilitate handling and protection against damage during transit, handling and storage.
- B. Transport products by methods that avoid product damage. Deliver products in undamaged condition in manufacturer's unopened containers or packaging.
- C. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- D. Upon delivery, promptly inspect shipments. Verify compliance with Contract Documents, correct quantities and undamaged condition of products. Immediately store and protect products and materials until installed in Work.
- E. Store products with seals and legible labels intact.
- F. Store moisture sensitive products in weathertight enclosures.

- G. Maintain products within temperature and humidity ranges required or recommended by manufacturer.
- H. Connect and operate space heaters during storage when ambient temperatures fall below temperatures recommended by manufacturer.
- I. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Repaint damaged painted surfaces.
- J. Exterior Storage of Fabricated Products:
 - 1. Place on above ground supports which allow for drainage.
 - 2. Cover products subject to deterioration with impervious sheet covering.
 - 3. Provide ventilation to prevent condensation under covering.
- K. Store loose granular materials on solid surfaces in well-drained area. Prevent materials mixing with foreign matter.
- L. Provide access for inspection.

1.06 PRODUCT SUBSTITUTIONS

- A. The Contractor may supply any of the materials specified or offer an equivalent. The Engineer shall determine whether the material offered is equivalent to that specified. The Contractor shall make all "Or Equal" submittals within thirty (30) calendar days after issuance of Notice to Proceed. Any request or submittal received after the specified period will be considered as not equal to that so specified and will be processed as a substitution described hereinafter.
- B. Whenever any particular material, process, or equipment is indicated by patent, proprietary or brand name, or by name of manufacturer, such wording is used for the purpose of facilitating its description and shall be deemed to be followed by the words 'or equal.' A listing of materials is not intended to be comprehensive, or in order of preference. The Contractor may offer any material, process, or equipment considered to be equivalent to that indicated. The substantiation of offers shall be submitted as provided in the Contract Documents.
- C. The Contractor shall, at its expense, furnish data concerning items offered by it as equivalent to those specified. The Contractor shall have the material tested as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the items will fulfill its intended function.
- D. Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results and determine if the substitutes are equivalent. The Engineer's findings shall be final. Installation and use of a substitute items shall not be made until approved by the Engineer.
- E. All manufacturers' data submitted to the Engineer for review and acceptance shall clearly identify each proposed substitute with the corresponding Plans and Details, and Specification Section.

- F. If the Engineer decides to accept for use in the Project a material, process or article which is not the equal of that specified, substitution shall be made in the manner described in Section 01 26 00, Payment for Changes and Extra Work, with a credit to the City for the difference in value.
- G. The Engineer shall determine whether the material offered is equivalent to that specified. Any revision to other Work made necessary by such substitution must be approved by the Engineer, and the entire cost both direct and indirect of these revisions shall be borne by the Contractor.
- H. Any materials, process, or article may be requested as a substitution by the Contractor, in lieu of that specified, under the following conditions:
 - 1. Requests must be submitted in writing and in the manner described in Section 01 33 00.
 - Requests must be submitted thirty (30) calendar days prior to starting the Work involved, as established by the Engineer, so as not to cause any delay in completion of the Project. No other request will be considered after expiration of the period specified, except that in exceptional cases where it is determined to be in the best interest of the City, as approved by the Engineer.
 - The Contractor agrees to pay for all engineering and design services, if required, to make all changes and adjustments in material and work of all trades directly or indirectly affected by the substitute, to the satisfaction of the Engineer, at no cost to the City.
 - 4. All requests for substitution shall be made through the Contractor. Submissions by the Contractor shall imply the Contractor's approval of such substitution.
 - 5. No requests for substitutions will be considered during the bidding period.
 - 6. The Contractor shall furnish adequate data with each request for approval of a substitute to enable the Engineer to evaluate the proposed substitution.
 - 7. If a substitute offered by the Contractor is not found to be equal to the specified material, then Contractor shall furnish and install the specified material.
 - 8. The specified Contract completion time shall not be affected by any circumstance developing from the provisions of this Section.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Deliver, handle, store, install, erect, or apply products in accordance with manufacturer's instructions, Contract Documents and industry standards.

3.02 INSPECTION OF PRODUCTS

A. Periodically inspect to assure products are undamaged and maintained under required conditions.

END OF SECTION

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SECTION 01 61 00 WARRANTIES AND GUARANTEES

PART 1 GENERAL

1.01 REQUIREMENTS

- A. The Contractor shall and does hereby warrant and guaranty that all Work executed under this Contract will be free from defects of materials and workmanship for a period of one (1) year from the date of final acceptance of the project by the City, except certain specific items of Work, materials and equipment requiring a guaranty or warranty for a greater period of time as hereinafter specified. In the event, however, that portions of the Work are sufficiently complete to allow use or occupancy by the City in the manner and for the purposes intended prior to final completion and acceptance of the project, the guarantee period will commence on the date shown on the Statement of Partial (or Substantial) Completion.
- B. The Contractor hereby agrees to indemnify and save harmless the City, and their Council, officers, agents and employees against and from all claims and liability arising from damage and injury due to said defects. The Contractor shall repair or replace, at no cost to the City, all such defective Work and all other Work or work damaged thereby, which becomes defective during the term of the above-mentioned guaranties and warranties.
- C. Within thirty (30) calendar days prior to completion of all Work the Contractor shall submit to the City original copies of all manufacturers guaranties covering all supplied and installed equipment and, where applicable, systems.
- D. In addition to the requirements of the Agreement and General Conditions, it shall be understood that the Surety for the faithful performance bond, submitted in conformance with the terms of the Contract for this project, is liable on its bond for all obligations of the Contractor including guaranty provisions.
- E. The Contractor shall, within twenty-four (24) hours of notice from the Engineer of any Work not in accordance with the requirements of the Contract, or any defects in the Work, commence and prosecute with due diligence all Work necessary to fulfill the terms of this Section and to complete the Work within a period of time as approved by the Engineer. The Contractor shall notify the Engineer of the repair schedule before commencing the repairs and notify the Engineer to arrange for inspection. The Contractor shall submit a written report of the defect and methods of correction. In the event of failure by the Contractor and/or its surety to respond to the notice or to complete the Work required by this Section within the time specified, the City shall proceed to have such Work done at the Contractor's expense.
- F. The Contractor or its Surety shall promptly reimburse the City all direct and indirect cost associated with performing this Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION
SECTION 01 66 00 STORAGE OF MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for storing materials and equipment on and off-site as necessary for the prosecution of the Work.
- B. Related Sections:
 - 1. Section 01 14 19 Contractor's Use of Premises.
 - 2. Section 01 33 00 Submittal Procedures.
 - 3. Section 01 57 23 Stormwater Pollution Prevention.
 - 4. Section 01 50 00 Temporary Facilities and Controls.
 - 5. Section 01 55 00 Traffic Regulation.

1.02 REQUIREMENTS

- A. Protection of Work and Materials
 - Provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the Work. Stored materials shall be reasonably accessible for inspection. Adequately protect new and existing Work and all items of equipment for the duration of the Contract.
 - 2. The Contractor shall not, without the City's consent, assign, sell, mortgage, hypothecate or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the Contract.
- B. Material Delivery
 - 1. The Contractor, subcontractors, and suppliers shall always comply with the requirements of the City of Foster City Truck Route Ordinance (§10.49.040 Foster City Municipal Code).
 - 2. As much as possible, material delivery should be completed before 10 a.m. Material delivery activities that require equipment to move or offload shall not be permitted before 8 a.m.
 - 3. Contractor shall submit the following for review in advance of the first scheduled material delivery:
 - a. Vicinity maps showing the project location and proposed truck access routes.
 - b. An estimation of the frequency of delivery trucks during each phase of construction, based on the Schedule of Values (Section 01 29 73).
 - c. Traffic control plans for truck delivery operations in conformance with Section 01 55 00.

- C. Storage of Equipment and Materials on Site
 - 1. To the maximum extent possible, construction materials and equipment shall be stored on site within an area secured by the Contractor.
 - 2. On site equipment and material storage shall occur within the areas designated on the Plans, unless written arrangements are made with the Engineer.
 - 3. Equipment and materials shall not be stored on existing or improved levee surfaces for more than one workday.
- D. Storage of Equipment and Materials in Public Streets
 - No storage of materials, facilities or equipment is permitted in City sidewalks, streets or parking lots, unless approved by the City, or in areas designated for stockpiling on the Plans. This includes sanitation facilities, office trailers, dumpsters and storage containers.
 - 2. If City parking lot use is approved, costs for parking space rentals will be assessed and additional bonding required.
 - 3. Notwithstanding the above criteria, construction materials shall not be stored in streets, roads, or highways for more than five (5) calendar days after unloading. All materials or equipment not installed or used in construction within five (5) calendar days after unloading shall be stored elsewhere by the Contractor at its expense unless authorized additional storage time. Equipment and materials shall not obstruct pedestrian or vehicular traffic, traffic lines of sight, or drainage paths.
 - 4. Construction equipment shall not be stored at the Work sites before its actual use on the Work nor for more than five (5) calendar days after it is no longer needed. Time necessary for repair or assembly of equipment may be authorized by the Engineer.
 - 5. Excavated material, except that which is to be used as backfill in the adjacent trench, shall not be stored in public streets unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.
 - 6. The Contractor shall be fully responsible for locating and obtaining permission to use stockpile sites.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 71 00 SITE INVESTIGATION

PART 1 GENERAL

1.01 SUMMARY

- A. Investigation of Site conditions and all Contract Documents prior to Bid.
- B. Related Sections:
 - 1. Section 00 21 20 Site Visit Affidavit.
 - 2. Section 01 26 57 Change Order Requests.
 - 3. Section 01 26 00 Payment for Changes and Extra Work.

1.02 REQUIREMENTS

- A. Investigate the jobsite prior to Bid and during construction to ascertain all conditions affecting necessary procedures and sequencing of the Work operations in the execution of the Contracted Work in accordance with the requirements shown herein and elsewhere.
- B. Start of Contracted Work at the jobsite shall imply Contractor's acceptance of job conditions.
- C. Work Determination
 - 1. Contractor shall satisfy itself regarding jobsite conditions, the nature and types of Work to be performed and shall be responsible for the determination of all classes of Work to be accomplished at the Project Site.
- D. Allotted Working Space
 - 1. Contractor shall limit work operations to the "working site" or "jobsite" or "worksite," and areas immediately adjacent thereto, as shown on the Contract Drawings, specified or authorized by the Engineer.

1.03 UTILITY LOCATION

- A. General
 - 1. City has searched known substructure records and will furnish the Contractor with copies of said documents which describe the location of utility substructures and indicates on the Plans those substructures (except for service connections) that may affect the Work.
 - a. The City has field-located buried utilities identified as in conflict with the Work and is coordinating with utility owners for their relocation under separate contracts.

- b. Notify Engineer immediately upon discovery of buried utilities that are not indicated on the Plans.
- 2. Where underground main distribution conduits, such as water, gas, sewer, electric power, telephone or cable televisions are shown on the Plans, the Contractor shall assume that every property parcel will be served by a service connection for each type of utility.
- 3. At least five (5) working days prior to commencing any excavation, the Contractor shall contact the regional notification center (Underground Service Alert) and obtain an inquiry identification number.
- 4. The California Department of Transportation is not required by Section 4216 of the California Government Code to become a member of the regional notification center. The Contractor shall contact it for location of its subsurface installations within the State right-of-way identified on the Plans.
- B. The Contractor shall determine the location and depth of all utilities, including service connections, which have been marked by the respective owners and which may affect or be affected by its operations. If no pay item is provided in the Contract for this Work, full compensation for such Work shall be considered as included in the prices bid for other items of Work.

1.04 COORDINATION

- A. The Contractor is advised that the Plans usually depict the location of substructures as they existed when the Project was designed. Present-day information may indicate that new facilities may have been added, or are going to be added, or that some of those substructures are now, or will be, relocated, abandoned, removed, lowered, raised, blanketed, encased enlarged, protected, or altered in some other way.
- B. The Contractor shall carefully examine the proposed construction sited prior to Bid and during construction for any evidence of recent surfacing of excavations, or the possible conflict with surface or aerial installations, and the latest substructure maps, and bid accordingly. If further information or clarification is desired, Contractor is urged to immediately contact the following:
 - 1. The appropriate utility companies.
 - 2. Public Works Department.
 - 3. Pacific Gas and Electric.
 - 4. California Water Service Company.
- C. Review and verify with the information indicated on the Plans and the information provided in Section 01 11 00, Summary of Work.

1.05 UTILITY PROTECTION

A. The Contractor shall not interrupt the service function or disturb the support of any utility without authority from the owner or order from the City. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

- B. Where protection is required to ensure support of utilities located as shown on the Plans, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at its expense.
- C. Upon learning of the existence and location of any utility omitted from or shown incorrectly on the Plans, the Contractor shall immediately notify the Engineer in writing.
- D. When authorized by the Engineer, support or protection of the utility will be paid for as provided in Section 01 26 00, Payment for Changes and Extra Work.
- E. The Contractor shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged. The Contractor shall bear the costs of repair or replacement of any utility damaged if located as noted in Subsection 1.03, Utility Location.
- F. When placing concrete around or contiguous to any non-metallic utility installation, the Contractor shall, at its expense:
 - 1. Furnish and install a 50mm (2 inch) cushion of expansion joint material or other similar resilient material; or
 - 2. Provide a sleeve or other opening which will result in a 50mm (2 inch) minimumclear annular space between the concrete and the utility; or
 - 3. Provide other acceptable means to prevent embedment in or bonding to the concrete.

1.06 UTILITY REMOVAL

A. Unless otherwise specified, the Contractor shall remove all interfering portions of utilities shown on the Plans or indicated in the Contract Documents as "abandoned" or "to be abandoned in place". Before starting removal operations, the Contractor shall ascertain from the City whether the abandonment is complete, and the costs involved in the removal and disposal shall be included in the bid for the items of Work necessitating such removals.

1.07 UTILITY RELOCATION

- A. When feasible, the owners responsible for utilities within the area affected by the Work will complete their necessary installations, relocations, repairs, or replacements before commencement of Work by the Contractor. When the Plans or Specifications indicate that a utility installation is to be relocated, altered, or constructed by others, the City will conduct all negotiations with the owners and work will be done at no cost to the Contractor. Utilities which are relocated in order to avoid interference shall be protected in their position and the cost of such protection shall be included in the Bid for the items of Work necessitating such relocation.
- B. After award of the Contract, portions of utilities which are found to interfere with the Work will be relocated, altered or reconstructed by the owners, or the Engineer may order changes to the Work to avoid interference. Such changes will be paid for in accordance with Section 01 26 00, Payment for Changes and Extra Work.

C. When the Plans or Specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such Work shall be included in the Bid for the items of Work necessitating such work. Temporary or permanent relocation or alteration of utilities requested by the Contractor for its convenience shall be its responsibility and it shall make all arrangements and bear all costs.

1.08 UTILITY DELAYS

- A. The Contractor shall notify the Engineer of its construction schedule insofar as it affects the protection, removal, or relocation of utilities. Said notification shall be included as part of the construction schedule required in Section 01 13 00. The Contractor shall notify Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or relocation of utilities.
- B. The Contractor will not be entitled to damages or additional payment for delays attributable to the utility relocations or alterations if correctly located, noted, and completed in accordance with Paragraph 1.03, Utility Location.
- C. The Contractor may be given an extension of time for unforeseen delays attributable to the unreasonably protracted interference by utilities in performing Work correctly shown on the Plans
- D. The City will assume responsibility for the timely removal, relation, or protection of existing main or trunk line utility facilities within the area affected by the Work if such utilities are not identified in the Contract Documents. The Contractor will not be assessed liquidated damages for any delay caused by failure of City to provide for the timely removal, relocation, or protection of such facilities.

1.09 UTILITY COOPERATION

A. When necessary, the Contractor shall so conduct its operations as to permit access to the worksite and provide time for utility work to be accomplished during the progress of the Work.

1.10 SUBSURFACE DATA

A. All soil and test boring data, water table elevation, and soil analyses referenced in the Plans or the Specifications apply only at the location of the test borings and to the depth indicated. Test reports for test borings, which have been drilled and that have been otherwise referenced in the Contract Documents, are available for inspection at the office of the Engineer or contained in the Geotechnical Report for the project. Any additional subsurface exploration shall be done by the Contractor at his own expense. The indicated elevation of the water table is that level at the date the test boring data was obtained. It is the Contractor's responsibility to determine and allow for the elevation of groundwater at the date of Project construction. A difference in elevation between the ground water shown in soil boring logs and groundwater encountered during construction will not be considered as a basis for extra Work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 POTHOLING

- A. The Contractor shall conduct exploratory excavations by potholing to verify or to discover the actual locations and the size of existing underground utilities and improvements. Potholing shall be done in each given area where excavation Work is to occur at least fourteen (14) calendar days in advance of any excavation or construction in that area, to avoid possible delay in the progress of the Work.
- B. Potholing shall consist of excavations at the locations indicated on the Plans, or as directed in writing by the Engineer. All costs of potholing operations shall be included in the bid prices.
- C. Potholing operations shall conform to all applicable injury prevention and safety requirements, as to sidewall slopes, sheeting and shoring, and all other excavation and trenching provisions specified herein.
- D. Potholing operations shall be conducted with all due regard to the protection of existing public and private improvements in order to ensure that the existing facilities will remain in operation with minimum interruptions. Potholes shall be identified and protected in accordance with Work Area Traffic Control Handbook (WATCH) Standards.
- E. The Contractor's proposed method of potholing and schedule for potholing shall be submitted to the Engineer for approval, prior to the commencement of said operations. Any utilities damaged during potholing shall be immediately reported to the Engineer and Inspector and repairs made immediately.
- F. A complete log of all potholes shall be kept by the Contractor, showing specific locations and dimensions of trenches. The log shall be verified by the Inspector prior to the backfilling of the potholes. The verified log will be submitted to the Engineer and the Inspector within two (2) working days after completion of potholing in each area.
- G. Upon completion of potholing in each area, and after verification of the logs by the Inspector, potholes shall be immediately backfilled and compacted in accordance with these specifications, Standard Drawings or restored as directed by the Engineer.

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SECTION 01 71 23 FIELD ENGINEERING AND SURVEYING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Field engineering to control the prosecution of Work.
 - 2. Surveying to establish lines and grades for the Work.
- B. Related Sections:
 - 1. Section 01 32 31 Inspections of Adjacent Property
 - 2. Section 01 77 39 Record Drawings.

1.02 QUALITY ASSURANCE

- A. Qualifications of Surveyor or Engineer: Registered Civil Engineer or Licensed Land Surveyor in California, qualified to complete this Work.
- B. Accuracy of stakes, alignments, and grades may be checked randomly by Engineer.
 - 1. When notice of checking is given, postpone parts of the work affected by stakes, alignments or grades to be checked, until checked.
 - 2. Do not assume that Engineer's check substitutes or complements required field quality control procedures.

1.03 CONSTRUCTION STAKES, LINES, AND GRADES

- A. Execute the Work in accordance with the lines and grades indicated on the Plans.
- B. Make distances and measurements on horizontal planes, except elevations and structural dimensions.

1.04 SURVEY REFERENCE POINTS

- A. The City has established horizontal and vertical control to be used for construction of the Work as indicated on the Plans.
- B. From the control lines shown and annotated on the Plans, Contractor shall establish other control and reference points as required to properly lay out the Work.
- C. Locate and protect control points prior to starting Work and preserve permanent reference points during construction.
 - 1. Make no changes or relocations without prior written notice.
 - 2. Replace Project control point, when lost or destroyed, in accordance with original survey control.

- D. Set monuments for principal control points and protect them from being disturbed and displaced.
 - 1. Re-establish disturbed monuments.
 - 2. When disturbed, postpone parts of the work that are governed by disturbed monuments until such monuments are re-established.

1.05 PRESERVATION OF PERMANENT SURVEY MARKERS

A. Lot Stakes: The Contract shall preserve permanent survey monuments, property line and corner survey markers; except where their destruction is unavoidable, and the Contractor is proceeding in accordance with accepted practice. Markers that otherwise are lost or disturbed by its operations shall be replaced at the Contractor's expense by the Engineer.

1.06 PROJECT SURVEY REQUIREMENTS

A. Assume responsibility for accuracy of stakes, alignments, and grades by performing verifications and checking in accordance with standard surveying practice.

1.07 RECORD DOCUMENTS

- A. Prepare and submit Record Documents as specified in Section 01 77 39.
- B. Maintain complete, accurate log of control points and survey.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 CONSTRUCTION SURVEYS

- A. The Contractor shall perform preconstruction surveys of the Project Sites and immediate vicinities as necessary to verify Project control and observable conditions. The surveys shall document the locations of public and private improvements within the limits of the work including: curbs, gutters, berms, sidewalks, fencing, gates, signage, street furniture, utility boxes and appurtenances, lighting, traffic signals and controls, loop detectors, landscaping, irrigation controllers, underground utility locations as marked by others, and all other structures.
- B. The Contractor shall perform any additional preconstruction survey that he deems necessary to show resulting effect during construction and make any post construction survey it deems necessary to show overall impacts to topography improvements and structures.

SECTION 01 73 10 MOBILIZATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes Work and operations required:
 - 1. Preparatory Work for construction activities, after the Notice to Proceed.
 - 2. To close out Project Work and remove all materials, equipment, and traffic control measures from the worksites that are not to remain as a permanent part of the Work (demobilization).
- B. Related Sections:
 - 1. Section 01 32 31 Inspections of Adjacent Property
 - 2. Section 01 78 00 Closeout Procedures.

1.02 GENERAL

- A. Mobilization shall include, but not be limited to:
 - 1. Movement of personnel, tools, equipment, materials, supplies, and incidentals to the Project site and all preparatory Work, including installation of Project signs.
 - 2. Establishment of all necessary facilities, including field offices and the acquisition of easements for the Contractor's convenience.
 - 3. Obtaining permits necessary for the execution of Work, that are not already in City possession.
 - 4. Providing required bonds and proof of insurance.
- B. Demobilization shall include the removal of tools, equipment, and unused materials and supplies from the Project Site, and the restoration of all disturbed areas outside of the limits identified on the Plans to their pre-construction condition or better.
- C. City retains the right to reject construction tools, equipment, materials, and supplies that are, in the Engineer's opinion, unsafe, improper, or inadequate.
 - 1. Contractor shall remove rejected tools, equipment, materials, and supplies from the Project Site.
- D. Mobilization and demobilization shall be in conformance with State Standard Specification Section 9-1.16D, Mobilization, except as modified herein.

1.03 SUBMITTALS

A. Submittals shall be made in conformance with Section 01 33 00.

B. Contractor shall submit product data and drawings within seven days after the effective date of the Notice to Proceed, a layout of the Project Site showing security fences, detours, construction parking areas, temporary buildings, temporary utilities, storage and staging areas, stockpile areas, and other improvements that demonstrate how the site will be prepared for the beginning of construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 73 24 SEISMIC DESIGN AND ANCHORAGE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Seismic design criteria for the following:
 - 1. Anchorage of mechanical and electrical equipment.
 - 2. Other structures or items as specified or indicated on the Plans.
- B. Execution of recommended seismic designs when anchoring mechanical and electrical equipment or other structures or items.

1.02 REFERENCES

- A. International Code Council (ICC)/California Building Standards Commission (CBSC).
 - 1. International Building Code (IBC), current edition.
 - 2. California Building Code (CBC), current edition.
- B. Project Geotechnical Reports.
 - 1. As referenced in Section 01 11 00, Summary of Work.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements: Design in accordance with the requirements of the California Building Code.
 - 1. CBC Site Class: D.
 - 2. CBC Seismic Importance Factor for Anchorage of Mechanical and Electrical Equipment: 1.50.
 - 3. CBC Seismic Importance Factor for the Design of Tanks and the Anchorage of Tanks: 1.50.
 - 4. Do not use friction to resist sliding due to seismic forces.
 - 5. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
 - 6. Do not use more than 60 percent of the weight of the tank for resisting overturning due to seismic forces.
 - 7. Use anchor bolts, bolts, or welded studs for anchors for resisting seismic forces. Anchor bolts used to resist seismic forces shall have a standard hex bolt head. Do not use anchor bolts fabricated from rod stock with an L or J shape.
 - a. Do not use concrete anchors, flush shells, chemical anchors, powder actuated fasteners, or other types of anchors unless indicated on the Plans or accepted in writing by the Engineer.

- b. Seismic forces must be resisted by direct bearing on the fasteners used to resist seismic forces. Do not use connections which use friction to resist seismic forces.
- B. CBC Site Categorization and Site Coefficients
 - 1. Based on the referenced ENGEO reports and other information:
 - a. Soil Profile Type (Table 16-J) SD
 - b. Seismic Zone (Figure 16-2) 4
 - c. Seismic Zone Factor (Table 16-I) 0.4
 - d. Seismic Source Name San Andreas
 - e. Seismic Source Type (Table 16-U) A
 - f. Distance to Seismic Source 11.5 kilometers
 - g. Near Source Factor Na (Table 16-S) 1.00
 - h. Near Source Factor Nv (Table 16-T) 1.14
 - i. Seismic Coefficient Ca (Table 16-Q) 0.44
 - j. Seismic Coefficient Cv (Table 16-R) 0.73
 - k. Peak estimated ground acceleration 0.57g

1.04 SUBMITTALS

- A. Shop Drawings and Calculations: Complete shop drawings and seismic calculations.
- B. Calculations shall be signed and stamped by a Civil or Structural Professional Engineer licensed to practice in California.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 73 25 WIND DESIGN AND ANCHORAGE

PART 1 GENERAL

1.01 SUMMARY

A. Contractor shall use specified wind design criteria to adequately brace and anchor exposed equipment and structures, both permanent and temporary.

1.02 REFERENCES

- A. International Code Council (ICC)/California Building Standards Commission (CBSC):
 - 1. International Building Code (IBC), current edition.
 - 2. California Building Code (CBC), current edition.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements: Design in accordance with the requirements of the Uniform Building Code.
 - 1. Uniform Building Code Basic Wind Speed: 80 miles per hour.
 - 2. Uniform Building Code Wind Exposure: C.
 - 3. Use anchor bolts, bolts, or welded studs for anchors for resisting wind forces. Anchor bolts used to resist wind forces shall have a standard hex bolt head. Do not use anchor bolts fabricated from rod stock with an L or J shape.
 - a. Do not use concrete anchors, flush shells, chemical anchors, powder actuated fasteners, or other types of anchor unless indicated on the Plans or accepted in writing by the Engineer.
 - b. Wind forces must be resisted by direct bearing on the anchors used to resist wind forces. Do not use connections which use friction to resist wind forces.

1.04 SUBMITTALS

- A. Shop Drawings and Calculations: Complete shop drawings and wind calculations.
- B. Calculations shall be signed and stamped by a Civil or Structural Professional Engineer licensed in California.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

SECTION 01 73 29 CUTTING AND PATCHING

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections:
 - 1. Section 02 41 16 Selective Structural Demolition
 - 2. Divisions 03 through 35 for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.02 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.03 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal, requesting approval from the Engineer to proceed, describing procedures at least ten (10) days before the time cutting and patching will be performed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
- B. Utility Services and Mechanical or Electrical Systems:
 - 1. List utilities that cutting and patching procedures will disturb or affect.
 - 2. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 3. Before cutting/core drilling the slab, structural members, concrete walls, etc. Xray the cut structure to determine whether any embedded items such as conduit and reinforcing steel would be cut or disturbed and provide X-rays to Engineer.

- 4. If the cutting/core drilling will cut any conduits, notify the Engineer to re-locate the opening or take other action as required.
- 5. If reinforcing steel is encountered, notify the Engineer to either re-locate the opening or evaluate the effect of cutting the reinforcement. Perform this evaluation by a registered professional engineer licensed in the State of California.
- 6. Refer to Section 01 14 10 for utility outage requirements.
- C. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 1. When cutting and patching involves welding or open flame cutting, obtain the approval of the City's Fire Marshal for such work prior to its start.
 - 2. Before cutting or drilling a structural element, X-ray the element to determine whether any embedded items such as conduit and reinforcing steel would be cut or disturbed and submit the X-ray report. Do not cut or core drill any holes through rebar, conduits or other embedded items. Prepare and submit an RFI when conflicts exist.
 - 3. Provide the services of a professional engineer licensed in California to evaluate and provide details for modification of existing systems and structures.
- D. Engineer's Approval: Obtain the Engineer's approval in writing of cutting and patching proposal before cutting and patching.
 - 1. Approval does not waive the City's right to later require removal and replacement of unsatisfactory Work.

1.04 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio. Submit a plan for cutting and patching of structural elements.
- B. Operational Elements: Do not cut and patch the following operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Submit a plan for cutting and patching for the following types of systems and equipment:
 - 1. Primary operational systems and equipment.
 - 2. Control systems.
 - 3. Communication systems.
 - 4. Electrical wiring systems.
 - 5. Security systems including CCTV and duress alarms.
 - 6. Other operating systems as identified in the Construction Documents.

- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
- D. Submit a plan for cutting and patching the following types of miscellaneous elements:
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Equipment supports.
 - 4. Piping, ductwork, vessels, and equipment.
 - 5. Other miscellaneous elements indicated in the Construction Documents.
- E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching.
- F. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that reduces the building's aesthetic qualities.
- G. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - 1. Processed concrete finishes.
 - 2. Stonework and stone masonry.
 - 3. Ornamental metal.
 - 4. Preformed metal panels.
 - 5. Other types of exposed construction indicated on the Construction Documents.
- H. Cutting and Patching Conference: Before proceeding, meet at the worksite with parties involved in cutting and patching, including mechanical and electrical trades.
 - 1. Review areas of potential interference and conflict.
 - 2. Coordinate procedures and resolve potential conflicts before proceeding.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Comply with requirements specified in the General Conditions, Special Provisions, and applicable Technical Specification Section.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, fully use materials that visually match existing adjacent surfaces as possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction and facilities during cutting and patching to prevent damage. Provide protection from adverse weather conditions for adjacent facilities and portions of the Work that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned; bypass such services/systems before cutting to prevent interruption to occupied areas.

3.03 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. For concrete and masonry, cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

- 4. Excavating and Backfilling: Should excavating and backfilling be required by cutting and patching operations comply with requirements in applicable sections of the Construction Documents.
- 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting. Remove conductors back to source of supply.
- 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in the General Conditions and other Specification Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch.
 - b. Provide additional coats until patch blends with adjacent surfaces.
 - 4. Exterior Building Enclosures: Patch components in a manner that restores enclosure to a weather tight condition.

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SECTION 01 74 00 SITE MAINTENANCE AND CLEANUP

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included:
 - 1. Throughout the construction period, maintain the Site in a standard of cleanliness as described in this Section.
 - 2. Tie-out and Underground Service Alert (USA) marking removal.
- B. Related Work:
 - In addition to standards described in this Section comply with requirements for cleaning as described in Section 01 50 00, Temporary Facilities and Controls; Section 01 57 00, Environmental Control; and Section 01 57 23, Stormwater Pollution Prevention.

1.02 QUALITY ASSURANCE

- A. A daily inspection, and more often if necessary, shall be conducted by the Inspector to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, the Contractor shall comply with pertinent requirements of other governmental agencies having jurisdiction over this Work.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. The Contractor shall provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

PART 3 EXECUTION

3.01 SITE MAINTENANCE

- A. General
 - 1. Any stored items shall be placed in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. The accumulation of scrap, debris, waste material and other items not required for construction of the Work shall not be allowed to occur.

- B. Site
 - 1. The Contractor shall inspect the Site daily, and more often if necessary, and ensure that all scrap, debris, and waste material is removed.
 - 2. The Contractor shall always maintain the Site in a neat and orderly condition. Both public and private areas shall be cleaned of all materials attributed to or involved in the work daily. It is especially important ensure that the site is left in a safe condition everyday, especially from loose lumber and nails.
- C. During rainy weather, all materials stored at a Work Site shall be covered with a waterproof covering. All loose material shall be swept up and removed from gutters at the end of each workday.
- D. The Contractor shall collect and remove all saw cut slurry from the Work area using a wet vacuum or other method approved by the Engineer. The Contractor shall be responsible for the proper disposal of the collected slurry material.
- E. The Contractor shall remove all utility, striping tie-out and USA paint markings upon completion of the Work.
 - 1. The method of tie-out and USA marking removal shall be approved by the Engineer prior to commencement of the Work. Solvents may not be used.

3.02 FINAL CLEANING

- A. The Contractor shall insure that all tools, surplus materials and soil, equipment, scrap, debris, and waste are removed from the Project Sites and storage areas prior to the final inspection. Progress payments and/or retention payments may be held until Work has been satisfactorily completed. Final cleaning constitutes part of the base contract.
- B. Site:
 - 1. Unless otherwise directed by the Engineer, clean all areas on the Site as specified herein.
 - 2. Completely remove all debris and foreign matter.
- C. Schedule final cleaning prior to final acceptance by City.

SECTION 01 75 23 OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Preparation and submittal of Operation and Maintenance Manuals.
- B. Related Sections:
 - 1. Section 01 30 00 Shop Drawings, Product Data and Samples.
 - 2. Section 01 33 00 Submittal Procedures.
 - 3. Section 10 71 19 Flood Barriers.

1.02 SUBMITTALS

- A. Submit Operation and Maintenance Manuals as part of the shop drawing approval process.
- B. Make additions and revisions to the Manuals in accordance with Engineer's review comments.
- C. Submit four (4) complete Manuals for each piece of equipment or system after shop drawing approval.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Preparation:
 - 1. Provide Operations and Maintenance Manuals in 3-ring binders with rigid covers. Utilize tab sheets to organize information.
- B. Contents of Operation and Maintenance Manuals:
 - 1. Cover Page: Equipment name, equipment tag number, project name, City's name, appropriate date.
 - 2. Table of Contents: General description of information provided within each tab section.
 - 3. Lubrication Information: Required lubricants and lubrication schedules.
 - 4. Start-up Procedures: Recommendations for installation, adjustment, calibration, and troubleshooting.
 - 5. Operating Procedures:
 - a. Step-by-step procedures for starting, operating, and stopping equipment under specified modes of operation.
 - b. Include safety precautions and emergency operating shutdown instructions.

- 6. Preventative Maintenance Procedures: Recommended steps and schedules for maintaining equipment.
- 7. Overhaul Instructions: Directions for disassembly, inspection, repair and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.
- 8. Parts List: Generic title and identification number of each component part of equipment; include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
- 9. Spare Parts List: Recommended number of parts to be stored at the site and special storage precautions.
- 10. Drawings: Exploded view or plan and section views with detailed callouts.
- 11. Provide approved shop and fabrication drawings.
- 12. Source (Factory) Quality Control Test Results: Provide copies of factory test reports as specified in Sections 01 45 00 or the equipment section.
- 13. Field Quality Control Test Results: After field testing is completed, insert field test reports as specified in the relevant technical section.
- 14. Equipment Summary Form: Completed form in the format attached at the end of this Section. Insert Equipment Summary Form after the tab sheet of each equipment section. The manufacturer's standard form will not be acceptable.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

EQUIPMENT SUMMARY FORM

- 2. MANUFACTURER _____
- 3. EQUIPMENT IDENTIFICATION NUMBER(S) (maps equipment number)
- 4. LOCATION OF EQUIPMENT_____
- 5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)

NAMEPLATE DATA -	
Horsepower	
Amperage	
Voltage	
Service Factor (S.F.)	
Speed	
ENC Type	
Capacity	
Other	

7. MANUFACTURER'S LOCAL REPRESENTATIVE

	Name
	Address
	Telephone Number
8.	MAINTENANCE REQUIREMENTS
9.	LUBRICANT LIST
10.	SPARE PARTS (recommendations)
11.	COMMENTS

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SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Contract closeout requirements including:
 - 1. Final cleaning.
 - 2. Disinfection of systems.
 - 3. Record documents.
 - 4. Preparation and submittal of closeout documents.
 - 5. Final completion certification.
- B. Related Sections:
 - 1. Section 01 71 23 Field Engineering and Surveying

1.02 CLOSEOUT TIMETABLE

A. The Contractor shall establish dates for testing and acceptance periods (as required under the Contract). Such dates shall be established not less than fourteen (14) calendar days prior to beginning any of the foregoing items, to allow the City, the Engineer, and their authorized representatives sufficient time to schedule attendance at such activities.

1.03 FINAL SUBMITTALS

- A. The Contractor, prior to requesting Final Payment, shall obtain and submit the following items to the Engineer.
 - 1. Written guarantees, where required.
 - 2. Technical manuals and instructions.
 - 3. Completed Record Drawings.
 - 4. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 5. Releases from all parties who are entitled to claims against the Project, property, or improvement pursuant to the provisions of law.

1.04 FINAL CLEANING

- A. Perform final cleaning prior to inspections for Substantial Completion.
- B. Employ skilled workers who are experienced in cleaning operations.

- C. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.
- D. Prevent scratching, discoloring, and otherwise damaging surfaces being cleaned.
- E. Clean drainage systems.
- F. Broom clean exterior paved surfaces and rake clean other surfaces of sitework.
- G. Remove dust, cobwebs, and traces of insects and dirt.
- H. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces and fixtures.
- I. Remove non-permanent protection and labels.
- J. Polish finish hardware.
- K. Wash tile.
- L. Polish glossy surfaces to clear shine.
- M. Clean light fixtures and replace burned-out or dim lamps.

1.05 REMOVAL OF ALL TEMPORARY FACILITIES

- A. Remove all temporary facilities including fences, mobile offices, storage facilities, toolboxes, temporary water meters, temporary electric services, temporary sanitary facilities, and all appurtenances that are not part of the work.
- B. Remove all construction locks and padlocks.

1.06 WASTE DISPOSAL

- A. Arrange for and dispose of surplus materials, waste products, and debris off-site.
 - 1. Prior to making disposal on private property, obtain written permission from the owner of such property.
- B. Do not fill ditches, washes, or drainage ways which may create drainage problems.
- C. Do not create unsightly or unsanitary nuisances during disposal operations.
- D. Maintain disposal site in safe condition and good appearance.
- E. Complete leveling and cleanup prior to final acceptance of the work.

1.07 TOUCH-UP AND REPAIR

A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Substantial Completion.

B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

1.08 CLOSEOUT DOCUMENTS

- A. Submit following Closeout Submittals upon Substantial Completion and at least 7 days prior to submitting Application for Final Payment:
 - 1. Evidence of Compliance with Requirements of Governing Authorities.
 - 2. Project Record Documents.
 - 3. Operation and Maintenance Manuals.
 - 4. Warranties and Bonds.
 - 5. Keys and Keying Schedule.
 - 6. Evidence of Payment and Release of Liens and/or Stop Payment Notices as outlined in Conditions of the Contract.
 - 7. Release of claims as outlined in Conditions of the Contract.
 - 8. Survey Record Documents as specified in Section 01 71 23.
 - 9. Certificate of Final Completion.

1.09 EVIDENCE OF COMPLIANCE WITH REQUIREMENTS OF GOVERNING AUTHORITIES

- A. Submit the following:
 - 1. Certificates of Inspection.

1.10 PROJECT RECORD DOCUMENTS

- A. Maintain at Project site, available to City and Engineer, one copy of the Contract Documents, shop drawings and other submittals, in good order.
 - 1. Mark and record field changes and detailed information contained in submittals and change orders.
 - 2. Record actual depths, horizontal and vertical location of underground pipes, duct banks and other buried utilities. Reference dimensions to permanent surface features.
 - 3. Identify specific details of pipe connections, location of existing buried features located during excavation, and the final locations of piping, equipment, electrical conduits, manholes, and pull boxes.
 - 4. Identify location of spare conduits including beginning, ending and routing through pull boxes, and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.
 - 5. Provide schedules, lists, layout drawings, and wiring diagrams.
 - 6. Make annotations with erasable colored pencil conforming to the following color code:

Additions:	Red
Deletions:	Green
Comments	Blue
Dimensions:	Graphite

- B. Maintain documents separate from those used for construction.
 - 1. Label documents "RECORD DOCUMENTS."
- C. Keep documents current.
 - 1. Record required information at the time the material and equipment is installed and before permanently concealing.
- D. Deliver record documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.
- E. During progress meetings, record documents will be reviewed to ascertain that changes have been recorded.
- F. Final Schedule Submittal in accordance with Section 01 32 16.

1.11 MAINTENANCE AND GUARANTEE

- A. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Engineer. If the Contractor fails to make such repairs or replacements promptly, the City reserves the right to do the Work and the Contractor and his surety shall be liable to the City for the cost thereof.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations within the warranty period, shall be considered as a part of such required repair Work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair Work.
- C. The Contractor shall provide a bond to guarantee performance of the provisions contained in this Section.

1.12 CERTIFICATE OF FINAL COMPLETION

- A. Engineer will submit a list of known items (punchlist) still to be completed or corrected prior to contract completion.
- B. List of items to be completed or corrected will be amended as items are resolved by Contractor.
- C. When all items have been completed or corrected, submit written certification that the entire work is complete in accordance with the Contract Documents and request final inspection.

D. Upon completion of final inspection, Engineer will either prepare a written acceptance of the entire work or advise Contractor of Work not complete. If necessary, inspection procedures will be repeated.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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SECTION 02 41 00 GENERAL DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor as required for the demolition and removal of structures and facilities as indicated on the Plans and specified herein.
- B. The Work of this section shall include, but shall not be limited to:
 - 1. Clearing, grubbing, stripping, removal and disposal of top soil and vegetation.
 - 2. Demolition of asphalt pavement, concrete pads, curb and gutter, and other features as required and backfilling of resulting voids.
 - 3. Removal and salvage of existing facilities and equipment as indicated on the drawings and as specified.
 - 4. Demolition of existing structures or portions thereof, as specified.
- C. Related Sections:
 - 1. Section 01 14 00 Work Restrictions.
 - 2. Section 01 35 26 Safety Plan.
 - 3. Section 01 57 00 Environmental Control.
 - 4. Section 01 57 23 Stormwater Pollution Prevention.
 - 5. Section 03 30 00 Cast-in-Place Concrete.
 - 6. Section 31 50 00 Excavation Support and Protection.
 - 7. Section 32 11 23 Aggregate Base Course.

1.02 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00:
 - 1. Demolition plan and schedule.
 - 2. Disposal means and locations.

1.03 DEMOLITION COORDINATION

A. The Contractor shall carefully coordinate the extent of demolition in areas where existing utility services shall be disconnected and reconnected to new facilities, where existing facilities shall remain operational, and where vegetation and curb and gutter shall be restored.

- B. In the case of existing utilities where only a portion is to be demolished, the Contractor shall cap, seal, or repair the utility at the point of disconnection such that the remainder of the system can remain in service.
- C. In the case of existing ductwork or piping where a portion will be demolished followed by future connection to new construction, the Contractor shall cleanly cut the duct or pipe and promptly cap it to protect it during construction
- D. Environmental Requirements:
 - 1. Conform to the specified environmental requirements and regulations regarding noise, dust, and vibration.
- E. Existing Conditions:
 - 1. Verify that utility services are disconnected.

1.04 SEQUENCING AND SCHEDULING

- A. Sequencing
 - 1. See Section 01 13 00 for sequencing and scheduling requirements.

1.05 REPAIR OF DAMAGE

- A. Any damage to personal property, and to other existing facilities to remain, as caused by the Contractor's operations shall be repaired at the Contractor's expense.
- B. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces to a condition equal to or better than that existing prior to damage or start of Work of this Contract.

1.06 BURNING

A. The use of burning for the disposal of refuse, debris, and waste materials resulting from demolition and site clearing operations will not be permitted.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions pertaining to demolition work.

3.02 PREPARATION

- A. Utilities:
 - 1. Disconnect any remaining utility services that will no longer be active.
- 2. Remove all disconnected utilities within the site.
- 3. Repair utility mains as necessary in conformance with City of Foster City Standard Specifications and Details.
- 4. The disconnection of utilities not shown on the Plans shall be paid for in conformance with Section 01 26 30, "Differing Site Conditions".
- B. Protection:
 - 1. Provide berms and other means acceptable to Engineer to keep drainage from demolition areas.

3.03 DEMOLITION

- A. Disposal of all materials shall be performed in compliance with all applicable local, state, and federal codes and requirements.
- B. Asphalt concrete pavement, concrete pavement, and concrete curb and gutter shall be removed as necessary to perform the specified work. The limits of removal shall be saw cut. When the required improvements have been constructed, new asphalt concrete pavement, concrete pavement, and concrete curb and gutter shall be constructed as specified and shown.
- C. Demolition debris shall be handled in conformance with Section 01 57 00, Environmental Control.

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SECTION 02 41 19 SELECTIVE STRUCTURAL DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Demolition of structures or portions thereof.
- B. Related Sections:
 - 1. Section 01 14 00 Work Restrictions.
 - 2. Section 01 30 00 Shop Drawings, Product Data and Samples.
 - 3. Section 01 73 29 Cutting and Patching.
 - 4. Section 03 30 00 Cast-in-place Concrete.
 - 5. Section 32 11 23 Aggregate Base Course.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Demolition procedures and operational sequence.
 - 2. Demolition methods of load bearing structures not indicated on the Plans, signed and sealed by structural Professional Engineer registered in California.
- B. Submittals for Information only:
 - 1. Permits and notices authorizing demolition.
 - 2. Certificates of severance of utility services.
 - 3. Permit for transport and disposal of debris.
- C. Project Record Documents: Include locations of service lines and capped utilities.

1.03 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Conform to environmental requirements and regulations regarding noise, dust, and vibration.
- B. Existing Conditions:
 - 1. Verify that utility services are disconnected.

1.04 REGULATORY REQUIREMENTS

- A. Dispose of debris in accordance with governing regulatory agencies.
- B. Comply with applicable Air Pollution Control regulations.

C. Obtain permits for building demolition, transportation of debris to disposal site and dust control.

1.05 SEQUENCING AND SCHEDULING

- A. Sequencing
 - 1. See Section 01 13 00 for sequencing and scheduling requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions pertaining to demolition work.

3.02 PREPARATION

- A. Utilities:
 - 1. Disconnect any remaining utility services that will no longer be active.
 - 2. Remove all disconnected utilities within the site.
 - 3. Repair utility mains as necessary in conformance with City of Foster City Standard Specifications and Details.
 - 4. The disconnection of utilities not shown on the Plans shall be paid for in conformance with Section 01 26 30, "Differing Site Conditions".
- B. Protection:
 - 1. Use saw cutting and other methods acceptable to Engineer to protect adjacent facilities.
 - 2. Provide berms and other means acceptable to Engineer to keep drainage from demolition areas.
 - 3. Do not interfere with use of adjacent buildings. Maintain free and safe passage to and from.
 - 4. Prevent movement, settlement, or collapse of structures adjacent services, sidewalks, driveways, and trees. Provide and place bracing or shoring. Assume liability for movement, settlement, or collapse. Promptly repair damage.
 - 5. Protect bench marks and existing construction to remain from damage or displacement.
- C. Obtain permission from adjacent property owners when outriggers, swinging cranes, and other equipment may have to traverse adjacent property.

3.03 SAFETY PRECAUTIONS

- A. Cease operations and notify Engineer immediately when safety of structure appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.
- B. Provide erect and maintain barricades, lighting, guard rails, and protective devices as required to protect building occupants, general public, workers, and adjoining property.
- C. Provide and maintain protective devices to prevent injury from falling objects.
- D. Locate guardrails in stairwells and around open shafts to protect workers. Post clearly visible warning signs.

3.04 EXISTING SERVICES

- A. Arrange and pay for capping and plugging utility services. Disconnect and stub off. Notify affected utility company in advance and obtain approval before starting demolition.
- B. Place markers to indicate location of disconnected services.

3.05 MAINTAINING TRAFFIC

- A. Do not close or obstruct roadways without approved traffic control plans.
- B. Conduct operations with minimum interference to public or private roadways.

3.06 PROSECUTION OF WORK

- A. Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities and services required for performing selective demolition Work.
- B. Erect weatherproof closures for exterior openings. Maintain exit requirements.
- C. Erect and maintain dustproof partitions as required to prevent spread of dust, fumes, and smoke to other parts of building. On completion, remove partitions and repair damaged surfaces to match adjacent surfaces.
- D. Protect interior of buildings from rain and water damage during and after demolition.
- E. Cause as little inconvenience to adjacent occupied building areas as possible.
- F. Carefully remove designated materials and equipment to be retained by City or reinstalled. Deliver materials and equipment when and where directed by Engineer. Store and protect materials and equipment to be re-installed.

3.07 DEMOLITION

A. Demolish designated portions of structures and appurtenances in orderly and careful manner.

- B. Demolition debris shall be handled in conformance with Section 01 57 00, Environmental Control.
- C. Do not burn materials on site.
- D. Immediately upon discovery, remove, and dispose of contaminated, vermin infested or dangerous materials by safe means so as not to endanger health of workers and public.
- E. Unless otherwise specified or indicated on the Plans, demolition includes removal of slabs, footings, foundations, piping, conduits, and appurtenances and backfilling of resulting voids with suitable excavated or imported material, compacted to 95 percent relative density.
- F. Rough grade areas affected by demolition.
- G. Unless specifically identified in the Contract Documents, when existing structures, equipment, pipelines, and other facilities are removed, they shall be the property of the Contractor.
- H. Materials shall be properly disposed of off-site at the Contractor's expense.
- I. Remove demolished materials, tools, and equipment upon completion of demolition.

3.08 PRESERVATION OF IMPROVEMENTS NOT TO BE DEMOLISHED

- A. Do not demolish improvements unless so directed by the Plans or Engineer.
- B. Contractor shall not remove or damage improvements to remain located within the Limit of Work shown on the Plans without written permission from the Engineer.

3.09 REPAIR OF UNAUTHORIZED DEMOLITION OR DAMAGE

- A. Repair damage to permanent improvements not called for removal caused by demolition, whether within the Limit of Work or not.
- B. All permanent improvements removed or damaged by the Contractor shall be restored to their original location and condition by the Contractor using new materials as directed by the Engineer.

SECTION 03 07 10 EPOXIES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Epoxy.
 - 2. Epoxy gel.
 - 3. Epoxy bonding agent.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 638 Test Method for Tensile Properties of Plastics.
 - 2. D 695 Test Method for Compressive Properties of Rigid Plastics.
 - 3. D 790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Provide epoxy materials that are new and use them within shelf life limitations set forth by manufacturer.
 - 2. Perform and conduct Work of this Section in neat orderly manner.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data completely describing epoxy materials.
- B. Quality Control Submittals:
 - 1. Manufacturer's installation instructions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Epoxy: Water-insensitive two-part type low viscosity epoxy adhesive material containing 100 percent solids and meeting or exceeding following characteristics when tested in accordance with standards specified: Manufacturers: One of the following or equal:
 - 1. Master Builders, Inc., Concressive Standard LVI.

2. Sika Chemical Corp., Sikadur 35 Hi-Mod LV.

Physical Characteristic	Test Method	Required Results
Tensile Strength	ASTM D 638	8,000 pounds per square inch at 14 days and 77 degrees Fahrenheit cure.
Flexure Strength	ASTM D 790	11,000 pounds per square inch at 14 days and 77 degrees Fahrenheit cure.
Compressive Strength	ASTM D 695	16,000 pounds per square inch at 24 hours and 77 degrees Fahrenheit cure.
Bond Strength		Concrete shall fail before failure of epoxy.
Gel Time In 5-Mil Film		Four hours maximum at 77 degrees Fahrenheit.
Elongation	ASTM D 638	1 percent minimum at 14 days and 77 degrees Fahrenheit.

- B. Epoxy Gel: Manufacturers: One of the following or equal:
 - 1. Sika Chemical Corp.'s, Sikadur 31, Hi-Mod Gel.
- C. Epoxy Bonding Agent: Manufacturers: One of the following or equal:
 - 1. Master Builders, Inc., Concressive 1001 Liquid LPL.
 - 2. Sika Chemical Corp.'s, Sikadur 32, Hi-Mod.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install and cure epoxy materials in accordance with manufacturer's installation instructions.
- B. Use epoxy in gel form for vertical or overhead Work, or where high viscosity epoxy is required.
 - 1. Epoxy gel used for vertical or overhead Work may be used for horizontal Work.
- C. Epoxy Bonding Agent:
 - 1. Apply in accordance with manufacturer's installation instructions.
 - 2. Bonding agent will not be required for filling form tie holes or for normal finishing and patching of similar sized small defects.

SECTION 03 07 20 EPOXY RESIN/PORTLAND CEMENT BONDING AGENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Epoxy resin/Portland cement bonding agent.

1.02 REFERENCES

- A. American Society for Testing of Materials (ASTM):
 - 1. C 109 Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch Cube Specimens).
 - 2. C 348 Test Method for Flexural Strength of Hydraulic Cement Mortars.
 - 3. C 496 Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
 - 4. C 882 Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete Slant Shear.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sika Corporation, Lyndhurst, New Jersey, Sika Armatec 110.
- B. Substitutions: The use of other than the specified product will be considered providing the Contractor requests its use in writing to the Engineer. This request shall be accompanied by:
 - 1. A certificate of compliance from an approved independent testing laboratory that the proposed substitute product meets or exceeds specified performance criteria, tested in accordance with the specified test standards.
 - 2. Documented proof that the proposed substitute product has a one year proved record of performance of bonding Portland cement mortar/concrete to hardened Portland cement mortar/concrete, confirmed by actual field tests and five successful installations that the Engineer can investigate.

2.02 PERFORMANCE CRITERIA

- A. Properties of the Mixed Epoxy Resin/Portland Cement Adhesive:
 - 1. Pot life: 75-105 minutes.
 - 2. Contact time: 24 hours.
 - 3. Color: Dark gray.

- B. Properties of the Cured Epoxy Resin/Portland Cement Adhesive:
 - 1. Compressive strength in accordance with ASTM C 109.
 - a. 1 day: 810 pounds per square inch minimum.
 - b. 7 day: 6,000 pounds per square inch minimum.
 - c. 28 day: 8,000 pounds per square inch minimum.
 - 2. Splitting tensile strength in accordance with ASTM C 496.
 - a. 28 days: 540 pounds per square inch minimum.
 - 3. Flexural Strength:
 - a. 1,100 pounds per square inch minimum in accordance with ASTM C 348.
 - 4. Bond strength in accordance with ASTM C 882 modified at 14 days.
 - a. 0 Hours Open Time: 1,900 pounds per square inch minimum.
 - b. 24 Hours Open Time: 1,500 pounds per square inch minimum.
 - 5. The epoxy resin/Portland cement adhesive shall not produce a vapor barrier.
 - 6. Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the Federal Highway Administration Program Report Number FHWA/RD86/193. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.

2.03 MATERIALS

- A. Epoxy Resin/Portland Cement Adhesive:
 - 1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2. Component "B" shall be primarily a water solution of a polyamine.
 - 3. Component "C" shall be a blend of selected Portland cements and sands.
 - 4. The material shall not contain asbestos.

PART 3 EXECUTION

3.01 MIXING AND APPLICATION

- A. Mixing the Epoxy Resin: Shake contents of Components "A" and Component "B". Empty all of both components into a clean, dry mixing pail. Mix thoroughly for 30 seconds with a jiffy paddle on a low-speed with 400 to 600 revolutions per minute drill. Slowly add the entire contents of Component "C" while continuing to mix for 3 minutes until uniform with no lumps. Mix only that quantity that can be applied within its pot life.
- B. Placement Procedure:
 - 1. Apply to prepared surface with stiff-bristle brush, broom, or "hopper type" spray equipment.
 - a. For Hand Applications: Place fresh, plastic concrete/mortar while the bonding

bridge adhesive is wet or dry, up to 24 hours.

- b. For Machine Applications: Allow the bonding bridge adhesive to dry for 12 hours minimum.
- C. Adhere to all limitations and cautions for the epoxy resin/Portland cement adhesive in the manufacturer's current printed literature.

3.02 CLEANING

A. Leave finished Work and Work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

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SECTION 03 11 00 CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

a. Formwork for concrete, with shoring, bracing and anchorage.

1.02 RELATED REQUIREMENTS

- A. Section 03 20 00 Concrete Reinforcing
- B. Section 03 30 00 Cast-in-Place Concrete

1.03 REFERENCE STANDARDS

- A. Reference standards are the editions adopted by the current governing California Building Code.
- B. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials.
- C. ACI 301 Specifications for Structural Concrete for Buildings; American Concrete Institute.
- D. ACI 318 Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.
- E. ACI 347 Guide to Formwork for Concrete; American Concrete Institute.
- F. ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- G. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- H. ASTM D994 Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- I. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.04 SUBMITTALS

- A. See Section 01 30 00 for shop drawing, product data and sample requirements.
- B. See Section 01 33 00 for submittal procedures.

- C. Product Data: Provide data on formwork release agent or form liner proposed for use with each formed surface.
- D. Formwork Facing Materials: Data on form-facing materials proposed for smooth-form finish if different from that specified in Part 2.02.
- E. Construction and Contraction Joints: Location of construction and contraction joints proposed if different from those indicated in the Contract Documents.
- F. Shop Drawings
 - 1. Shop drawings and calculations shall be prepared, stamped, and signed by a registered Civil or Structural Engineer of the State of California.
 - 2. Submit shop drawings for fabrication and erection of forms for portions of the concrete surfaces, as indicated below:
 - a. For formwork over 12' in height.
 - b. Show general construction of forms including size of members, bracing, jointing, special form joint or reveals, location and pattern of form tie placement, and other items that affect the structural integrity of formwork or exposed concrete visually.
 - Falsework and Shoring Shop Drawings: The Contractor shall submit shop drawings and calculations of any required falsework, shoring. Shop drawings and calculations shall be prepared in accordance with the requirements of the ACI 318 and State of California Department of Transportation Standard Specifications, Section 48-2 - Falsework.
 - 4. Reshoring and Backshoring Plans: When reshoring or backshoring is required or permitted, submit procedures and plans of operations, before use. Indicate on shop drawings the magnitude of construction loads permitted during reshoring or back-shoring.
- G. Testing for Formwork Removal: Data on method for determining strength of concrete for removal of formwork when a method other than field-cured cylinders (ASTM C31 and ASTM C39) is proposed.
- H. Formwork Removal Plans: Detail plans for formwork removal operations when removal of forms at concrete strengths lower than that specified in Part 3.08 is proposed.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. California Building Code, current governing edition
 - 2. ACI 318
 - 3. ACI 347

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Maximum deflection of facing materials reflected on concrete surfaces exposed to public view shall be 1/240 of the span between structural members of the formwork. For architectural concrete, see "Architectural Concrete" 03 33 00.
- B. Formed Construction and Contraction Joints
 - 1. Locate and form construction joints that least impair strength of the structure and meet the requirements of Section 03 30 00 Cast-in-Place Concrete Part 3.05.
 - 2. Unless otherwise specified or permitted, locate and detail formed construction joints to the following requirements:
 - a. Locate construction joints within the middle third of the spans of slabs, beams, and girders. When a beam intersects a girder within this region, offset the joint in the girder a distance equal to or greater than twice the width of the beam.
 - b. Locate joints in walls and columns at the underside of slabs, beams, or girders and at the tops of footings or slabs.
 - c. Make joints perpendicular to the main reinforcement.
 - 3. Provide keyways where indicated in Contract Documents. Unless otherwise specified, longitudinal keyways indicated in the Contract Documents, shall be a minimum of 1-1/2 in. deep in joints in walls and between walls and slabs or footings.
 - 4. Provide construction and contraction joints where indicated in the Contract Documents. Submit for acceptance the location of construction and contraction joints differing from those indicated in the Contract Documents.

2.02 FORM MATERIALS

- A. Form-facing materials: Materials for form faces in contact with concrete shall meet the requirements of "Concrete Finishing" Section 03 30 00 Cast-in-Place Concrete and the following requirements unless otherwise specified in Contract Documents.
 - 1. For smooth-form finish, use plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other acceptable materials capable of producing the desired finish for form-facing materials.
 - 2. Form-facing materials shall produce a smooth, uniform texture on the concrete.
 - 3. Do not use form-facing materials with raised grain, torn surfaces, worn edges, dents, or other defects that will impair the texture of concrete surfaces.
 - 4. Facing materials shall be supported with studs or other backing capable of maintaining deflections within the tolerances specified in Part 2.01.

2.03 FORMWORK ACCESSORIES

A. Use commercially manufactured accessories for formwork accessories that are partially or wholly embedded in concrete, including ties and hangers. Do not use non-fabricated wire form ties.

B. Where indicated in the Contract Documents, use form ties with integral water barrier plates in walls or other acceptable positive water barriers.

2.04 FORMWORK RELEASE AGENT

A. Use commercially manufactured formwork release agents that prevent formwork absorption of moisture, prevent bond with concrete, and do not stain the concrete.

2.05 EXPANSION JOINT FILLER

A. Pre-molded expansion joint filler shall conform to ASTM D994 or ASTM D1751.

2.06 FABRICATION AND MANUFACTURE

- A. Formwork shall be tight to prevent loss of mortar from concrete.
- B. Place ³/₄-inch chamfer strips in the corners of formwork to produce beveled edges on permanently exposed surfaces unless otherwise specified. Do not bevel reentrant corners or edges of formed joints of concrete unless specified in the Contract Documents.
- C. Inspect formwork and remove deleterious material immediately before concrete is placed. Provide temporary openings where needed at the base of column and wall formwork to facilitate cleaning and inspection.
- D. Fabricate form ties so ends or end fasteners can be removed with minimum spalling at the faces of concrete.
- E. Locate waterstops in joints where indicated in Contract Documents. Use pieces of pre-molded waterstop with a maximum practicable length to create the minimum number of end joints. Make joints in waterstops in accordance with the manufacturer's recommendations. Ensure that joints develop effective watertightness equal to the continuous waterstop material, permanently develop not less than 50% of the strength of the parent section and permanently retain flexibility.

PART 3 EXECUTION

3.01 EARTH FORMS

A. Where sides of excavations have been cut neat and accurate in stable earth material to size for pouring of concrete directly against the excavation, forms for footings will not be required. Remove loose soil prior to placing concrete.

3.02 CONSTRUCTION AND ERECTION OF FORMWORK

A. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed to view over the hardened concrete in the previous placement. Ensure formwork is sealed against hardened concrete to prevent offsets or loss of mortar at construction joints and to maintain a true surface.

- B. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in the formwork after concrete has reached its time of initial setting. Brace formwork securely against lateral deflection and lateral instability.
- C. Fasten form wedges in place after final adjustment of forms and before concrete placement.
- D. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movement of the formwork system during concrete placement. Form supports shall be placed on adequate foundations and have sufficient strength and bracing to prevent settlement or distortion from the weight of the concrete or other cause. Support shall rest on double wedged shim, or other approved means, so that the forms will be maintained at the proper grade.
- E. Construct formwork for wall openings to facilitate removal and to counteract swelling of wood formwork.
- F. Provide runways for moving equipment and support runways directly on the formwork or structural member without resting on the reinforcing steel.
- G. All formed joints on concrete surfaces to be exposed shall be taped and shall align so joints will not be apparent on the concrete surfaces.
- H. Any movement or bellying of forms during construction shall be considered just cause for their removal and, in addition, the concrete work so affected.
- Bolts, rods, or other approved devices shall be used for internal form ties and shall be of sufficient quantities to prevent spreading of the forms. The ties shall be placed at least 1 inch away from the finished surface of the concrete. Bolts and rods that are to be completely withdrawn shall be coated with grease.
- J. Boards or other form materials that have been damaged or checked or warped prior to placing of concrete shall be removed from the forms and replaced with approved materials or otherwise corrected to the satisfaction of the engineer.
- K. Assign a sufficient number of men to keep watch on and maintain the forms during placing of concrete. Satisfactorily remedy any displacement or looseness of forms or reinforcement before placing of concrete. No form shall be moved or altered except as may be specifically directed.
- L. Wall forms shall be set to account for movement of post-tensioned slabs that will occur due to long term shortening of slabs. The Engineer will establish the offsets at each level after the Contractor submits a detailed pour schedule.

3.03 APPLICATION - FORM RELEASE AGENT

A. Cover surfaces of formwork with an acceptable material that will prevent bond with the concrete. A field-applied formwork release agent or a factory-applied liner may be used. If a formwork release agent is used, apply to the surfaces of the formwork in accordance with the manufacturer's recommendations before placing reinforcing

steel. Do not allow formwork release agent to puddle in the forms. Do not allow formwork release agent to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Position and support expansion joint materials, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.
- B. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work before concrete placement. Holes, notches, conduits, pipes, etc. are not allowed in concrete slabs, walls, members, etc. unless shown on the structural drawings or requested and specifically accepted by the Engineer.

3.05 FORM CLEANING

A. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete is placed.

3.06 FORMWORK TOLERANCES

- A. Unless otherwise specified in the Contract Documents, construct formwork so concrete surfaces conform to the tolerance limits of ACI 117. The class of surface shall conform to Part 2.02.
- B. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork during concrete placement. Set formwork and intermediate screed strips for slabs accurately to produce designated elevations and contours of the finished surface before removal of formwork. Ensure that edge forms and screed strips are strong enough to support vibrating screeds or roller pipe screeds when the finish specified requires the use of such equipment.
- C. When formwork is cambered, set screeds to the same camber to maintain specified concrete thickness.

3.07 FIELD QUALITY CONTROL

- A. The Contractor shall hire the engineer responsible for the design of formwork over 12' in height, falsework or shoring to inspect the work as detailed on the reviewed shop drawings.
- B. The engineer responsible for design of formwork over 12' in height, falsework or shoring shall write a letter to the City certifying construction is in accordance with the reviewed shop drawings and meets his/her approval prior to the Contractor placing any concrete.
- C. The Contractor shall verify accuracy of items, furnished under other sections of these specifications and installed under this Section.

3.08 FORM REMOVAL

- A. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or treatments required at once, and then follow immediately with specified curing.
- B. Do not damage concrete during removal of formwork for columns, walls, slabs, sides of beams, and other parts not supporting the weight of the concrete. Perform needed repair and treatment required on vertical surfaces at once and follow immediately with specified curing.
- C. Leave formwork and shoring in place to support the weight of concrete in beams and joists for at least 14 days, or 21 days for beams with over 20 feet in clear span, and in slabs for at least 10 days after the last concrete and until concrete has attained 3000 psi minimum per Part 3.08E and the engineer responsible for design of shoring and falsework has approved removal.
- D. Vertical forms shall remain on columns, walls, pilasters for at least seven 7 days after the last concrete and until concrete has attained 3000 psi minimum per Part 3.08E and the engineer responsible for design of the formwork has approved removal.
- E. Contractor shall request to have field cured compression test specimen taken where it is planned to remove formwork and shoring sooner than indicated above and submit detailed plans for review and acceptance. Mold cylinders in accordance with ASTM C31, and cure them under the same conditions for moisture and temperature as used for the concrete they represent. Test cylinders in accordance with ASTM C39.
- F. In removing plywood forms, no metal pinch bars shall be used and special care to be taken in stripping. Start at top edge or vertical corner where it is possible to insert wooden wedges. Wedging shall be done gradually and shall be accompanied by light tapping of the plywood panels to crack them loose. Do not remove forms with a single jerk after it has been started at one end.
- G. Nothing herein shall be construed as relieving the Contractor of any responsibility of the safety of the formwork or structure.

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SECTION 03 15 13 HYDROPHILIC RUBBER WATERSTOP

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Hydrophilic Rubber Waterstop.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers Tension.
 - 2. D 792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - 3. D 2240 Test Method for Rubber Property Durometer Hardness.

1.03 SUBMITTALS

- A. Product Data.
- B. Samples.
- C. Manufacturer's Installation Instructions.

PART 2 PRODUCTS

2.01 HYDROPHILIC RUBBER WATERSTOP

- A. Manufacturers: One of the following or equal:
 - 1. Asahi Denka Kogyo K.K., Tokyo, Japan; as distributed by Adeka Ultra Seal U.S.A., MC-2010M.
- B. General: Composed of rubber and urethane polymer as the hydrophilic agent, capable of repeated wet/dry expansion cycles without losing performance standards and returning to the original dimensions when dried. Shall have stainless steel wire mesh embedded in waterstop to direct and control expansion. Shall meet the following performance requirements:

Property	Test Method	
Hardness Hs	ASTM D 2240	*Not less than 30 ± 6 Durometer Type A.
Tensile Strength	ASTM D 412	*Not less than 142 pounds per square inch
Elongation	ASTM D 412	*Not less than 500 percent
Specific Gravity	ASTM D 792	1.18 ± 0.15

Property	Test Method	
Expansion Coefficient by Volume	In House	Not less than 1.9
* Based on pressed sheet of compound.		

2.02 ADHESIVE

- A. Manufacturers: One of the following or equal:
 - 1. Adeka P-201,
 - 2. 3-M Company, 3M-2141 rubber adhesive.
 - 3. Hilti, Construction Adhesive 3200.

2.03 SEALANT

- A. Manufacturers: One of the following or equal:
 - 1. Asahi Denka Kogyo K.K., Tokyo, Japan, Adeka Ultra Seal P-201, single component elastic sealant.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Fill all voids and rough areas under hydrophilic rubber waterstop with sealant.
- C. At concrete construction joints, fix hydrophilic waterstop in place with concrete nails, screws, or adhesive. Keep hydrophilic waterstop taut during the fastening process. Do not allow any gap between the concrete and the hydrophilic waterstop.
- D. Use sealant at all corner joints and overlap splices of hydrophilic waterstop.
- E. For waterstop adhered to pipe, prime surface with epoxy resin coating compatible with waterstop product. Epoxy coating shall be formulated for application on surfaces to produce a watertight bond between surface and rubber waterstop.

3.02 SCHEDULE

- A. Construction Joints:
 - 1. MC-2010M (or equal) with stainless steel reinforcing, 20 by 10 millimeters.
 - 2. For rough concrete surfaces, bed MC-2010M in bead of Adeka P-201 or equal. Fix MC-2010M (or equal) in place with concrete nails.

SECTION 03 20 00 CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for concrete and mechanically stabilized earth walls.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 Concrete Forming and Accessories.
- B. Section 03 30 00 Cast-in-Place Concrete.
- C. Section 32 05 00 Mechanically Stabilized Earth Walls.

1.03 REFERENCE STANDARDS

- A. Standards refer to editions adopted by the current governing California Building Code.
- B. American Concrete Institute (ACI):
 - 1. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International.
 - 2. ACI 301 Specifications for Structural Concrete for Buildings; American Concrete Institute International.
 - 3. ACI 318 Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.
 - 4. ACI SP-66 ACI Detailing Manual; American Concrete Institute International.
- C. ASTM International (ASTM):
 - 1. ASTM A706 Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 2. ASTM A775 Epoxy-Coated Reinforcing Steel Bars.
 - 3. ASTM A934 Epoxy-Coated Prefabricated Steel Reinforcing Bars.
 - 4. ASTM A1055 Standard Specification for Zinc and Epoxy Dual-Coated Steel Reinforcing Bars.
 - 5. ASTM D3963 Fabrication and Jobsite Handling of Epoxy-Coated Reinforcing Steel Bars.
 - 6. ASTM E329 Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

- D. American Welding Society (AWS):
 - 1. AWS D1.4 Structural Welding Code Reinforcing Steel.
- E. State of California, Department of Transportation (Caltrans):
 - 1. Caltrans Standard Specifications (2018).
- F. Concrete Reinforcing Steel Institute (CRSI):
 - 1. CRSI (DA4) Manual of Standard Practice.

1.04 SUBMITTALS

- A. See Section 01 30 00 Shop Drawings, Product Data and Samples for requirements.
- B. See Section 01 33 00 for submittal procedures.
- C. Shop Drawings (Placing drawings)
 - 1. Comply with requirements of ACI SP-66. Shop drawings shall also show details for congested areas and connections. Shop drawings used in field shall be reviewed copies.
- D. Product Data
 - 1. Manufacturer's catalog sheets including instructions for use and description of application and ICC/IAPMO evaluation report shall be provided on each of the following items intended for use on project:
 - a. Mechanical anchorage devices for splices.
- E. Mill Certificates
 - 1. The Contractor shall provide Mill Certificates for each size of bar for each heat to be used on project and certify that reinforcing steel supplied for this project meet or exceed specified requirements.
 - Mill Certificates shall include name of mill, date of rolling, date of shipping to fabricator and shall be signed by fabricator certifying that each material complies with or exceeds the specified requirements. A Mill Certificate shall be furnished with each lot of material delivered to the project and the lot shall be clearly identified in the Certificate.
 - 3. When Mill Certificates cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance and provide laboratory test reports. The Contractor shall pay for the cost of testing.
- F. Laboratory Test Reports
 - 1. Laboratory test reports shall be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.
 - 2. When required by other portions of these specifications, laboratory test reports shall be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these specifications.

G. Welder's Certificates and WPS: Submit description of reinforcement weld locations, welding procedures, and welder certification when welding is permitted.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with the current governing edition of CBC, ACI 301, ACI SP-66, ACI 318, and AWS D1.4 except as modified by the contract documents.
- B. Sampling and Testing:
 - 1. General
 - a. If the Engineer, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - b. Testing agencies shall meet the requirements of ASTM E329. Testing agencies shall be accepted by the Engineer before performing any work.
 - 2. Testing responsibilities of Contractor:
 - a. Submit data on qualifications of proposed testing agency for acceptance. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in compliance with the Contract Documents.
 - b. Cooperate with and notify owner's agent at least 24 hours in advance of inspections required and shall provide samples, test pieces, and facilities for inspection at no cost to the owner.
 - c. Identify each lot of fabricated reinforcing steel to be shipped to the site by assigning an individual lot number that identifies steel by heat number and shall be tagged in such a manner that each such lot can be accurately identified at the job site.
 - d. Remove all unidentified reinforcing steel, anchorage assemblies and bar couplers received at the site.

1.06 STORAGE OF MATERIALS

A. Store reinforcement during fabrication and at site to avoid excessive rusting or coating with grease, oil, soil, or other objectionable materials. Epoxy-coated reinforcement shall be handled and stored by methods that will not damage the coating. Bundles shall not be dropped or dragged. Reinforcing steel shall be transported and stored in a manner that will not damage any applied coating. The epoxy-coated reinforcement shall not be exposed to any fire or flame.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate work with all trades so as not to interfere with the work of other trades. Bring interferences between trades to Engineer's attention and resolve before any concrete is placed.

PART 2 PRODUCTS

2.01 REINFORCING BARS

- A. Reinforcing Steel:
 - 1. Bars for reinforcement shall conform to the requirements of ASTM A706, Grade 60 deformed low-alloy steel bars.

2.02 EPOXY COATING

- All concrete bar reinforcement shall be epoxy coated. Epoxy coated bar reinforcement shall be in conformance with Caltrans Standard Specification 52-2, "Epoxy-Coated Reinforcement and Epoxy-Coated Prefabricated Reinforcement," and ASTM A934 except as provided herein.
- B. Wire reinforcement shall be epoxy coated in conformance with ASTM A884 to the requirements for Class A, Type 2 coating.
- C. Epoxy coatings shall be purple or gray in color.
- D. Prior to coating, Contractor shall furnish a representative 1/4-pound sample from each batch of epoxy coating material to be used, identified with the manufacturer's name and batch number.
- E. Job site practices shall comply with sections X2.3.1 through X2.3.15 of appendix X2 of ASTM A934/A934M for bar reinforcement, except replace "should" with "shall."
- F. Dual-coated Bar Reinforcing:
 - 1. You may use dual-coated bar reinforcing steel complying with ASTM A1055 as an alternative to epoxy-coated reinforcement. Bar reinforcing steel to be dual-coated shall be deformed, Grade 60 bars complying with ASTM A706.
 - 2. Dual-coated bar reinforcement shall be the same bar size and shall be placed at the same spacing as described for epoxy-coated reinforcement and epoxy-coated prefabricated reinforcement.
 - 3. Do not bend bar reinforcing steel complying with ASTM A1055 after coating application if used as an alternative to epoxy coated prefabricated reinforcement.
 - 4. Job site practices for substituted bar reinforcement shall comply with Appendix X1 of ASTM A1055, except replace "should" with "shall."

2.03 WELDED WIRE REINFORCEMENT

- A. Welded wire reinforcement shall be used only where specifically called for on the Plans.
- B. Welded wire reinforcement shall conform to ASTM A1064, plain welded wire mesh in flat sheets (not rolls), with welded intersections spaced not farther apart than 12 in. in the direction of principal reinforcement.

C. Use wire-reinforcement supports complying with Class 1, maximum protection, or Class 2, moderate protection, as indicated in Chapter 3 of the CRSI Manual of Standard Practice.

2.04 WELDING ELECTRODES

A. Welding electrodes shall be per Table 5-1 of AWS D1.4.

2.05 MECHANICAL COUPLING DEVICES

A. Mechanical coupling devices shall develop 125 percent of the minimum yield strength of the bars spliced.

2.06 REINFORCEMENT ACCESSORIES

A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. Reinforcement supports shall conform to the requirements of ACI 301.

2.07 OTHER MATERIALS

A. All other materials not specifically described by these specifications but required for complete and proper placement of reinforcement shall be new, first quality of their respective kinds, and subject to the approval of the Engineer.

2.08 FABRICATION

- A. Welding of reinforcement is permitted only with the specific approval of Engineer. Perform welding in accordance with AWS D1.4. Do not weld crossing bars (tack welds) for assembly of reinforcement, supports, or embedded items.
- B. Hooks and bends shall conform to the requirements of ACI 315, unless otherwise indicated.
- C. All steel bars shall be of size and length indicated, accurately bent or formed to the shapes detailed or scheduled by experienced shops by methods that will not injure the materials. All reinforcing bars shall be shop fabricated to lengths and bends shown on the Plans. Fabrication tolerance shall be in conformance with the requirements of ACI 301.
- D. Steel reinforcement shall not be bent or straightened in a manner that will injure the material or the embedding concrete. Bars with kinks or bends not shown on the plans shall not be used. Heating of reinforcement for bending will not be permitted.
- E. Reinforcement shall be tagged with suitable identification to facilitate sorting and placing.
- F. Except for field welding of butt splices, all welding of reinforcement shall be complete prior to epoxy coating the reinforcement.

- G. Prior to epoxy coating, all resistance butt welds shall have the weld flash removed to produce a smooth profile free of any sharp edges that would prevent proper coating of the bar. The flash shall be removed such that the ultimate tensile strength and elongation properties of the bar are not reduced and the outside radius of the flash, at any point along the circumference of the bar is not:
 - 1. Less than the nominal radius of the bar.
 - 2. Greater than 3/16-inch beyond the nominal radius of the bar.
 - 3. A proposed weld flash removal process shall be submitted to and approved by the Engineer prior to performing any removal work.
- H. Bending of epoxy coated reinforcement after the coating has been applied is not allowed.

PART 3 EXECUTION

3.01 EXISTING CONDITIONS

- A. Prior to all work of the section, carefully inspect the installed work of other trades and verify that all work is sufficiently complete to permit the start of work under this section and that the completed work of this section will be in complete accordance with the original design and the reviewed shop drawings. In the event of discrepancy, immediately notify the Engineer in writing.
- B. In the event conduits, pipes, inserts, sleeves, or any other items interfere with placing the reinforcement as indicated on the drawings or approved shop drawings, or as otherwise required, immediately notify the Engineer and obtain approval on procedure before placement of reinforcement is started.

3.02 PROTECTION AND REPAIR

- A. Epoxy-coated reinforcement shall be covered with opaque polyethylene sheeting or other suitable protective material to protect the reinforcement from exposure to sunlight, salt spray, and weather. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be adequately secured; however, it should allow for air circulation around the reinforcement to prevent condensation under the covering.
- B. Epoxy-coated reinforcement shall not be stored within 1,000 feet of tidal water for more than two months.
- C. All visible damage to coatings caused by shipping, handling, or installation shall be repaired as required for repairing coating damaged prior to shipment as described in ASTM A934 for bar reinforcement. When the extent of coating damage prior to repair exceeds two percent of the bar surface area in any one-foot length, repair of the bar is not allowed and the coated bar will be rejected.
- D. Coating patching material and processes shall be suitable for field application. The patching material shall be pre-qualified as required for the coating material and shall be either identified on the container as a material compatible with the reinforcement

coating, or shall be accompanied by a Certificate of Compliance certifying that the material is compatible with the reinforcement coating. Damaged areas shall be patched in conformance with the patching material manufacturer's recommendations.

3.03 BENDING

- A. Bends for reinforcing steel shall be made in accordance with ACI 301 and ACI 318. Bend bar sizes No. 3 through 5 cold only one time, provided reinforcing bar temperature is above 32 degrees F.
 - 1. Do not field bend reinforcing steel in a manner that will injure material, cause the bars to be bent on too tight a radius, or that is not indicated as allowed on drawings or permitted by Engineer.
 - 2. Do not straighten bent or kinked bars for use on project without permission of Engineer.
 - 3. Replace bars with kinks or bends not shown on the drawings.

3.04 PLACING

- A. All reinforcement shall be placed in strict conformance with the requirements of the Contract Drawings, both as to location, position and spacing of members. It shall be supported and secured against displacement by the use of adequate and proper wire supporting and spacing devices, tie wires, etc. so that it will remain in its proper position in the finished structure. Reinforcement may not be wet set in concrete pours.
- B. Tolerances: Do not exceed the placing tolerances specified in ACI 318 and ACI 117, whichever is more stringent, before concrete is placed. Placing tolerances shall not reduce cover requirements except as specified in ACI 117.
- C. Minimum concrete cover for reinforcement and couplers shall be as indicated in the Contract Drawings. Concrete cover is measured from the theoretical excavation line, not the line of any over excavation. Where less than 3 inches cover is noted and concrete will be placed against soil, increase the section thickness to attain 3 inches cover.
- D. Preserve clear space between parallel bars of not less than 1-1/2 times the nominal diameter of round bars and in no case let the clear distance be less than 1-1/2 inches nor less than 1-1/3 times the maximum size of aggregate for concrete.
- E. Not used.
- F. Not used.
- G. Lap splices shall be contact lap splices in accordance with ACI 318 unless noted otherwise on the Contract Drawings.
- H. Butt splices shall be accomplished by mechanical anchorage devices. Stagger these devices 2 feet, unless noted otherwise on the Contract Documents.

I. Bars shall not be cut by gas torch.

3.05 CLEANING REINFORCEMENT

A. Take all means necessary to ensure that steel reinforcement, at the time concrete is placed around it, is completely free from rust, soil, loose mill scale, oil, paint and all coatings which will destroy or reduce the bond between steel and concrete.

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place structural concrete.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 Concrete Forming and Accessories.
- B. Section 03 20 00 Concrete Reinforcing.
- C. Section 31 23 16 Structural Excavation
- D. Section 31 23 23 Structural Fill

1.03 REFERENCE STANDARDS

- A. Standards reference editions adopted by the current governing California Building Code.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M 295 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 - 2. AASHTO M 307 Standard Specification for Silica Fume Used in Cementitious Mixtures
 - AASHTO T 105 Standard Method of Test for Chemical Analysis of Hydraulic Cement
- C. American Concrete Institute (ACI):
 - 1. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - 3. ACI 301 Specifications for Structural Concrete for Buildings.
 - 4. ACI 302.1R Guide for Concrete Floor and Slab Construction.
 - 5. ACI 306.1 Cold Weather Concreting.
 - 6. ACI 308R Guide to Curing Concrete.
 - 7. ACI 318 Building Code Requirements for Structural Concrete and Commentary.

- D. ASTM International (ASTM):
 - 1. ASTM A240 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 2. ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 3. ASTM C33 Standard Specification for Concrete Aggregates.
 - 4. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 5. ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 6. ASTM C94 Standard Specification for Ready-Mixed Concrete.
 - 7. ASTM C143 Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - 8. ASTM C150 Standard Specification for Portland Cement.
 - 9. ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
 - 10. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete.
 - 11. ASTM C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - 12. ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete.
 - 13. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 14. ASTM C311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.
 - 15. ASTM C494 Standard Specification for Chemical Admixtures for Concrete.
 - 16. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 17. ASTM C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 - 18. ASTM C 979 Standard Specification for Pigments for Integrally Colored Concrete.
 - 19. ASTM C1077 Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - 20. ASTM C1107 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
 - 21. ASTM C1218 Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
 - 22. ASTM C1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

- 23. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- 24. ASTM D4832 Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
- 25. ASTM E1155 Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
- 26. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- 27. ASTM F594 Standard Specification for Stainless Steel Nuts.
- 28. ASTM F836M Standard Specification for Style 1 Stainless Steel Metric Nuts (Metric).
- E. U. S. Army Corp of Engineers, Concrete Research Division (CRD):
 - 1. CRD-C513 Corps of Engineers Specifications for Rubber Waterstops.

1.04 SUBMITTALS

- A. See Section 01 30 00 Shop Drawings, Product Data and Samples, for requirements.
- B. See Section 01 33 00 for submittal procedures.
- C. Product Data
 - 1. Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:
 - a. Epoxies
 - b. Grout
 - c. Admixtures
 - d. Curing Compounds
 - e. Chemical Hardener
 - f. Waterstops
 - g. Adhesive Anchoring System
 - 2. Mix designs shall be submitted for each class of concrete on the job and shall show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job. Field test records or test data that is used to establish the average compressive strength of the mixture shall be submitted.
- D. Concrete Placement Schedule: The Contractor shall submit a concrete placement schedule which shall show all proposed construction joint locations, limits of each placement sequence, order of placement and type of joint proposed at each joint location.
- E. Samples: Submit to testing agency sample of materials as specified and as otherwise required by Engineer, including names, sources, and descriptions.

- 1. Select samples to fairly represent average quality and grading of aggregates proposed.
- F. Certificates of Compliance
 - 1. The Contractor shall provide Certificate of Compliance for each type of aggregate, cementitious material and admixture to be used in each class of concrete or a Certificate of Compliance for each class of concrete.
 - 2. Certificates of Compliance for cementitious materials shall include type, manufacturing location, shipping location; for aggregates: type, pit or quarry location, producers' name, grading, specific gravities and certification evidence not more than 90 days old; for admixtures: type, brand name, producer, manufacturer's technical data sheet, and certification data; and for water: source of supply that are used in each class of concrete and shall be signed by the concrete supplier certifying that each material item complies with, or exceeds the specified requirements. Certificates of Compliance shall be furnished 60 days in advance of any concrete pours.
 - When Certificates of Compliance cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material to be used in each Class of Concrete. The cost of testing shall be paid for by the Contractor.
- G. Weight and Batch Tags:
 - 1. The special inspector shall be provided with a weight and batch tag upon delivery of each load of concrete. The batch tag must show weight of all materials.

1.05 QUALITY ASSURANCE

- A. Comply with the provisions of the current governing CBC, ACI 301, and ASTM C94 except where more stringent requirements are shown or specified.
- B. Sampling, Testing and Inspection:
 - 1. General:
 - a. If the Engineer, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - b. Testing agencies shall meet the requirements of ASTM C1077. Testing agencies shall be accepted by the Engineer before performing any work.
 - 2. Contractor:
 - a. The Contractor shall cooperate with and notify Engineer at least 24 hours in advance of inspection required and shall provide samples and facilities for inspection without extra charge.
 - b. The Contractor shall provide and maintain adequate facilities on the project site for safe storage and initial curing of concrete test specimens as required by ASTM C31 for the sole use of the testing agency.
 - c. Each mix design shall be verified by trial batch tests or field test records and certified to by a principal of a testing agency who is a registered Civil Engineer in the State of California and submitted to the Engineer for review.

d. Agency field test records, in order to be acceptable, must satisfy the requirement of ACI 318 section 5.3 otherwise trial mixture meeting the requirements of ACI 318 section 5.3 shall be made. The Contractor shall submit data on qualifications of proposed testing agency for acceptance and hire the accepted testing agency to provide trial mixture test data for each type of concrete on the job.

1.06 SEQUENCING AND SCHEDULING

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete so provision for their work can be made without delaying the project.
- B. Perform any coring and infill of cored holes that were required by failed test results from test panels, failure or delay in complying with these requirements, at no cost to the City.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.03 CEMENTITIOUS MATERIALS

- A. Portland Cement: ASTM C150, Type II or V.
 - 1. The C3S content of Type II cement must not exceed 65 percent.
 - 2. The alkali content must not exceed 0.60 percent by mass of alkalies as Na2O + 0.658 K2O when determined under AASHTO T 105.
 - 3. Autoclave expansion must not exceed 0.50 percent.
- B. Fly Ash: ASTM C618, Class F.
- C. Natural Pozzolan: Raw or calcined natural pozzolans complying with AASHTO M 295, Class N, and either of the following:
 - 1. Available alkali as Na2O + 0.658 K2O must not exceed 1.5 percent when tested under ASTM C311.
 - 2. Total alkali as Na2O + 0.658 K2O must not exceed 5.0 percent when tested under AASHTO T 105.
- D. Silica Fume: AASHTO M 307, with a minimum reduction in mortar expansion of 80 percent when using the cement from the proposed mix design.

E. Metakaolin: AASHTO M 295, Class N, and the chemical and physical requirements for the quality characteristics shown in the following 2 tables:

Chemical quality characteristic	Requirement (percent)
Silicon dioxide (SiO2) + aluminum oxide (Al2O3) (minimum)	92.0
Calcium oxide (CaO) (maximum)	1.0
Sulfur trioxide (SO3) (maximum)	1.0
Loss on ignition (maximum)	1.2
Available alkalies as Na2O + 0.658 K2O (maximum)	1.0

Chemical quality characteristic	Requirement (percent)
Particle size distribution less than 45 microns (minimum)	92.0
Strength activity index with portland cement	
7 days (percent of control, minimum)	100
28 days (percent of control, minimum)	100

F. Ultra-Fine Fly Ash: AASHTO M 295, Class F, and the chemical and physical requirements for the quality characteristics shown in the following 2 tables:

	Requirement
Chemical quality characteristic	(percent)
Sulfur trioxide (SO3) (maximum)	1.5
Loss on ignition (maximum)	1.2
Available alkalies as Na2O + 0.658 K2O (maximum)	1.5

Chemical quality characteristic	Requirement (percent)
Particle size distribution	<u> </u>
Less than 3.5 microns (minimum)	50
Less than 9.0 microns (minimum)	90
Strength activity index with portland cement	
7 days (percent of control, minimum)	95
28 days (percent of control, minimum)	110
Expansion at 16 days when testing project materials under ASTM	0.10
C1567 (maximum) (In the test mix, at least 12 percent, by weight,	
of the Type II or V portland cement must be replaced with ultra-	
fine fly ash)	

- G. Ground-granulated Blast-furnace Slag:
 - 1. ASTM C989 grades 100 or 120
- H. Use cementitious materials that are of the same brand and type and from the same plant of manufacture as the cementitious materials used in the concrete represented by the submitted field test records or used in the trial mixtures.
- I. Color Additives: ASTM C979, synthetic or natural mineral-oxide pigments or liquid coloring admixtures, temperature stable and nonfading.
- J. Fiber Reinforcement: Only where shown; synthetic fiber, fibrillated polypropylene fibers designed for use in concrete, complying with ASTM C1116, Type III, ½-inch to 1-1/2 inch in length.
2.04 AGGREGATES

- A. Aggregates for hardrock concrete shall conform to ASTM C33.
- B. Aggregates used for entire project shall be obtained from the same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data or used in trial mixtures.

2.05 WATER

A. Mixing Water for concrete shall be clean and free from deleterious amounts of chlorides, acids, alkalis or organic materials.

2.06 CHEMICAL ADMIXTURES

- A. Do not use chemicals that contain calcium chloride or will result in total soluble chloride ions in hardened concrete at ages from 28 to 42 days contributed from water, aggregates, cementitious materials, and admixtures in excess of 0.30 percent by weight of cement for reinforced concrete. Measure water-soluble chloride-ion content in accordance with ASTM C1218. Admixtures containing chloride salts shall not be used where concrete is poured on top of metal decking.
- B. Air Entrainment Admixture: ASTM C260.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Sika Aer; Sika Corporation.
 - b. MB-VR or MB-AE; Master Builders.
 - c. Darex AEA; W.R. Grace.
- C. High Range Water Reducing and Retarding Admixture: ASTM C 494 Type G.
- D. High Range Water Reducing Admixture (Super Plasticizer): ASTM C494 Type F.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. WRDA19; W.R. Grace.
 - b. Sikament; Sika Chemical Corporation.
 - c. Pozzolith 400; Master Builders.
- E. Water Reducing and Retarding Admixture: ASTM C494 Type D.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Pozzolith 300-R; Master Builders.
 - b. Daratard; W.R. Grace.
 - c. Plastiment; Sika Chemical Corporation.
- F. Water Reducing Admixture: ASTM C494 Type A.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Eucon WR-75; Euclid Chemical Company.
 - b. Pozzolith 344; Master Builders.
 - c. Plastocrete 160; Sika Chemical Corporation.

G. Admixtures used in concrete shall be the same as those used in the concrete represented by the submitted field test records or used in the trial mixtures.

2.07 ACCESSORY MATERIALS

- A. Non-Shrink Grout:
 - 1. ASTM C1107 Grade B or C, pre-mixed, high strength, non-metallic flowable grout, which does not shrink as it cures. Water-soluble chloride ion content of grout less than 0.06 percent chloride ion by weight of cement when tested in accordance with ATM C1218.
 - a. Minimum Compressive Strength at 7 Days: 5000 psi.
- B. Expansive Grout:
 - Expansive grout shall be composed of cement, sand, water and intraplast-N expanding grouting aid (manufactured by Sika) or approved equal. Expansive grout shall be proportioned and installed in accordance with intraplast-N recommendations and shall develop a minimum compressive strength of 3000 psi in 28 days.
- C. Post-Installed Anchoring Systems: Comply with requirements of Section 03 90 00.
- D. Cast-In-Place Anchors:
 - 1. Anchor Rods and Nuts: ASTM F593 Alloy 316 with ASTM F594 or F836M nuts. Embedded rods shall be threaded full length unless noted otherwise.
 - 2. Washers: ASTM A240/A240M.

2.08 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System: Epoxies shall be a two-component material for use on dry or damp surfaces and shall conform to the requirements of ASTM C881. Epoxy bonding agents and adhesives shall be used in strict accordance with manufacturer's recommendations.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Sikadur Armatec 110; Sika Chemical Corporation or equal.
- B. Waterstops: Rubber, complying with CRD-C513.
 - 1. Acceptable products subjected to compliance with requirements:
 - a. The Burke Company.
 - b. Progress Unlimited.
 - c. Williams Products.
 - d. Edoco Technical Products.
- C. Joint Filler: ¹/₂-inch thick unless noted on the drawings, with removable top section that will form ¹/₂-inch deep sealant pocket after removal.

2.09 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membraneforming compound, that dissipates within 3 to 5 weeks; complying with ASTM C309.
- B. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, nonyellowing acrylic; complying with ASTM C1315 Type 1 Class A.
- C. Curing and Sealing Compound, High Gloss: Liquid, membrane-forming, clear, nonyellowing acrylic; complying with ASTM C1315 Type 1 Class A.
- D. Moisture-Retaining Sheet: ASTM C171.

2.10 CONCRETE MIX DESIGN

- A. Admixtures: Where admixtures are used, they shall be added as recommended in ACI 211.1 for normal weight concrete and at rates recommended by manufacturer. Admixtures are subject to the engineer's review.
- B. Normal Weight Concrete Mix Requirements:
 - 1. Shall be made with aggregates for hardrock concrete.
 - 2. Minimum Compressive Strength, f'c, when tested in accordance with ASTM C39 at 28 days: As scheduled below.
 - 3. Minimum Cementitious Material Content:
 - a. Concrete must contain at least 675 pounds of cementitious material per CY.
 - 4. The cementitious material must be composed of one of the following, by weight, unless noted otherwise:
 - a. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement.
 - b. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement.
 - c. 12 percent silica fume, metakaolin, or ultra-fine fly ash, and 88 percent portland cement.
 - d. 50 percent ground-granulated blast-furnace slag and 50 percent portland cement.
 - 5. For concrete at sheet pile wall concrete caps and pilasters, the cementitious material must be composed of one of the following, by weight:
 - a. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement.
 - b. 12 percent silica fume, metakaolin, or ultra-fine fly ash, and 88 percent portland cement.
 - c. 50 percent ground-granulated blast-furnace slag and 50 percent portland cement.
 - 6. Maximum Water-Cement Ratio: As scheduled below. Volume of liquid admixtures shall be considered as part of the mixing water if the dosage is more than 1/2 gallon of admixture per cubic yard of concrete.

- 7. Maximum Aggregate Size: Nominal maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.
- 8. Compressive strengths and maximum water/cementitious material ratios by concrete class are provided in the following table:

	Minimum 28-day	Maximum Water/Cement	itious Material Ratio
Concrete Class	Compressive Strength f'c	Non-Air Entrained	Air Entrained
Class D	5000 psi	0.40	0.40
Class F	2000 psi	0.67	0.62
Lean Concrete (CLSM)	300 psi		
Tremie Concrete	4000 psi	0.45	0.40

- C. Controlled Low Strength Material (CLSM) Mix Requirements:
 - 1. Shall be made with aggregates conforming to ASTM C33.
 - 2. Minimum Compressive Strength, f'c, when tested in accordance with ASTM D4832 at 28 days: As scheduled above.
 - 3. Minimum Cement Content: 2 sacks.
 - 4. Maximum Water-Cement Ratio: Sufficient to produce a fluid workable mixture without segregation of the aggregate when placed.
- D. Concrete Mix Designs: The following table presents a schedule of classes of concrete, maximum aggregate, maximum slump and air content for each type of concrete, which shall be as follows:

	Class of	Max. Size	Max. Slump (inch)
Concrete Element	Concrete	Aggregate	at point of discharge
Foundation Walls, Footings, Slabs-On-	D	3/4	4
Grade, Walls, Beams and Elevated Slabs			
Structural Backfill	Lean	1.5	6
Sidewalks and Curbs	F	3/4	4

- E. Determine the slump by ASTM C143 at the point of truck discharge. Slump shall not exceed 3" for any concrete placement where top of surface slopes more than 2%. When use of a Type I or II plasticizing admixture conforming to ASTM C1017 or when a Type F or G high-range water-reducing admixture conforming to ASTM C494 is permitted to increase the slump of concrete, concrete shall have a slump of 2 to 4 in. before the admixture is added and a maximum slump of 8 in. at the point of truck discharge after the admixture is added unless otherwise specified.
- F. Add an air entraining agent to the concrete to provide specified amounts of entrained air per table below unless noted otherwise. Measure air content at the point of delivery in accordance with ASTM C173. Tolerance is plus or minus 1.5%.

	Air content,
Nominal Maximum Aggregate Size, inch	percent
3/8	7.5
1/2	7
3/4	6
1	6
1.5	5.5

G. Returned Plastic Concrete (RPC) shall not be used.

2.11 MIXING

- A. Use ready-mixed concrete complying with ASTM C94 and with the requirements of Contract Documents. Mix for a period of not less than ten (10) minutes; at least three (3) minutes of the mixing period shall be immediately prior to discharging at the job.
- B. CLSM shall be placed in the work within 3 hours after introduction of the cement to the aggregates.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.
- B. Examine jobsite conditions and other work before proceeding with work of this section.

3.02 WEATHER REQUIREMENTS

- A. Reinforcement, forms, and ground that concrete will contact shall be completely free of frost.
- B. When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40° F for more than three successive days, deliver concrete to meet the following minimum temperatures immediately after placement:
 - 1. 55° F for sections less than 12 in. in the least dimension;
 - 2. 50° F for sections 12 to 36 in. in the least dimension;
 - 3. 45° F for sections 36 to 72 in. in the least dimension; and
 - 4. 40° F for sections greater than 72 in. in the least dimension.

The temperature of concrete as placed shall not exceed these values by more than 20° F. These minimum requirements may be terminated when temperatures above 50° F occur during more than half of any 24-hour duration.

- C. The temperature of concrete as placed shall not exceed 90° F. When temperature of steel reinforcement, embedments, or forms is greater than 120° F, fog steel reinforcement, embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.
- D. Do not begin to place or continue to place concrete while rain, sleet, or snow is falling unless adequate protection is provided and, when required, acceptance of protection is obtained. Do not allow rainwater to increase mixing water or to damage the surface of the concrete.

3.03 CONVEYING AND PLACING CONCRETE

- A. All concrete shall be mixed, delivered and discharged in accordance with the requirements of ASTM C94. All concrete shall be placed, finished and cured and all other pertinent construction practices shall be in accordance with the requirements of ACI 301.
- B. Notify Engineer not less than 48 hours prior to commencement of placement operations.
- C. Before placing, clean mixing and conveying equipment, clean forms and space to be occupied by concrete and wet forms. Remove ground water until completion of work.
- D. Place no concrete in any unit of work until all formwork has been completely constructed, all reinforcements secured in place, all items to be built into concrete are in place, form ties at constructions joints tightened and all preparation have been checked by the Inspector. A placing record shall be kept on the site of the time and date of placing the concrete in each portion of the structure until the completion of the structure and shall be open to the Inspector.
- E. Slabs shall not be subjected to occupant or storage loads exceeding 20 psf until specified strength is reached (28 days minimum).
- F. Concrete shall be placed so that a uniform appearance of surfaces will be obtained. The concrete will be free of all rock pockets, honeycombs and voids.
- G. The subgrade must be moist when the concrete is placed on ground to prevent excessive loss of water from the concrete mix.
- H. Pumping of concrete may require admixtures to increase slump beyond the maximum slump listed. Admixtures are subject to the engineer's review.
- I. Carry on concreting, once started, as a continuous operation until the section of approved size and shape is completed. Make pour cut-offs of approved detail and location.
- J. Handle concrete as rapidly as practicable from mixer to place of deposit by methods which prevent separation or loss of ingredients. Deposit as nearly as practicable in final position to avoid rehandling or flowing. Do not drop concrete freely where reinforcing bars will cause segregation, impact the soil face of excavations nor drop freely more than eight feet. Use hoppers, chutes or trunks of varying length so that the free unconfined fall of concrete shall not exceed eight feet. Deposit to maintain a plastic surface approximately horizontal. In walls, deposit in horizontal layers not over eighteen inches deep. In pouring pilasters, walls or thin sections of considerable heights, use openings in forms, elephant trunks, tremies or other approved devices which permit concrete to be placed without segregation or accumulation of hardened concrete on forms or metal reinforcement above the level of the concrete. Install so concrete will be dropped vertically.

- K. Consolidating: All concrete shall be placed with mechanical vibration unless noted otherwise. Employ as many vibrators and tampers as necessary to secure the desired results. Minimum: one per each 20 cubic yards of concrete placed per hour. Eliminate the following practices: Pushing of concrete with vibrator; external vibration of forms; allowing vibrator to vibrate against reinforcing steel where steel projects into green concrete; allowing vibrator to vibrate contact faces of forms. Vibrators shall function at a minimum frequency of 3600 cycles per minute when submerged in concrete. Supplement vibration by forking and spading along the surfaces of the forms and between reinforcing whenever flow is restricted. Drilled piers shall be vibrated only to a depth of 3 times the pier diameter measured from the top of pier. Vibrators used for concrete with epoxy-coated reinforcement must have a resilient covering to prevent damage to the epoxy coating.
- L. Tremie Method: Tremie is a special procedure for placing concrete underwater. Tremie concrete shall be placed by pump or a gravity feed pipe. If a gravity feed pipe is used it shall be 8" minimum diameter and shall be affixed with a shutoff device at the bottom that will allow filling of the pipe with concrete without allowing water to enter. Pumping pipe shall be 4" minimum diameter. The trunk of the pump or gravity pipe shall be placed at the bottom of drilled pier prior to placing any concrete. The pump trunk or gravity pipe shall be removed slowly as the drilled pier is filled insuring that the end of pump trunk or gravity pipe is embedded in concrete a minimum of 5 foot.

3.04 SLAB JOINTING

A. Saw Cut Control Joints: Saw cut joints with the Soff-Cut system or approved equal as soon as the surface is firm enough so that it will not be damaged by the blade, usually within 2 to 4 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.05 FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness
 - 1. 1/4 inch in 10 feet in accordance with the "10-ft straight edge method" in ACI 117.
 - 2. Correct the slab surface if minimum 10% of the data samples are greater than 1/4 inch or if some data are not less than 3/8 inch.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values
 - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15.
- C. Measure F(F) and F(L) in accordance with ASTM E1155 and the F-number system in ACI 117, within 48 hours after slab finishing operations and before removal of shores; report both composite overall values and local values for each measured section. Measure FL for level slabs on grade when they are shored.
- D. Correct the slab surface if composite overall values are less than specified and if local values are less than three-fifth of specified value. Correct defects by grinding or by removal and replacement of the defective work.

- 1. Areas requiring corrective work will be identified.
- 2. Re-measure corrected areas by the same process.

3.06 CONSTRUCTION JOINTS

- A. Location and details of construction joints shall be as indicated on drawings, specified, or as approved by the Engineer. Locate so as not to impair the strength of the structure.
- B. Sandblast all construction joints using coarse sand or waterblast to clean and roughen entire surface of joint to ¼-inch amplitude at all construction joints unless noted otherwise, exposing coarse aggregate solidly embedded in mortar matrix uniformly. Clean forms and reinforcing of drippings. Clear away debris by compressed air.

3.07 CONCRETE FINISHING

- A. Finishing Formed Surfaces: Finish per specifications and the requirements of ACI 301.
 - 1. If the type of finish is not specified, use grout-cleaned finish for permanently exposed formed surfaces except foundation surfaces and smooth-rubbed finish for exposed foundation surfaces.
- B. Finishing Unformed Surfaces: Finish per specifications and the requirements of ACI 301. Start finishing after bleeding of concrete is finished. The presence of bleed water is detected visually but when concrete surface is getting dry fast and rate of evaporation is so high, place a clear plastic sheet over a section of the concrete to block evaporation and to allow observation of bleeding.
- C. Measure slabs-on-ground to verify compliance with the tolerance requirements of ACI 117 as specified below:
 - 1. 1/4 inch in 10 feet in accordance with the "10-ft straight edge method" in ACI 117. 2.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 301. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at above 50° F for the period of time necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: At least the first 7 days after placement.
 - 2. High early strength concrete: At least the first 3 days after placement.
- C. Curing methods shall comply with ACI 308R.

- D. Curing compounds conforming to ASTM C309 or ASTM C1315 shall be applied in accordance with the recommendations of the manufacturer and shall not be used on any surface against which additional concrete or other cementitious finishing materials are to be bonded, nor on surfaces where such curing is prohibited by the project specifications.
- E. Unformed concrete surfaces: Start curing as soon as the bleed water sheen has disappeared and before surface is dry.
 - Initial Curing: If surface drying starts before initial set of concrete, keep concrete continuously moist up to final set of concrete by fog spray. Time of initial set is also known as the vibration limit where concrete cannot be properly consolidated after reaching initial set. Before initial set, the concrete is not stiff enough to support the weight of a finisher or finishing machine. Water from fogging should be removed or allowed to evaporate before finishing.
 - 2. Final Curing: Begin immediately after finishing. If finishing is completed but concrete has not reached final set, keep concrete continuously moist by fog spray, a liquid-applied evaporation reducer spray, or liquid membrane-forming curing compound spray. Water from fogging should be removed or allowed to evaporate before finishing. After final set of concrete, curing shall be accomplished by one of the following materials or method:
 - a. Ponding, continuous fogging, or continuous sprinkling;
 - b. Application of a curing compound.
 - c. Application of mats or fabric kept continuously wet.
 - d. Application of moisture-retaining sheet conforming to ASTM C171.
 - e. Other moisture-retaining covering as reviewed by Engineer.
- F. Formed concrete surfaces: Steel forms and all wood forms in contact with the concrete shall be kept wet until they are removed. After formwork removal cure concrete by one of the methods specified for final curing.
- G. Remove protection in such a manner that the maximum decrease in temperature measured at the surface of the concrete in a 24-hour period shall not exceed the following:
 - 1. 50° F for sections less than 12 in. in the least dimension;
 - 2. 40° F for sections from 12 to 36 in. in the least dimension;
 - 3. 30° F for sections 36 to 72 in. in the least dimension; or
 - 4. 20° F for sections greater than 72 in. in the least dimension.
- H. Measure concrete temperature using a method acceptable to the Engineer and record the concrete temperature.
 - 1. When the surface temperature of the concrete is within 20° F of the ambient or surrounding temperature, protection measures may be removed.

3.09 PATCHING AND CLEANING

- A. After forms are removed, remove projecting fins, form ties, nails, etc. not necessary for the work or cut back one inch from the surface. Joint marks and fins in exposed work shall be smoothed off and cleaned as directed by the Engineer.
- B. Repair defects in concrete work as directed by the Engineer and per ACI 301. Chip voids and stone pockets to a depth of one inch or more as required to remove all unsound material. Voids, surface irregularities, chipped areas, etc., shall be filled by patching, gunite or rubbing, as directed by the Engineer. Repaired surfaces shall duplicate appearance of unpatched work.
- C. Clean exposed concrete surfaces and adjoining work stained by leakage of concrete to approval of the Engineer.

3.10 CLEANUP

A. Clean up all concrete and cement work on completion of this portion of the work.

3.11 GROUTING

- A. Not used.
- B. Bearing plates: The space between plates bearing against masonry or concrete shall be filled with grout when required by the Engineer. The grout shall be mixed and placed in strict accordance with manufacturer's instructions. Care shall be taken in the grouting to ensure that there are no voids or air pockets, and that there is full bearing between the bearing plates and channels and the grout.

3.12 POST INSTALLED ANCHORS

A. Comply with requirements of Section 03 90 00.

3.13 FIELD QUALITY CONTROL

- A. Engineer Review: The Engineer shall inspect the surfaces between plates and bearing on masonry and concrete to determine if grouting of space is necessary. If grouting of space is necessary, the Engineer shall inspect the grouting procedure.
- B. Acceptance of concrete strength is in accordance with ACI 318 section 5.3 unless noted otherwise.
- C. When the strength of field-cured cylinders is less than 85% of companion laboratorycured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Field Acceptance of concrete: Concrete not within the specified limits of airentrainment, slump and temperature shall not be used in the work.
- E. Additional Tests: The Engineer will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure or deficiencies in protection and curing has occurred,

as directed by the Engineer. Engineer may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, other additional testing as may be required, and cost of repairing areas of structure tested when unacceptable concrete is verified.

3.14 DEFECTIVE CONCRETE

- A. General: Work considered to be defective may be ordered by the Engineer to be replaced in which case the Contractor shall remove the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:
 - 1. Concrete in which defective or inadequate reinforcing steel has been placed.
 - 2. Concrete in incorrectly formed, or not conforming to details and dimensions on the drawings or with the intent of these documents or concrete the surfaces of which are out of plumb or level.
 - 3. Concrete below specified strength.
 - 4. Concrete not meeting the maximum allowable drying shrinkage requirements.
 - 5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings.

3.15 CORRECTION OF DEFECTIVE WORK

- A. The Contractor shall, at his expense, make all such corrections and alleviation measures as directed by the Engineer.
- B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, shall be chipped out until all unconsolidated material is removed.
- C. Secure approval of chipped-out areas before patching. Patch per ACI 301-latest governing edition.

END OF SECTION

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SECTION 03 45 00 PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.01 **RELATED DOCUMENTS**

Plans and General Provisions of Contract, including General and Supplementary Α. Conditions and Division 1 Specification Sections apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for Α. installation of Precast Architectural Concrete items, also referred to as Glass Fiber Reinforced Concrete (GFRC) as shown on the Plans and as specified in this Section.
- B. Related Work includes but is not limited to:
 - 1 Site Concrete

1.03 **STANDARDS & DEFINITIONS**

- Α. Unless otherwise shown or specified, all materials and methods shall conform to the appropriate current sections of:
 - American Concrete Institute specifications latest editions including: 1.
 - ACI 318 Building Code Requirements for Structural Concrete American Welding Society specifications - latest editions - including:
 - 2.
 - AWS D1.1, Structural Welding Code Steel a.
 - AWS D1.4, Structural Welding Code Reinforcing Steel b.
 - 3. Precast / Prestressed Concrete Institute specifications - latest editions including:
 - PCI MNL 117, Manual for Quality Control for Plants and Production of a. Architectural Precast Concrete Products.
 - PCI MNL 120, PCI Design Handbook-Precast and Prestressed Concrete b.
- Applicable ASTM International Standards (latest revisions) as they apply to this Work Β. and related test methods, including:
 - A185 Specification for Steel Welded Wire Reinforcement, Plain, for Concrete 1.
 - 2. A615 Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - 3. C33 Specification for Concrete Aggregates
 - C150 Specification for Portland Cement 4.
 - C42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of 5. Concrete
 - 6. C260 Specification for Air-Entraining Admixtures for Concrete
 - C270 Specification for Mortar for Unit Masonry 7.
 - 8. C404 Specification for Aggregates for Masonry Grout
 - C476 Specification for Grout for Masonry 9.
 - C494 Specification for Chemical Admixtures for Concrete 10.
 - C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for 11. Use in Concrete

12. C979 Specification for Pigments for Integrally Colored Concrete

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed precast architectural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fabricator Qualifications: A firm that complies with the requirements of this Specification and is experienced in manufacturing precast architectural concrete units similar to those indicated for this Project and with a record of successful in-service performance.
 - 1. Fabricator assumes responsibility for engineering precast architectural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a professional engineer, licensed in the State of California.
 - 2. Fabricator has sufficient production capacity to produce required units without delaying the project.
 - 3. Fabricator has a quality control program that is comparable to APA or PCI that is certified by a professional engineer.
- C. Testing Agency: An independent testing agency acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Quality-Control Standards:
 - 1. PCI MNL 177 for manufacturing procedures and testing requirements, qualitycontrol recommendations, and dimensional tolerances for types of units required.
 - 2. Welding: Qualify procedures and personnel according to AWS D1.1 and AWS D1.4
- E. Fabrication Tolerances: Fabricate precast architectural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items:
 - 1. Overall height and width of units, measured at the face exposed to view: 10 feet or under, +/- 1/8 inch.
 - 2. Overall height and width of units, measured at the face not exposed to view: 10 feet or under, +/- 1/4 inch.
- F. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.
 - 1. Weld Plates: +/- 1 inch.
 - 2. Inserts: +/- 1/2 inch.
 - 3. Handling Devices: +/- 3 inches.
 - 4. Reinforcing Steel and Welded Wire Fabric: +/- 1/4 inch where position has structural implications or affects concrete cover; otherwise, +/- 1/2 inch.

1.05 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Precast Mix: noting proportions of sand, aggregate, cement, water, and admixtures.
- C. Shop Drawings: Detail fabrication and installation of precast architectural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, arrangement of joints, and types of reinforcement, including special reinforcement.
 - 1. Indicate locations and extent and treatment of dry joints if two-stage casting is proposed.
 - 2. Indicate welded connections by AWS standard symbols. Detail loose and castin hardware, inserts, connections, and joints, including accessories.
 - 3. Indicate locations and details of anchorage devices to be embedded in other construction.
 - 4. Indicate locations and details of facings, anchors, and treatment of joints.
- D. Sample Color / Finish Range: if the color and finish is noted as to-be-decided (TBD) on the Plans, then submit sample range of colors and finishes for prior selection.
- E. Sample Chips: three (3) sample color chips of each type of architectural precast concrete that are representative of the general range of color, texture and finish specified on the Plans. The approved / selected sample(s) shall be the basis of all rejection or approval of the material.
 - 1. Grout Samples for Initial Selection: Color charts consisting of actual sections of grout showing the manufacturer's full range of colors.
- F. Mockups: Prior to installing precast architectural concrete units, build a minimum of two (2) mockups for each color / finish specified to verify qualities of materials and execution. Build mockups to comply with the following requirements:
 - 1. Mockup #1: Place the mockup in a staging yard or other appropriate location. In presence of the Owner's Representative, damage part of an exposed face for each finish, color, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces. Maintain this mockup in an undisturbed condition as a standard for judging the completed Work. Demolish and remove mockups when directed by the Owner's Representative.
 - Mockup #2 (or more): Install as a first-in-place mockup in the location and of the size indicated or, if not indicated, then as directed by Owner's Representative.
 - 3. Obtain Architect's approval by the Owner's Representative of both mockups prior to starting fabrication.
- G. Material Test Reports / Certificates: From qualified independent testing agencies indicating compliance with applicable industry standards.
 - 1. Concrete materials.
 - 2. Reinforcing materials
 - 3. Admixtures.

- H. Sample Test Reports: from a qualified independent testing agency and no more than 90 days old
 - 1. Compression tests
 - 2. Water absorption tests
- I. Installer Experience: of firms and persons specified in Quality Assurance to demonstrate capabilities and experience. Include lists of completed projects of at least three (3) years of age, along with owner, architect and contractor references.
- J. Fabricator Experience: description of firms manufacturing capacity, and certified quality control program.

1.06 DELIVERY STORAGE & HANDLING

- A. Delivery: Package and deliver precast architectural concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so markings are visible.
- B. Mark production units with the identification marks as shown on the shop drawings. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings.
- C. Provide an itemized list of products to support the bill of lading.

1.07 TESTING & INSPECTION

- A. Source Quality Control: Owner may choose to employ an independent testing agency to evaluate precast architectural concrete fabricator's quality-control and testing methods.
 - 1. Allow Owner's testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities.
 - 2. Cooperate with Owner's testing agency and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
- B. Fabricators Tests: Employ the Testing Agency to test and inspect precast concrete according to PCI MNL 117 and ACI 318 strength requirements.
- C. Owner's Tests: If there is evidence that the strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C42.
 - 1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Owner's Representative.
 - 2. Cores will be tested in an air-dry condition.
 - 3. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.

- 4. Test results will be made in writing on the same day that tests are performed, with copies to the Owner's Representative, Contractor, and precast concrete fabricator.
- 5. Test reports will include the following:
 - a. Project identification name and number.
 - b. Date when tests were performed.
 - c. Name of precast concrete fabricator.
 - d. Name of concrete testing agency.
 - e. Identification letter, name, and type of precast concrete unit or units represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- E. Field Inspections and Tests:
 - 1. The Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections.
 - 2. Field welds and connections using high-strength bolts will be subject to tests and inspections.
 - 3. Testing agency will report test results promptly and in writing to Contractor and the Owner's Representative.
 - 4. Additional testing and inspecting, at Contractor's expense, may be performed to determine compliance of corrected Work with specified requirements.

PART 2 - PRODUCTS

2.01 PRE-APPROVED PRODUCT / FABICATOR

- 1. Lite Crete Glass Fiber Reinforced Concrete (GFRC) consisting of highdensity concrete made of cement, silica sand, and polymers, and reinforced with glass fibers; asbestos free.
- 2. Approved Equal.

2.02 MOLD MATERIALS

- A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for required finishes.
 - 1. Molds to be mortar tight and of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes.
 - 2. Molds to be maintained to provide completed precast architectural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
 - 3. Edge and Corner Treatment: Uniformly radiused, unless otherwise noted on the Plans.

2.03 CONCRETE MATERIALS

- A. Portland Cement: Type-I OR Type-III cement, white and/or grey. Conform to ASTM C150. Use the same type / brand / source for the entire production.
- B. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C33, with coarse aggregates complying with Class 5S.
 - 1. Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining.
 - a. Gradation: Gap Graded.
 - 2. Fine Aggregates: Selected, natural or manufactured sand of the same material as coarse aggregate, unless otherwise approved by the Owner's Representative.
- C. Coloring Admixture: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
- D. Chemical Admixtures: Manufactured by BASF, Sika, W.R. Grace or approved equal.
 - 1. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - 2. Water Reducing: conform to ASTM C494, Type A.
 - 3. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 4. Calcium chloride is not permitted in the manufacture of chemical admixtures.
- E. Fly Ash: Fly ash, Class C, F, or N. Conform to ASTM C618 & C311
 - 1. Fly ash: supplied by an experienced producer, complying with all applicable standards.
 - 2. Dark and variable colors shall not be used in surfaces intended to be exposed to view.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117
- G. Fiber Reinforcement: Alkali resistant continuous filament glass fibers, as provided by the precast panel manufacturer.

2.04 CONCRETE MIXES

- A. Design mixes for each type of concrete required. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast architectural concrete fabricator's option.
 - 1. Limit use of fly ash and silica fume to not exceed, in aggregate, 25 percent of Portland cement by weight.
 - 2. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318.
 - 3. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.
 - 4. When included in design mixes, add other admixtures to concrete mixes according to manufacturer's written instructions.

- B. Normal-Weight Concrete Mixes: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 5000 psi
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45

2.05 SETTING BED & JOINT MATERIALS

- A. Mortar: conform to ASTM C270 Type N.
- B. Grout: conform to ASTM C404 / C476. 28-day strength of 2,000 psi and be composed of one-part Portland cement and two parts sand.

2.06 SEALERS

A. Water repellent sealers and stain repellents of the "penetrating, breathable" type.

2.07 REINFORCMENT

- A. Reinforcement:
 - 1. Bars: conform to ASTM A615. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 inches.
 - 2. Welded Wire Fabric: conform to ASTM A185 where applicable for wet cast units. Welded wire fabric shall not be used in dry cast units.

2.08 CONNECTORS

A. Anchorage Hardware: Cast-in Anchors, Inserts, Plates, Angles and other connectors: non-corrosive steel per PCI-ML117

PART 3 - EXECUTION

3.01 GENERAL

- A. Preinstallation meeting:
- B. Coordination: Fit architectural precast items Work into other Work.
- C. Weather conditions: do not install architectural precast items during heavy rain.
- D. Concrete / unit masonry base: Verify that the base / wall has been installed and/or surface prepared correctly prior to installation of architectural precast items.
- E. Sequencing: Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

3.02 FABRICATION

A. Anchorage: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during pre-casting operations. Locate

anchorage hardware where it does not affect position of main reinforcement or concrete placements.

- 1. Furnish loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast architectural concrete units to supporting and adjacent construction.
- 2. Cast-in reglets, slots, holes, and other accessories in precast architectural concrete units to receive cramps, dowels, reglets, waterstops, flashings, and other similar Work as indicated.
- B. Reinforcement: Reinforce precast architectural concrete units to resist handling, transportation, and erection stresses.
 - 1. Comply with recommendations in CRSI's "Manual of Standard Practice" and PCI MNL 117 for fabricating, placing, and supporting reinforcement.
 - 2. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
 - 3. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 - 4. Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
 - 5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- C. Concrete:
 - 1. Mix concrete according to PCI MNL 117 and requirements in this Section. After concrete batching, no additional water may be added.
 - 2. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirements in PCI MNL 117 for measuring, mixing, transporting, and placing concrete.
 - 3. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 117.
 - 4. Comply with ACI 306.1 procedures for cold-weather concrete placement.
 - 5. Comply with ACI 305R recommendations for hot-weather concrete placement.
 - 6. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.
- D. Finishes: Finish exposed-face surfaces of precast architectural concrete units to match approved design reference sample and as follows:
 - 1. Textured-Surface Finish: Impart by form liners as specified or inserts to provide surfaces free of pockets, streaks, and honeycombs, with uniform color and texture. Any air-pocket in the surface of the precast must be sacked or filled to match.
 - 2. Finish unexposed surfaces of precast architectural concrete units by float finish.

- E. Identification: Identify pickup points of precast architectural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings.
 - 1. Imprint or permanently mark casting date on each precast architectural concrete unit on a surface that will not show in finished structure.
- F. Quality Control:
 - 1. Defective Work: Precast architectural concrete units that do not comply with testing requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

3.03 JOB CONDITIONS

- A. Substrates: Examine substrates and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Do not install precast concrete units until supporting concrete has attained minimum design compressive strength.
- B. Protection: Take all steps necessary not to damage existing and/or adjacent improvements. If damage occurs, repair immediately and if repair cannot be made to the satisfaction of the Owner's Representative, remove and replace at no expense to the Owner.

3.04 INSTALLATION

- A. Layout: As shown on the Plans.
- B. Install precast architectural concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.
 - 1. Plan Location from Building Grid Datum: +/- 1/2 inch
 - 2. Plan Location from Centerline of Steel: +/- 1/2 inch
 - 3. Top Elevation from Nominal Top Elevation:
 - a. Exposed Individual Panel: +/- 1/4 inch
 - b. Nonexposed Individual Panel: +/- 1/2 inch
 - c. Exposed Panel Relative to Adjacent Panel: 1/4 inch
 - d. Nonexposed Panel Relative to Adjacent Panel: 1/2 inch
 - 4. Support Elevation from Nominal Support Elevation:
 - a. Maximum Low: 1/2 inch
 - b. Maximum High: 1/4 inch
 - 5. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet: 1 inch
 - 6. Plumb in Any 10 Feet of Element Height: 1/4 inch
 - 7. Maximum Jog in Alignment of Matching Edges: 1/4 inch
 - 8. Joint Width (Governs over Joint Taper): +/- 1/4 inch
 - 9. Maximum Joint Taper: 3/8 inch
 - 10. Joint Taper in 10 Feet: 1/4 inch
 - 11. Maximum Jog in Alignment of Matching Faces: 1/4 inch

- 12. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/4 inch
- C. Anchor precast architectural concrete units in position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring and grouting are completed.
- D. At bolted connections, use lock washers or other acceptable means to prevent loosening of nuts.
- E. Grouting Connections: Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

3.05 REPAIR AND REPLACEMENT

- A. Remove and replace precast architectural concrete units that do not comply with field inspection and testing requirements.
- B. Discard precast architectural concrete units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by the Owner's Representative.
- C. If permitted by the Owner's Representative, then repair exposed exterior surfaces of precast architectural concrete units to match color, texture, and uniformity of surrounding precast architectural concrete.
- D. Remove and replace damaged precast architectural concrete units if repairs do not satisfy the Owner's Representative.
- E. All repairs and replacements are at no additional cost to the Owner.

3.06 CLEAN UP

- A. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.
 - 1. Wash and rinse according to precast concrete fabricator's written recommendations. Protect other Work from staining or damage due to cleaning operations.
 - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.
- B. Clean the site of all waste materials created from the masonry Work. All soil contaminated by mortar, concrete, or grout shall be removed to the satisfaction of the Owner's Representative.

END OF SECTION

SECTION 03 90 00 POST-INSTALLED ANCHORING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Adhesive anchoring systems.
- B. Expansion anchors.
- C. Cast-in-place inserts.

1.02 RELATED REQUIREMENTS

- A. Section 03 10 00 Concrete Forming and Accessories.
- B. Section 03 20 00 Concrete Reinforcing.
- C. Section 31 23 23 Structural Fill

1.03 REFERENCE STANDARDS

- A. Standards reference editions adopted by the current governing California Building Code.
- B. American Concrete Institute (ACI):
 - 1. ACI 301 Specifications for Structural Concrete for Buildings.
 - 2. ACI 318 Building Code Requirements for Structural Concrete and Commentary.
- C. ASTM International (ASTM):
 - 1. ASTM A36 Specification for Carbon Structural Steel.
 - 2. ASTM A193 Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
 - ASTM F3125 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.

1.04 SUBMITTALS

- A. See Section 01 30 00 Shop Drawings, Product Data and Samples, for requirements.
- B. See Section 01 33 00 for submittal procedures.

- C. Product Data:
 - 1. Manufacturer's catalog sheets including instructions for use and description of application for post-installed anchoring systems.
 - 2. Current ICC/IAPMO evaluation report for post-installed anchoring systems.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Adhesive anchoring system:
 - 1. Adhesive anchoring system in concrete must be HILTI HIT-HY 200 (ESR-3187) or approved equal with a current ICC/IAPMO evaluation report.
 - 2. Adhesive anchoring system in masonry must be Hilti HIT-HY 270 system (ESR-4143) or approved equal with a current ICC/IAPMO evaluation report.
- B. Expansion anchors:
 - 1. Expansion anchors must be HILTI KWIK BOLT-TZ (ESR-1917), or approved equal with a current ICC/IAPMO evaluation report.
- C. Inserts with stainless steel threaded rod:
 - 1. HILTI HIS-RN Inserts (ESR-3187) with ASTM A193 Grade B8M stainless steel threaded rod.
- D. Expansion anchors and threaded rods shall be stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Anchor minimum edge distances defined by the current ICC/IAPMO evaluation report must be met at edges, control joints and cracks greater than 0.015 inches wide. Installation of anchors and adhesive including drilling, cleaning of holes and torque must be in accordance with the current ICC/IAPMO evaluation report. Verify whether the evaluation report requires a maximum or minimum torque. Confirm torque with a torque wrench calibrated to the inspector's torque wrench. Post installed anchors must be used only in applications permitted by the Evaluation Report. Anchors must use washer sized to prevent crushing of the attached member at installation torque.
- B. If reinforcement is encountered during drilling, abandon and shift the hole location to avoid the reinforcement. Provide a minimum of 2 anchor diameters or 1 inch, whichever is larger, of sound concrete between the anchor and the abandoned hole. Fill the abandoned hole with non-shrink grout. If the anchor or dowel may not be shifted as noted above, the Engineer will determine a new location.

- C. Adhesive Anchors:
 - 1. Insert the anchor or dowel in the hole with a twisting motion to the required embedment depth. Do not pump the anchor or dowel in and out of the hole.
 - 2. Wedge bars tight and centered in the hole with wooden wedges (golf tees) to hold it in place until the adhesive sets.
- D. Expansion Anchors:
 - 1. Install per the ICC/IAPMO report to the nominal embedment depth shown on the plans. Tightening of expansion anchors must not reduce the embedment below that specified on the plans by more than eight threads. Projecting portions of expansion anchors must not be cut off before inspection is complete.

END OF SECTION

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SECTION 05 50 00 METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Metal fabrications including:
 - 1. Handrails and Guardrails.
 - 2. Ladders and Stairs.
 - 3. Miscellaneous Metals: Includes aluminum, stainless steel, and structural steel.
 - 4. Associated accessories to the above items.
- B. Related Sections:
 - 1. Section 01 30 00 Shop Plans, Product Data and Samples.
 - 2. Section 09 96 00 Coatings.

1.02 REFERENCES

- A. Aluminum Association (AA):
 - 1. Specification M32-C22-A41 Aluminum Finishes.
- B. American Society for Testing and Materials (ASTM):
 - 1. A 36/A 36M Specification for Structural Steel.
 - 2. A 48 Specification for Grey Iron Castings.
 - 3. A 53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 4. A 123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. A 143 Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - 6. A 153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 7. A 167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 8. A 240 Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - 9. A 269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 10. A 276 Specification for Stainless Steel Bars and Shapes.

- 11. A 320 Specification for Alloys Steel Bolting Materials for Low-Temperature Service
- 12. A 307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- 13. A 325 Specification for High-Strength Bolts for Structural Steel Joints.
- 14. A 384 Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
- 15. A 385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
- 16. A 489 Specification for Carbon Steel Lifting Eyes.
- 17. A 490 Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.
- 18. A 500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- 19. A 501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- 20. A 569 Specification for Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip Commercial Quality.
- 21. A 570/A 570M Specification for Steel, Sheet and Strip, Carbon. Hot-Rolled, Structural Quality.
- 22. A 635/A 635M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled.
- 23. A 653/A 653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
- 24. A 780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- 25. A 1264 Safety Requirements for Workplace Floor and Wall Openings, Stairs and Railing Systems.
- 26. B 209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- 27. B 221 Aluminum Alloy, Extruded Bars, Rods, Wire, Shapes, Tubing.
- 28. B 429 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- 29. D 822 Tests on Paint and Related Coatings Using Filtered Open-Flame Carbon-Arc Exposure Apparatus.
- 30. D 1794 Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- 31. D 3363 Test Method for Film Hardness by Pencil Test.
- 32. E 894 Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
- 33. E 935 Permanent Metal Railing Systems and Rails for Buildings.
- C. American National Standards Institute (ANSI):
 - 1. A14.3 Ladders-Fixed: Safety Requirements

- 2. 531 Metal Bar Grating Manual
- D. American Welding Society (AWS).
 - 1. D1.1 Structural Welding Code: Steel
 - 2. D1.3 Structural Welding Code: Sheet Steel
- E. International Code Council (ICC)/California Building Standards Commission (CBSC):
 - 1. International Building Code (IBC), current governing edition.
 - 2. California Building Code (CBC), current governing edition
- F. The National Association of Architectural Metal Manufactures (NAAMM) Manuals:
 - 1. Metal Bar Gratings (ANSI/NAAMM MBG 531)
 - 2. Pipe Railing Manual, Including Round Tube
- G. Occupational Safety and Health Administration (OSHA).
 - 1. 1910.27 Fixed Ladders.

1.03 QUALITY ASSURANCE

- A. **Hand Railing and Walkways** shall comply with SAA Code for fixed platforms, walkways, stairways and ladders, AS1657.
- B. **Regulatory Requirements:** Except as modified by the requirements specified herein and detailed on the plans, the installation of fabricated metal Work shall conform to the "California Building Code" (CBC).

1.04 SUBMITTALS

- A. Shop Drawings: Submit for handrails and guardrails, including details on connection attachments, gates, kickplates, ladders, and angles.
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 2. Include erection plans, elevations, and details where applicable.
 - 3. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
- B. Samples: Cable railing and guardrails with specified finishes.
- C. Quality Control Submittals:
 - 1. Design Data.
 - 2. Test Reports:

- a. Guardrails: 3 copies of certified tests performed by an independent testing laboratory certifying that guardrails meet current State and Occupational Safety and Health Administration strength requirements.
- b. Gratings and covers:
 - 1) Manufacturers' calculations showing that gratings and covers will meet specified load bearing and deflection requirements for each size grating or cover for each type of installation.
 - 2) Reports of tests performed.

PART 2 PRODUCTS

2.01 GENERAL

A. Materials: Unless otherwise specified or indicated on the Plans, structural and miscellaneous metals shall conform with the standards of the ASTM, including the following:

ltem	ASTM Standard No.	Class, Grade . Type or Alloy No.			
Cast Iron					
Cast Iron	A 48	Class 40B			
Steel					
Galvanized sheet iron or steel	A 653	Coating G90			
Black steel, sheet or strip	A 569, A 570				
Coil (plate)	A 635				
Structural plate, bars, rolled shapes, and miscellaneous items	A 36				
Standard bolts, nuts, and washers	A 307				
High strength bolts, nuts, and hardened flat washers	A 325 A 490				
Eyebolts	A 489	Type 1			
Tubing, cold-formed	A 500				
Tubing, hot-formed	A 501				
Steel pipe	A 53	Grade B			
Stainless steel					
Plate, sheet and strip	A 167	Type 316*			
Bars and shapes	A 276	Type 316*			
Bolts and threaded rods	A 320	Type 316*			
Aluminum					

ltem	ASTM Standard No.	Class, Grade Type or Alloy No.	
Sheet aluminum-flashing	B 209	Alloy 5005-H14, 0.032 inches minimum thickness	
Sheet aluminum-structural	B 209	Alloy 6061-T6	
Structural aluminum	B 308 B 209	Alloy 6061-T6	
Extruded aluminum	B 221	Alloy 6063-T42	
* Use Type 316L if material will be welded.			

- 1. Stainless steels are designated by type or series defined by ASTM.
- 2. Where stainless steel is welded, use low-carbon stainless steel.

2.02 HANDRAILS AND GUARDRAILS

- A. General: Design and fabricate assemblies to conform to current local, State, and Occupational Safety and Health Administration standards and requirements.
 - 1. See Guardrail and Handrail schedules on the Drawings.
- B. Standard of Quality: Similar to Casino Architectural Railing System by SC Railing Company, Minneapolis (sc-railing.com)
- C. Top Rails: Stainless steel, 2.5-inch diameter with circumferential #4 finish.
- D. Handrails: 1.5-inch diameter Type 316 stainless steel with circumferential #4 finish.
- E. Posts: Type 316 stainless steel with circumferential #4 polish.
 - 1. Post spacing shall be 4 feet on center nominal.
 - 2. Fabricate posts in single, un-spliced length.
- F. Infill: 3/16-inch diameter Type 316 stainless steel cable.
- G. Attachment Devices: Provide clip angles and other fasteners necessary for securing handrails and guardrails to other construction as generally indicated on the Plans and as shown on the manufacturer's fabrication Plans.
 - 1. Continuously weld joints and grind smooth.
 - 2. Neatly weld intersection of rails and posts, and grind surfaces smooth.
- H. Fastenings and Fasteners: As recommended or furnished by guardrail manufacturer for use with this system.

2.03 FIXED LADDERS AND WALL CROSSOVERS

- A. Fixed aluminum wall ladders and wall crossovers shall be as shown on the Plans, fabricated from ASTM A6063-T6 alloy in conformance with ASTM B221.
- B. Rungs shall be 1-1/4" round serrated and have cast aluminum rung connectors secured to 1/8" thick by 3" wide channel side rails with at least four solid aircraft rivets each for a combined shear strength of over 3600 pounds per rung. Rung spacing shall be 12" on center, providing a minimum 7" distance from the adjacent wall surface, unless otherwise shown on the plans.
- C. Ladders shall be provided with a marine quality anodized coating of aluminum oxide with a coating thickness of 2 to 3 mils.
- D. Ladder dimensions shall be as shown on the plans and verified in the field.
- E. Mounting hardware brackets shall be aluminum to match ladder materials. Where aluminum surfaces come into contact with dissimilar materials such as concrete or steel, exposed aluminum surfaces shall be painted with one coat of bituminous paint or other approved insulating material. The location of all mounting brackets shall be field-verified prior to fabrication. Mounting brackets shall be welded to the ladders prior to delivery, with mounting instructions.
- F. Ladders shall be mounted to concrete surfaces using 316 stainless steel bolts, with dielectric insulation to prevent direct contact between stainless steel and aluminum.
- G. Provide a 5-year warranty for defects in materials and workmanship.

2.04 MISCELLANEOUS METAL

- A. Miscellaneous Aluminum: Fabricate aluminum products, not covered separately herein, in accordance with the best practices of the trade and field assemble by riveting or bolting. Do not weld or flame cut.
- B. Miscellaneous Stainless Steel:
 - 1. Provide miscellaneous stainless steel items not specified herein as indicated on the Plans or specified elsewhere. Fabricate and install in accordance with the best practices of the trade.
- C. Miscellaneous Structural Steel:
 - 1. Provide miscellaneous steel items not specified herein as indicated on the Plans or specified elsewhere. Fabricate and install in accordance with the best practices of the trade.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine Work in place to verify that it is satisfactory to receive the work of this Section. If unsatisfactory conditions exist, do not begin this work until such conditions have been corrected.

3.02 INSTALLATION

- A. General: Install products as indicated on the Plans, and in accordance with shop Plans and manufacturer's printed instructions, as applicable except where specified otherwise.
- B. Protect installed products until the completion of the Project.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

3.03 LADDERS AND STAIRS

- A. Coordinate anchorages and mounting with other trades.
- B. Do not begin installation until supporting structures are complete and ladder installation will not interfere with supporting structure Work.
- C. Provide hangers and struts required to support the loads imposed.
- D. Perform job site welding and bolting as specified for shop fabrication.
- E. Set ladders, stairs and other members in position and secure to structure as shown.
- F. Install ladders plumb, level and true to line.

3.04 HANDRAILS AND GUARDRAILS

- A. During construction, keep exterior surfaces of handrails and guardrails covered with 0.4 millimeters, minimum, heat shrink polyethylene film.
- B. Do not remove protective film before handrails and guardrails have been accepted by Engineer nor before other Work in proximity of handrails and guardrails has been completed.
- C. Discontinue handrails and guardrails at obstructions.
- D. Provide 1/8-inch diameter weep hole at base of each post.
- E. Where protection is applied for prevention of dissimilar materials electrolysis, make application such that none of the protective material is visible in the completed assembly.

- F. Anchor posts into concrete and concrete block by grouting posts into core drilled holes in concrete, into stainless steel sleeves cast in concrete; or bracket mount to face of concrete surfaces as specified and indicated on the Plans.
- G. Do not cut reinforcing bars in concrete. Where required to fasten guardrail to other construction, fasten as indicated on the Plans.
- H. Make adequate provision for expansion and contraction. Make provisions for removable sections where indicated on the Plans.
- I. Make cable rails a single, unspliced length between posts, or continuous.
- J. Make top rails continuous whenever possible, and attach single, unspliced lengths to 3 posts minimum.
- K. Space attachment brackets as indicated on shop plans or in manufacturer's installation instructions.
- L. Completed installation shall have handrails and railings rigid and free of play at joints and attachments.
- M. Protect handrail and guardrail finish from scratches, gouges, dents, stains, and other damage.
- N. Replace damaged or disfigured handrails and guardrails with new.
- O. Shortly before final acceptance of the Work, and after removal of protective polyethylene film, clean handrails and guardrails with mild detergent or with soap and water.
- P. After cleaning, thoroughly rinse handrails and guardrails and wipe with soft cloth.
- Q. Erect guardrail straight, level, plumb, and true to the positions as indicated on the Plans. Correct deviations from true line of grade which are visible to the eye.

END OF SECTION

SECTION 09 96 00 COATINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Field applied coatings.
 - 2. Coating accessories.
- B. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 01 60 00 Product Requirements.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. SSPC Society for Protective Coatings:
 - 1. SSPC SP1 Solvent Cleaning.
 - 2. SSPC SP2 Hand Tool Cleaning.
 - 3. SSPC SP3 Power Tool Cleaning.
 - 4. SSPC SP5 White Metal Blast Cleaning.
 - 5. SSPC SP6 Commercial Blast Cleaning.
 - 6. SSPC SP7 Brush-Off Blast Cleaning.
 - 7. SSPC SP8 Pickling.
 - 8. SSPC SP10 Near-White Blast Cleaning.
 - 9. SSPC SP 11 Power Tool Cleaning to Bare Metal.
 - 10. SSPC-SP 12 High- and Ultrahigh-Pressure Water Jetting.

1.03 DEFINITIONS

- A. Immersion Service: Surfaces which are or will be -
 - 1. Normally or intermittently underwater.
 - 2. In structures which normally contain water.
 - 3. Below tops of walls of water containing structures.
 - 4. Exposed to corrosive gases.

- B. Exposed Surface: Any metal or concrete surface, indoors or outdoors that is exposed to view.
- C. Dry Film Thickness (DFT): Thickness of fully cured coating, measured in mils.
- D. Volatile Organic Compound: Volatile Organic Compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon.
- E. Paints: Manufacturer's best ready-mixed coatings, except when field catalyzed, with fully ground pigments having soft paste consistency and capable of being readily and uniformly dispersed to complete homogeneous mixture, having good flowing and brushing properties, and capable of drying or curing free of streaks or sags.

1.04 PERFORMANCE REQUIREMENTS

- A. Coating materials for concrete and metal surfaces shall be especially adapted for use in marine environments.
- B. Pigments shall be materials that do not darken, discolor, or fade due to action of seawater or salt spray.

1.05 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00.
- B. Shop Drawings: Include schedule of where and for what use coating materials are proposed in accordance with requirements for Product Data.
- C. Product Data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips.
 - 1. Regulatory Requirements: Submit data concerning the following
 - a. Volatile organic compound limitations.
 - b. Coatings containing lead compounds and PCBs.
 - c. Abrasives and abrasive blast cleaning techniques, and disposal.
- D. Samples: Samples: Include 8 inch square draw-downs or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.
- E. Certificates: Submit in accordance with requirements for Product Data.
- F. Manufacturer's Instructions: Include the following:
 - 1. Special requirements for transportation and storage.
 - 2. Mixing instructions.
 - 3. Shelf Life.
 - 4. Pot life of material.
- 5. Precautions for applications free of defects.
- 6. Surface preparation.
- 7. Method of application.
- 8. Recommended number of coats.
- 9. Recommended thickness of each coat.
- 10. Recommended total thickness.
- 11. Drying time of each coat, including prime coat.
- 12. Required prime coat.
- 13. Compatible and non-compatible prime coats.
- 14. Recommended thinners, when recommended.
- 15. Limits of ambient conditions during and after application.
- 16. Time allowed between coats.
- 17. Required protection from sun, wind and other conditions.
- 18. Touch-up requirements and limitations.
- G. Manufacturer's Field Reports: Submit for Engineers' record only.
- H. Maintenance Data: Submit as specified in Section 01 78 23.
- I. Quality Assurance Submittals:
 - 1. Quality Assurance Plan.
 - 2. Qualifications of coating applicator including list of similar projects.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications:
 - 1. Minimum of 5 years' experience applying specified type or types of coatings under conditions similar to those of the Work.
 - a. Provide qualifications of applicator and references listing five similar projects completed in the past two years.
 - 2. Manufacturer approved applicator when manufacturer has approved applicator program.
- B. Regulatory Requirements: Comply with governing agencies regulations by using coatings that do not exceed permissible volatile organic compound limits and do not contain lead.
- C. Certification: Certify that applicable pigments are resistant to discoloration or deterioration when exposed to hydrogen sulfide and other sewage gases and product data fails to designate coating as "fume resistant".

- D. Field Samples: Paint one complete surface of each color scheme to show colors, finish texture, materials and workmanship. Obtain approval before painting other surfaces. Approved field sample may be part of Work.
- E. Compatibility of Coatings: Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
- F. Services of Coating Manufacturers Representative: Arrange for coating manufacturers' representative to attend pre-installation conferences and to make periodic visits to the project site to provide consultation and inspection services during surface preparation and application of coatings.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products in accordance with Section 01 66 00.
- B. Remove unspecified and unapproved paints from Project site immediately.
- C. Deliver containers with labels identifying the manufacturer's name, brand name, product type, batch number, date of manufacturer, expiration date or shelf life, color, and mixing and reducing instructions.
- Store coatings in well ventilated facility that provides protection from the sun, weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.
- E. Take precautions to prevent fire and spontaneous combustion.

1.08 ENVIRONMENTAL CONDITIONS

- A. Surface Moisture Contents: Do not coat surfaces that exceed manufacturer specified moisture contents, or when not specified by the manufacturer, the following moisture contents:
 - 1. Concrete and Concrete Block: 12 percent.
- B. Do Not Apply Coatings:
 - 1. Under dusty conditions, unless tenting, covers, or other such protection is provided for structures to be coated.
 - 2. When light on surfaces measures less than 15 foot-candles.
 - 3. When ambient or surface temperature is less than 45 degrees Fahrenheit.
 - 4. When relative humidity is higher than 85 percent.
 - 5. When surface temperature is less than 5 degrees Fahrenheit above dew point.
 - 6. When surface temperature exceeds the manufacturer's recommendation.
 - 7. When ambient temperature exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
 - 8. Apply clear finishes at minimum 65 degrees Fahrenheit.

- C. Provide fans, heating devices, dehumidifiers, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
- D. Provide adequate continuous ventilation and sufficient heating facilities to maintain minimum 45 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes.

1.09 PROTECTION

- A. Protect adjacent surfaces from paint and damage. Repair damage resulting from inadequate or unsuitable protection.
- B. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- C. Place cotton waste, cloths and material which may constitute fire hazard in closed metal containers and remove daily from site.
- D. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. Carefully store, clean and replace on completion of painting in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

1.10 EXTRA MATERIALS

- A. Extra Materials: Deliver to City maintenance yard as directed. Include minimum 1 gallon of each type and color of coating applied.
 - 1. Deliver material in containers properly sealed and identified with typed labels indicating brand, type and color.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Special Coatings: One of the following or equal:
 - 1. Carboline: Carboline, St. Louis, MO.
 - 2. Ceilcote: Ceilcote Corrosion Control, Brecksville, OH.
 - 3. Devoe: Devoe Coatings, Louisville, KY.
 - 4. Dudick: Dudick, Inc., Streetsboro, OH.
 - 5. International: International Protective Coatings, Houston, TX.
 - 6. PPG Industries, Pittsburgh, PA.
 - 7. S-W: Sherwin-Williams Co., Cleveland, OH.
 - 8. Tnemec: Tnemec Co., Kansas City, MO.

2.02 PRETREATMENT, PRIMERS, AND PRIMER-SEALERS

- A. Pretreatment, primers, and primer-sealers shall be as specified herein or as recommended by the specific paint manufacturer for each paint system.
- B. Primers and primer-sealers shall be as manufactured by the paint supplier or certified as compatible with the paint system. Colors of prime and intermediate coats shall be compatible with color of top coat.
- C. Surface Cleaner and Degreaser: As manufactured by one of the following or equal:
 - 1. Carboline Surface Cleaner No. 3.
 - 2. Devoe: Devprep 88.

2.03 MIXES

- A. Mix epoxy parts in accordance with manufacturer's instructions.
- B. Mix epoxy in containers furnished by manufacturer for mixing purposes. Mix unit quantities only. Use power mixer for minimum time recommended by manufacturer. Do not include time during pouring or stirring in mixing time.

2.04 COLORS

- A. Final topcoat colors shall be selected by the City from the manufacturer's standard gray color pallet as submitted.
- B. Prime and intermediate coats may be tinted a complementary color to assist in obtaining coverage.

2.05 PAINTING SCHEDULE

- A. For convenience, the coating systems of one manufacturer, Tnemec, are named for reference in addition to the generic painting system name to establish a level of acceptable quality. Substitutions may be made in accordance with this specification.
- B. Provide all necessary preparation, primers, and sealers in conformance with the paint manufacturer's standards, whether specifically called out in the painting schedule or not. It is the Contractor's responsibility to provide a complete system.
- C. Coating Systems
 - 1. Provide the following coating systems by surface application:

Surface	Generic Coating System	Tnemec Reference System	No. Coats and DFT per (mils)
Concrete and	Prep: SSPC-SP13/NACE 6 Clean and Dry		
Concrete Block Units, Exterior Exposed for Graffiti Protection	Prime: RTV Silicone Rubber Water Repellent and Graffiti Protectant	Series 626 Dur A Pell GS	2 (75 ft²/gal)

Surface	Generic Coating System	Tnemec Reference System	No. Coats and DFT per (mils)	
	Prep: SSPC-SP6 (Commercial Blast Cleaning)			
Sheet Piling Exposed to Sunlight, Land Side Only	Prime: Zinc-rich aromatic urethane	Series 90-97 Tneme-Zinc	1 (2.5-3.5)	
	Intermediate: High-build Polyamide Epoxy-Coal Tar	Series N69 High-Build Epoxoline II	2 (8 - 10)	
	Top: Waterborne Acrylic Polyurethane (gloss)	Series 1080 Endura-Shield	1 (2 - 3)	
Handrails/Guardrails	Factory coated per Section 05 50 00			

PART 3 EXECUTION

3.01 GENERAL PROTECTION

- A. Protect adjacent surfaces from coatings and damage. Repair damage resulting from inadequate or unsuitable protection:
- B. Protect adjacent surfaces not to be coated from spatter and droppings with drop cloths and other coverings.
 - 1. Mask off surfaces of items not to be coated or remove items from area.
- C. Furnish sufficient drop cloths, shields and protective equipment to prevent spray or droppings from fouling surfaces not being coated and in particular, surfaces within storage and preparation area.
- D. Place cotton waste, cloths and material which may constitute fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings and fastenings, prior to application of coating operations. Carefully store, clean and replace on completion of coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

3.02 GENERAL PREPARATION

- A. Prepare surfaces in accordance with coating manufacturer's instructions, or when none, the following:
 - 1. Galvanized Surfaces: Remove surface contamination and oils and wash with degreasers. Apply coat of etching type primer.
 - 2. Unprimed Steel and Iron: Remove grease, rust, scale, dirt and dust by wire brushing, sandblasting or other necessary method.
 - 3. Shop Primed Steel: Sand and scrape to remove loose primer and rust. Feather out edges to make touch-up patches inconspicuous. Clean surfaces. Prime bare steel surfaces.

- 4. Mildew: Remove by scrubbing with solution of tri-sodium phosphate and chlorine bleach. Rinse with clean water and allow surface to dry completely.
- B. Protect following surfaces from abrasive blasting by masking, or other means:
 - 1. Threaded portions of valve and gate stems.
 - 2. Machined surfaces for sliding contact.
 - 3. Surfaces to be assembled against gaskets.
 - 4. Surfaces of Shafting on which sprockets are to fit.
 - 5. Surfaces of shafting on which bearings are to fit.
 - 6. Machined surfaces of bronze trim, including those slide gates.
 - 7. Cadmium-plated items except cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment requiring abrasive blasting.
 - 8. Galvanized items, unless scheduled to be coated.
- C. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by entering sand or dust.
- D. Concrete and Concrete Block:
 - 1. Allow new concrete to cure for minimum of 28 days before coating.
 - 2. Clean concrete surfaces of dust, mortar, fins, loose concrete particles, form release materials, oil, and grease. Fill voids so that surface is smooth. Etch or brush-off blast clean in accordance with SSPC SP-7 to provide surface profile similar to 80-grit sandpaper, or as recommended by coating manufacturer.
- E. Ferrous Metal Surfaces:
 - 1. Remove grease and oil in accordance with SSPC SP-1.
 - 2. Remove rust, scale, and welding slag and spatter, and prepare surfaces in accordance with SSPC SP-2 through SP-10.
 - 3. Abrasive blast surfaces prior to coating.
 - 4. When abrasive blasted surfaces rust or discolor before coating, abrasive blast surfaces again to remove rust and discoloration.
 - 5. When metal surfaces are exposed because of coating damage, abrasive blast surfaces before touching-up.
- F. Ferrous Metal Surfaces Not to be Submerged: Abrasive blast in accordance with SSPC SP-6, unless blasting may damage adjacent surfaces, prohibited or specified otherwise. Where not possible to abrasive blast, power tool clean surfaces in accordance with SSPC SP-3.
- G. Ferrous Metal Surfaces to be Submerged: Unless specified otherwise, abrasive blast in accordance with SSPC SP-10 or better to clean and provide roughened surface profile of not less than 2 mils and not more than 4 mils in depth when measured with Elcometer 123, or as recommended by the coating manufacturer.

- H. Sherardized, Aluminum, Copper, and Bronze Surfaces: Prepare in accordance with paint manufacturer's instructions.
- I. Galvanized Surface:
 - 1. Degrease or solvent clean to remove oily residue.
 - 2. Power tool or hand tool clean or whip abrasive blast.
 - 3. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded physically, such as bolts, nuts, or preformed channels.
- J. Shop Primed Metal:
 - 1. Certify that primers applied to metal surfaces in the shop are compatible with coatings to be applied over such primers in the field.
 - 2. Remove shop primer from metal to be submerged by abrasive blasting in accordance with SSPC SP-10, unless greater degree of surface preparation is required by manufacturer of coating system.
 - 3. Correct abraded, scratched or otherwise damaged areas of shop prime coat by sanding or abrasive blasting in accordance with SSPC SP-6.
 - 4. When entire shop priming fails or has weathered excessively, or when recommended by coating manufacturer, abrasive blast shop prime coat to remove entire coat and prepare surface in accordance with SSPC SP-10.
 - 5. When incorrect prime coat is applied, remove incorrect prime coat by abrasive blasting in accordance with SSPC SP-10.
 - 6. When prime coat not authorized by Engineer is applied, remove unauthorized prime coat by abrasive blasting in accordance with SSPC SP-10.
 - 7. Shop Applied Bituminous Paint Asphalt Varnish): Abrasive blast clean shop applied bituminous paint or asphalt varnish from surfaces scheduled to receive non-bituminous coatings.
- K. Abrasive blast cadmium-plated, zinc-plated, or sherardized fasteners in same manner as unprotected metal when used in assembly of equipment designated for abrasive blasting.
- L. Abrasive blast components to be attached to surfaces which cannot be abrasive blasted before components are attached.
- M. Grind sharp edges to approximately 1/8 inch radius.
- N. Remove and grind smooth all excessive weld material and weld spatter before blast cleaning.
- O. Cleaning of Previously Coated Surfaces:
 - 1. Utilize cleaning agent to remove soluble salts such as chlorides and sulfates from concrete and metal surfaces.
 - a. Cleaning Agent: Biodegradable non-flammable and containing no volatile organic compounds.

- b. Manufacturer: Chlor-Rid International, Inc., or accepted equal.
- 2. Cleaning of surfaces utilizing the decontamination cleaning agent may be accomplished in conjunction with abrasive blast cleaning, high pressure, washing, or hand washing as approved by the coating manufacturer's representative and the Engineer.
- 3. Test cleaned surfaces in accordance with the cleaning agent manufacturer's instructions to ensure all soluble salts have been removed. Additional cleaning shall be carried out as necessary.
- 4. Final surface preparation prior to application of new coating system shall be made in strict accordance with coating manufacturer's printed instructions.

3.03 GENERAL APPLICATION REQUIREMENTS

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Coat metal unless specified otherwise.
- C. Verify metal surface preparation immediately before applying coating in accordance with SSPC Pictorial Surface Preparation Standard.
- D. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- E. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
- F. Prime shop primed metal surfaces. Spot prime exposed metal of shop primed surfaces before applying primer over entire surface.
- G. Apply minimum number of specified coats.
- H. Apply coats to thicknesses specified, especially at edges and corners.
- I. Apply additional coats when necessary to achieve specified thicknesses.
- J. Coat surfaces without drops, ridges, waves, holidays, laps, or brush marks.
- K. Remove spatter and droppings after completion of coating.
- L. When multiple coats of same material are specified, tint prime coat and intermediate coats with suitable pigment to distinguish each coat.
- M. Dust coatings between coats. Lightly sand and dust surfaces to receive high gloss finishes, unless instructed otherwise by coating manufacturer.
- N. Apply coating by brush, roller, trowel, or spray, unless particular method of application is required by coating manufacturer's instructions or these Specifications.

- O. Spray Application:
 - 1. Stripe coat edges by brush before beginning spray application, as necessary, to ensure specified coating thickness along edges.
 - 2. When using spray application, apply coating to thickness not greater than that suggested in coating manufacturer's instructions for brush coat application.
 - 3. Use airless spray method, unless air spray method is required by coating manufacturer's instruction or these Specifications.
 - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist or spray.
- P. Drying and Recoating:
 - 1. Provide fans, heating devices, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
 - 2. Limit drying time to that required by these Specifications or coating manufacturer's instructions.
 - 3. Do not allow excessive drying time or exposure which may impair bond between coats.
 - 4. Recoat epoxies within time limits recommended by coating manufacturer.
 - 5. When time limits are exceeded, abrasive blast clean prior to applying another coat.
 - 6. When limitation on time between abrasive blasting and coating cannot be met before attachment of components to surfaces which cannot be abrasive blasted, coat components before attachment.
 - 7. Ensure primer and intermediate coats of coating are unscarred and completely integral at time of application of each succeeding coat.
 - 8. Touch up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
 - 9. Leave no holidays.
 - 10. Sand and recoat scratched, contaminated, or otherwise damaged coating surfaces so damages are invisible to naked eye.
- Q. Concrete and Concrete Block:
 - 1. Apply first coat (primer) only when surface temperature of concrete is decreasing in order to eliminate effects of off-gassing on coating.

3.04 EPOXY AND POLYURETHANE COATING SYSTEM

- A. Preparation:
 - 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Prepare concrete surfaces in accordance with general preparation requirements.

- b. Touch up shop primed steel and miscellaneous iron.
- c. Abrasive blast ferrous metal surfaces at jobsite in accordance with SSPC SP-6, Commercial Blast Cleaning, prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP-6.
- d. Degrease or solvent clean, whip abrasive blast, power tool, or hand tool clean galvanized metal surfaces.
- e. Lightly sand fiberglass and plastic to be coated and wipe clean with dry cloths, or solvent clean in accordance with coating manufacturer's instructions.
- f. Abrasive blast clean ductile iron surfaces in accordance with SSPC SP-7.
- B. Application:
 - 1. Apply coatings in accordance with general application requirements and as follows:
 - 2. Apply 3 coat system consisting of:
 - a. Primer: 4 to 5 mils dry film thickness high solids epoxy primer,
 - b. Intermediate Coat: 4 to 5 mils dry film thickness high solids epoxy intermediate coat, and
 - c. Top Coat: 2.5 to 3.5 mils dry film thickness aliphatic or aliphatic-acrylic polyurethane topcoat.
 - Recoat or apply succeeding epoxy coats within 30 days or within time limits recommended by manufacturer, whichever is shorter. Prepare surfaces for recoating in accordance with manufacturer's instructions.

3.05 CONCRETE COATINGS

- A. Preparation:
 - 1. Prepare surfaces in accordance with general application requirements and in strict a accordance with coating manufacturer's instructions.
 - 2. Verify with the Engineer which concrete surfaces are to be coated.
- B. Application:
 - 1. Apply primer if required by coating manufacturer.
 - 2. Apply one or more coats as recommended by coating manufacturer to receive a minimum total dry film thickness of 25 mils, color as selected by City.

3.06 FIELD QUALITY CONTROL

- A. Each coat will be inspected. Strip and remove defective coats, prepare surfaces and recoat. When approved, apply next coat.
- B. Control and check dry film thicknesses and integrity of coatings.
- C. Measure dry film thickness with calibrated thickness gauge.

- D. Dry film thicknesses may be checked with Elcometer or Positector 2000.
- E. Verify coat integrity with low-voltage holiday detector. Allow Engineer to use detector for additional checking.
- F. Check wet film thickness before coal tar epoxy coating cures on concrete or nonferrous metal substrates.
- G. Arrange for services of Coating manufacturer's field representative to provide periodic field consultation and inspection services to ensure proper surface preparation of facilities and items to be coated, and to ensure proper application and curing.
 - 1. Notify Engineer 24 hours in advance of each visit by Coating Manufacturer's representative.
 - 2. Provide Engineer with a written report by Coating Manufacturer's representative within 48 hours following each visit.

3.07 SCHEDULE OF ITEMS NOT REQUIRING COATING

- A. General: Unless specified otherwise, the following items do not require coating.
 - 1. Items that have received final coat at factory and not listed to receive coating in field.
 - 2. Aluminum, brass, bronze, copper, plastic, rubber, stainless steel, chrome, everdur, or lead.
 - 3. Buried or encased piping or conduit.
 - 4. Exposed exterior concrete.
 - 5. Grease fittings.
 - 6. Steel to be encased in concrete or masonry.

3.08 CLEANING

- A. As work proceeds and upon completion, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of work keep premises free from unnecessary accumulation of tools, equipment, surplus materials and debris.
- C. Upon completion of work leave premises neat and clean.

END OF SECTION

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SECTION 10 14 53 TRAFFIC SIGNAGE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Traffic signage used for vehicular and pedestrian detours and traffic control during the prosecution of Work.
 - 2. Replacement traffic signage that is damaged during the course of construction and will remain at Project completion.
- B. Related Sections:
 - 1. Section 01 30 00 Shop Plans, Product Data and Samples.
 - 2. Section 01 55 00 Traffic Regulation during Construction.

1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. M133 Standard Specification for Preservatives and Pressure Treatment Processes for Timber.
 - 2. M168 Standard Specification for Wood Products.
 - 3. M268 Standard Specification for Retroreflective Sheeting for Flat and Vertical Traffic Control Applications.
 - 4. MASH Manual for Assessing Safety Hardware.
- B. ASTM International:
 - 1. A36 Carbon Structural Steel.
 - 2. A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. A320 Alloy-Steel and Stainless-Steel Bolting for Low-Temperature Service.
 - 4. A499 Steel Bars and Shapes, Carbon Rolled from "T" Rails.
 - 5. A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - 6. A563 Carbon and Alloy Steel Nuts.
 - 7. A653 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 8. A709 Structural Steel for Bridges.
 - 9. A1011 Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

- 10. B209 Aluminum and Aluminum-Alloy Sheet and Plate.
- 11. B221 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- 12. C94 Ready-Mixed Concrete.
- 13. D4956 Retroreflective Sheeting for Traffic Control.
- 14. F436 Hardened Steel Washers.
- 15. F3125 High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength.
- C. United States Federal Highway Administration (FHWA):
 - 1. SHS Standard Highway Signs.
 - 2. MUTCD Manual on Uniform Traffic Control Devices.
- D. State of California Department of Transportation (Caltrans).
 - 1. Sign Specification Updates.
 - 2. MUTCD Manual on Uniform Traffic Control Devices.

1.03 GENERAL

- A. Traffic control signage shall conform to the State of California Manual on Uniform Traffic Control Devices.
- B. Any signs not detailed on the Plans shall be in accordance with the FHWA SHS.

1.04 SUBMITTALS

- A. Product Data:
 - 1. Traffic signposts.
 - 2. FHWA Acceptance Letter.
 - 3. Traffic sign retroreflective sheeting.

B. Samples:

- 1. Flexible posts.
- C. Quality Control Submittals:
 - 1. List of traffic control signs to be used for the Project.
 - 2. Manufacturer and supplier of traffic control signs.
 - 3. Keyed traffic control plan showing location of traffic control signs to be used on the Project, submitted in conformance with Section 01 50 00.

PART 2 PRODUCTS

2.01 TRAFFIC SIGNPOSTS

- A. Signposts located within the clear zone of roads and streets shall be a breakaway or yielding design.
 - Meet the crashworthiness criteria of NCHRP 350 or the Manual for Assessing Safety of Hardware (MASH) or must be shielded by guardrail, barrier, or an energy absorbing system meeting the requirements of NRCRP 350 or AASHTO MASH.
 - 2. FHWA acceptance letters for various breakaway supports for signs are available on the FHWA Safety Program webpage.
- B. Ensure details of signposts are included in the drawings.
- C. Breakaway support anchor posts may extend no more than 100 mm 4 inches above grade to lessen the probability of snagging the undercarriage of a vehicle after a support has broken away from its base.
- D. Extend anchor posts at least 450 mm 18 inches below grade.

2.02 STEEL FLANGED CHANNEL SECTION (U-SHAPE)

- A. Fabricate steel posts from steel conforming to ASTM A36 or ASTM A499 and with a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi.
- B. Punch or drill 5/16- to 3/8-inch diameter holes spaced at 1- or 2-inch centers along the centerline of the web prior to galvanizing for the entire length of the post.
- C. Galvanize posts after punching in accordance with ASTM A123.

2.03 PERFORATED STEEL TUBE

- A. Fabricate steel posts from steel conforming to either ASTM A653 structural steel, Grade 340 50, Class 1, coating designation G90 or ASTM A1011, structural steel, Grade 340 50, hot dip galvanized after punching in accordance with ASTM A123.
- B. Pre-punch holes approximately 7/16-inch in diameter spaced at approximately 1-inch centers along each side of the tube for the entire length of the post.

2.04 STEEL TUBE

- A. Conform to ASTM A500, Grade B or C, and hot-dip galvanized in accordance with ASTM A123.
- B. Manufactured triangular slip bases must be approved by the Federal Highway Administration (FHWA) for use under the provisions of NCHRP 350, TL-2 or AASHTO MASH, TL-2.
 - 1. Submit a copy of the FHWA Acceptance Letter.

2.05 STRUCTURAL STEEL H SECTION

- A. Conform to ASTM A709, Grade 345 50 or 345W 50W.
- B. Galvanize posts, fuse plate and splice plate after fabrication in accordance with ASTM A123.

2.06 SLIP BASE, FUSE PLATE AND SPLICE PLATE

A. Conform to ASTM A36, minimum yield strength 50,000 psi.

2.07 HIGH-STRENGTH BOLTS, NUTS, AND WASHERS

- A. High strength bolts shall conform to ASTM F3125.
- B. Nuts shall conform to ASTM A563.
- C. Washers shall conform to ASTM F436.
- D. High strength bolts, nuts and washers shall be zinc coated.

2.08 WOOD

- A. Wood posts shall be dry No. 1 Grade Douglas fir, southern or Ponderosa pine, hemlock, spruce, or western larch conforming to AASHTO M168, or the State Standard Specifications.
- B. Treat posts with water-borne preservative according to AASHTO M133, AWPA T1, and AWPA U1.

2.09 FLAT ALUMINUM SIGN PANELS.

- A. Aluminum sign panels shall conform to ASTM B209, alloy-temper 6061-T6 or 5052-H38.
- B. The blanks shall be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use.
- C. The thickness shall be uniform and the blank commercially flat.

2.10 EXTRUDED ALUMINUM SIGN PANELS

- A. Extruded aluminum sign panels shall be used for large signs.
- B. Conform to ASTM B221, alloy 6063-T6.
 - 1. The maximum allowable deviation from flat on the face is 0.05 inch per foot.
- C. Aluminum edge molding, if used, shall be in accordance with ASTM A320 or SAE J405d austenitic steel, minimum yield strength of 30,000 psi.

2.11 TRAFFIC SIGN RETROREFLECTIVE SHEETING

- A. All background sheeting applied to flat sheet and extruded panel signs shall be in accordance with ASTM D4956, Type III, IV, VII, VIII, IX or XI retroreflective sheeting and must have Class 1, 3, or 4 adhesive backing.
- B. Retroreflective sheeting shall be high intensity that is an unmetallized micro prismatic reflective material.
- C. Retroreflective sheeting shall have sufficient adhesion, strength and flexibility such that the sheeting can be handled, processed and applied according to the manufacturer's recommendations without appreciable stretching, tearing, cracking or other damage.

2.12 LEGEND AND BORDER

- A. Border Apply retroreflective sheeting as legend and border in accordance with ASTM D4956, Type IX, XI, or AASHTO M268 Type C or D, Class 1.
- B. Retroreflective sheeting shall be an unmetallized cube corner micro-prismatic reflective material.
- C. Retroreflective sheeting applied as legend and border for specific signing applications, without a datum mark on the surface of the sheeting, shall be evaluated for rotational sensitivity in accordance with AASHTO M268, Section 3.3.1 and fabricated in accordance with AASHTO M268, Section 3.3.2.

2.13 SCREEN PRINTED TRANSPARENT COLORED AREAS

A. For screen printed transparent colored areas or transparent colored overlay films on white sheeting, the coefficient of retroreflection (RA) shall be no less than 70 percent of the original values for the corresponding color.

2.14 ADHESIVE PERFORMANCE

- A. Adhesive performance for retroreflective sheeting shall be in accordance with ASTM D4956. The sheeting surface shall be in condition to be readily screen processed and compatible with transparent overlay films, plus recommended transparent and opaque screen process colors.
- B. Furnish manufacturer's information as to the type of solvent or solvents that may be used to clean the surface of the sheeting without detrimental loss of performance and durability.

2.15 LETTERS, NUMERALS, ARROWS, SYMBOLS, AND BORDERS

- A. Apply letters, numerals, arrows, symbols, and borders on the retroreflective sheeting or opaque background of the sign using the direct or reverse screen process.
- B. Apply messages and borders of a color darker than the background to the paint or the retroreflective sheeting using the direct process. Messages and borders shall be

of a color lighter than the sign background and applied using the reverse screen process. Use opaque or transparent colors, inks, and paints of the type and quality recommended by the retroreflective sheeting manufacturer in the screen process.

- C. Perform the screening in a manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use.
- D. Air dry or bake the signs after screening according to the manufacturer's recommendations to provide a smooth hard finish. Reject any signs with blister's or other blemishes.

2.16 DELINEATOR POSTS

- A. **Steel Posts:** Fabricate posts from steel conforming to ASTM A36 or ASTM A499 and having a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi. Galvanize posts after punching in accordance with ASTM A123/
- B. **Flexible Posts:** Provide one-piece driveable flexible posts. Posts must be impactresistant, integrally colored (orange) UV stabilized polymer or polycarbonate extrusion or fiberglass reinforced composite material. Other materials are subject to approval by the Engineer. Include a retroreflective sheeting plate with each post as indicated.

2.17 DELINEATOR RETROREFLECTORS

- A. **Circular Prismatic Reflectors:** Retroreflectors attached to steel posts shall be a 3inch minimum diameter acrylic plastic lens with prismatic optical elements and a smooth, clear, transparent face.
 - 1. Fabricate the back from similar material and fuse to the lens around the entire perimeter to form a homogeneous unit.
 - 2. Permanently seal the units against the intrusion of dust, water, or air.
 - 3. Mount the retroreflector unit in a housing fabricated from 0.063-inch aluminum alloy or similar, or from cold-rolled, hot dip, galvanized steel, having a thickness of 0.064 inches.
 - 4. Provide the indicated color.
- B. **Retroreflective Sheeting:** A retroreflective sheeting plate shall be applied to each flexible post by the post manufacturer and must be in accordance with ASTM D4956, Type III, IV, V, VII, VIII, IX or XI retroreflective sheeting.
 - 1. Retroreflective sheeting shall be high intensity that is an unmetallized cube corner micro prismatic reflective material.
 - 2. Provide the size and color of the retroreflective sheeting plate as indicated.

2.18 HARDWARE

- A. Bolts, nuts, post clips, lock and flat washers shall be either aluminum alloy or commercial quality stainless steel, hot dip galvanized or cadmium plated after fabrication.
- B. Bolts and nuts shall be an approved tamper resistant design.
- C. Provide fiber washers of commercial quality.

2.19 CONCRETE

- A. ASTM C94, using ³/₄-inch maximum aggregate.
- B. Minimum compressive strength of 3,000 psi at 28 days.

PART 3 EXECUTION

3.01 SIGNPOSTS

- A. Drive steel sign base posts with a suitable driving head.
- B. Attach signposts to base posts.
- C. Replace any base posts damaged during driving or otherwise at no additional cost to the City.

3.02 STRUCTURAL STEEL H SECTION POSTS

- A. Tighten all breakaway assembly bolts in a systematic manner to the prescribed torque indicated on the State Standard Plans.
- B. Loosen each breakaway assembly bolt and re-tighten to the required torque in the same order as the initial tightening.
- C. Burr the threads at the nut using a center punch to prevent the nut from loosening.
- D. Tighten nuts on hinge plate bolts to the required minimum bolt tension values indicated.

3.03 WOOD

A. Drill holes in the post as indicated by the State Standard Plans.

3.04 SIGN PANELS

A. Clean, degrease and etch the face of metal panels using methods recommended by the retroreflective sheeting manufacturer.

- B. After cleaning and degreasing, apply retroreflective sheeting material to the sign panels as recommended by the manufacturer. Perform shearing, cutting and punching prior to preparing the blanks for application of reflective material.
- C. Do not field drill holes in any part of the panel.
- D. Use nylon washers recommended by the sign sheeting manufacturer between the bolt heads and sign faces on flat sheet aluminum signs.
- E. Replace any damaged sign panels at no additional cost to the City.

3.05 DELINEATORS

- A. Drive steel delineator posts into the ground in a manner that will not damage the post.
- B. Attach flexible delineator posts to steel anchors or drive into the soil in accordance with the manufacturer's instructions.

3.06 LOCATION AND POSITION OF SIGNS

- A. Locate and erect all signs in accordance with the traffic control plans prepared by the Contractor and MUTCD.
- B. Vertically mount signs at right angles to the direction of, and facing, the traffic that they are intended to serve. Where mirror reflection from the sign face is encountered to such a degree as to reduce legibility, turn the sign slightly away from the road.
- C. Turn signs that are placed 30 feet or more from the pavement edge toward the road.
- D. On curved alignments, determine the angle of placement by the direction of approaching traffic rather than by the roadway edge at the point where the sign is located.
- E. Mount signs on traffic signal posts with strap or clamp type sign supports.

END OF SECTION

SECTION 10 14 56 TRAIL SIGNS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the provision and installation of trail signs as shown on the Plans and as specified in this Section. The Work includes all miscellaneous hardware, foundations, footings and miscellaneous appurtenances associated with the installation.
- B. Related Work includes but is not limited to:
 - 1. Site Concrete

1.03 STANDARDS

- A. CCR Title 24 Part 2 (California Building Code Section 11B-703 all relevant subsections), latest edition.
- B. CALTRANS Standard Specifications for materials and installations, latest edition.
- C. Applicable ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including:
 - 1. A653 Specification for Steel Sheet, Zinc-Coated or Zinc-Iron Alloy-Coated by the Hot-Dip Process
 - 2. D4596 Specification for Retroreflective Sheeting for Traffic Control
 - 3. F1043 Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
 - 4. F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structure

1.04 SUBMITTALS

- A. Documentation:
 - 1. Materials data for signs
 - 2. Full-size and full-color artwork for each custom sign

PART 2 - PRODUCTS

2.01 POST MOUNTED SIGNS

A. Custom Signs:

- 1. Bay Trail Sign, 12"x12", 3-color, 12-ga (0.080") aluminum, pre-drilled with (2) holes for 3/8" bolts. Sign graphic per the Plans.
- 2. Foster City Logo Sign, 12"x12" Reflective Black on white reflective background, 12-ga (0.080") aluminum, pre-drilled with (4) holes for 3/8" bolts. Sign graphic per the Plans.
- 3. Speed Limit Sign, 12"x12", Black & Red text on reflective yellow background, 12-ga (0.080") aluminum, pre-drilled with (2) holes for 3/8" bolts. Sign graphic per the Plans.
- 4. Keep Left / Right Sign, 12"x12" Reflective Black on white reflective background, 12-ga (0.080") aluminum, pre-drilled with (2) holes for 3/8" bolts. Sign graphic per the Plans.
- 5. Mile Marker Sign, 12"x8" Black text on reflective yellow background, 12-ga (0.080") aluminum, pre-drilled with (2) holes for 3/8" bolts. Sign graphic per the Plans. Each sign is unique.
- 6. Half-mile Marker Sign, 12"x8" Black text on reflective yellow background, 12ga (0.080") aluminum, pre-drilled with (2) holes for 3/8" bolts. Sign graphic per the Plans. Each sign is unique.
- B. Other Signs:
 - 1. City Limit Sign: Existing 18"x24" sign to be salvaged and reinstalled.

2.02 ATTACHMENT HARDWARE

A. Fittings: Stainless Steel, 316 grade, tamper-resistant button head machine screws with 316 grade tamper-resistant nuts.

2.03 POST & SETTING MATERIALS

- A. Posts: Steel tube, ASTM A500, hot-dipped galvanized, wall thickness as shown on the Plans.
- B. Setting Materials: As shown on the Plans and per specification section Site Concrete.

PART 3 - EXECUTION

3.01 GENERAL

- A. Locate all signs as shown on the Plans. Make adjustments as approved by the Owners Representative. Review all sign locations prior to proceeding with any installation.
- B. Install all embedded sign posts in concrete paving areas prior to the concrete pour. Schedule the receiving of equipment in conjunction with the concrete pour. Any block outs of concrete pour due to scheduling conflicts shall be approved by the Owners Representative and at no additional cost to the Owner. Finish of any block out areas shall match adjacent paving.

3.02 INSTALLATION

- A. Signs: install signs as shown on the Plans and as approved in the field by the Owner's Representative.
 - 1. Minimum vertical clearance to bottom edge of sign in paved areas shall be 80" and in non-paved areas shall be 60".

3.03 CLEAN-UP

A. After completion of all operations, remove all excess soil, trash, and other debris. Clean all walks, walls, and pavement, leaving the entire area in a neat, orderly condition.

END OF SECTION

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SECTION 10 71 19 FLOOD BARRIERS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes automatically activated flood barrier systems.
- B. Related Sections:
 - 1. Section 01 30 30 Shop Drawings, Product Data and Samples.
 - 2. Section 01 60 00 Product Requirements.
 - 3. Section 03 30 00 Cast-in-Place Concrete.

1.02 REFERENCES

- A. The Aluminum Association Aluminum Design Manual.
- B. ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- C. ASTM A240/240M Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- D. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- E. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
- F. AWS American Welding Society.
- G. FEMA Federal Emergency Management Agency.

1.03 DEFINITIONS

A. Mitigation Height: The elevation of the adjacent flood wall minus the elevation at which the flood barrier is installed.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

C. Shop Drawings: Submit plan, section, elevation, and perspective drawings as necessary to depict proper placement, installation and operation methods for each gate to be installed.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section shall be supplied by a single manufacturer with a minimum of 5 years' experience in design and manufacturer of passive flood barrier systems and evidence of a minimum of 25 projects.
- B. Installer Qualifications: All Work listed in this section is to be installed by a contractor approved by the flood barrier manufacturer. A manufacturer's representative must be on-site during gate installation to provide advisory services.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Engineer.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Engineer.
 - 3. Refinish mock-up area as required by Engineer to produce acceptable Work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with Section 01 35 29.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. At project closeout, provide to City an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: FloodBreak Automatic Floodgates, which is located at: 2800 Post Oak Blvd. Suite 5850; Houston, TX 77056; Tel: 713-980-6610; Fax: 713-629-9936; Email: info@floodbreak.com; Web: www.floodbreak.com.

- B. Substitutions: Substitutions are allowed so long as all other requirements of the specification are met by the substitute bidder.
 - 1. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.02 APPLICATIONS/SCOPE

- A. Provide a means of passively protecting human and property assets subject to damage during a flood caused by external forces.
- B. Passive shall mean that the gate functions without human intervention or power to make the gate deploy and drain.

2.03 DESIGN REQUIREMENTS

- A. Design gate height based on the Mitigation Height at the location of the gate as shown on the Plans.
- B. Design the gate to allow safe passage of vehicular and human traffic while in its dry or "closed" position.
- C. Design the gate to hinder the passage of floodwater and resist hydrostatic and hydrodynamic pressures while in its operating or "open" position.
- D. Gates shall be designed as vehicular gates. While the gate is in the "closed" position, it shall be able to sustain traffic loads corresponding to AASHTO HS-25 (40 ton) truck.
- E. Design the gate to exclude the use of any electric or mechanical powered support equipment, springs, or pumps, for any operation of the gate to its open or closed position in passive mode.
- F. Design that the actual gate installation "set-down" below surface grade is a maximum of 12 inches. Gate shall anchor into its structural foundation.
- G. Design the gate system using only aluminum and stainless-steel components to resist corrosion and EPDM rubber gaskets.

2.04 COMPONENTS

- A. Concrete: In conformance with Section 03 30 00 of these Specifications.
- B. Pan:
 - 1. Material: ¼-inch (6mm) smooth plate Grade 5052 Aluminum.
 - 2. Minimum Yield (F_y): 25.8 ksi.
- C. Pan Support Tubing:
 - 1. Material: ¹/₄-inch (6mm) structural 2-inch by 2-inch (51mm x 51mm) square extrusions Grade 6063-T6 Aluminum.

- 2. Minimum Yield (F_y): 25 ksi.
- D. Pan Inlet Grate:
 - 1. All grates shall be rated for vehicular load: 3/8-inch by 1-inch (10mm x 25mm) flat aluminum bar spaced 3/8 inch (10mm).
- E. Gaskets: 3/16-inch (4.8mm) EPDM rubber.
- F. Lid:
 - 1. Material: 5" x 2¹/₂" x 1/8" (127mm x 63mm x 3mm) 1-6005-T5 aluminum extrusion.
 - 2. Minimum yield $(F_y) = 35$ ksi.
- G. Lid Stiffener Tubing:
 - 1. Material: 2-inch by 2-inch by ¹/₄-inch (51mm x 51mm x 6mm) square tubes, Grade 6063-T6 aluminum.
 - 2. Minimum yield $(F_y) = 25$ ksi.
- H. Pan and Lid Yoke Plates:
 - 1. Material: ¹/₂-inch (12mm) plate Grade 5052 Aluminum.
 - 2. Minimum Yield (F_y): 25.8 ksi.
- I. Gasket Flanges:
 - 1. Material: ¹/₄-inch (6mm) 6061-T6 aluminum.
 - 2. Minimum Yield (F_y): 35 ksi.
- J. Retention Arm:
 - 1. Material: 1¹/₂ inch by ¹/₂-inch (38mm x 13mm) 6061-T6 Aluminum flat stock.
 - 2. Minimum Yield (Fy): 35 ksi.
- K. Structural Angles:
 - 1. Material: ¼-inch (6mm) structural 2-inch by 2-inch (51mm x 51mm) angles 6061-T6 aluminum.
 - 2. Minimum Yield (Fy): 35 ksi.
- L. Hardware:
 - 1. Concrete Anchor Bolts:
 - a. Material: ½-inch (13mm) diameter ASTM F593 Grade 316 Stainless Steel.
 - b. Minimum Yield (F_y): 50 ksi.
 - 2. Hinge Pins:
 - a. Material: ½- inch (13mm) diameter ASTM F593 Grade 316 Stainless Steel.
 - b. Minimum Yield (F_y): 50 ksi.

- 3. Bolts:
 - a. Material: Countersunk ASTM F593 Grade 316 Stainless Steel bolts. Bolt diameter as noted on the fabrication drawings.
 - b. Minimum Yield (F_y): 50 ksi.
- 4. Retention Arm Anchors:
 - a. Material: ¹/₂-inch (13mm) ASTM F593 Grade 316 Stainless Steel.
 - b. Minimum Yield (F_y): 50 ksi.
- M. Welding Wire: Aluminum Wire ER 4043 AWS A5.10

2.05 FABRICATION

- A. General Requirements:
 - 1. Fabricate all components and elements following the standards, tolerances and guidelines noted in the fabrication drawings.
 - 2. All welding to be performed by a certified welder in accordance with AWS standards and guidelines.
 - 3. Tighten all bolts to torque specifications determined by the manufacturer and Engineer of record.
- B. Concrete: Encapsulate pan and extending bars in a monolithic concrete pour with a depth of no less than 11 inches (280mm) and extending a lateral distance from the pan no less than 12 inches (305mm) in any direction.
- C. Pan:
 - 1. Fabricate pan to include a drainage trough running parallel to and for the entire length of the gate at the approximate centerline of the pan. Trough will have a depth of 2 inches (51mm) and a width of 6 inches (152mm).
- D. Drainage: Connect 4-inch (102mm) diameter drain to the drainage trough centered within the pan in all directions.
- E. Gate:
 - 1. At panel joints, stitch weld every 5 inches (127mm) on center with a 3/16-inch fillet weld 3 inches (76mm) long.
 - 2. At panel splices, place splice flanges within 12 inches (305mm) of adjacent retention arms.
- F. Hinges and Anchors:
 - 1. Seam-weld retention arm brackets to gate and pan. Include stiffener plates on each side.
 - 2. Attach retention arm anchors through pan and into concrete with ½-inch (13mm) diameter anchor bolts.
- G. Wiper Wall: Manufacturer to provide 3/8-inch (10mm) aluminum wiper wall to maintain contact with gate seal and protective gaskets at all points of operation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 93 00 SITE FURNISHINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the provision and installation of Site Furnishings as shown on the Plans and as specified in this Section. The Work includes all miscellaneous hardware, foundations, footings and miscellaneous appurtenances associated with the installation. Items to be installed include:
 - 1. Bench
 - 2. Donor Bench
 - 3. Picnic Table
 - 4. Trash Receptacle
 - 5. Recycling Receptacle
 - 6. Pet Litter Station
 - 7. Bicycle Rack
 - 8. Bicycle Repair Station
 - 9. Information Kiosk
 - 10. Solar Bollard Light
- B. Related Work includes but is not limited to:
 - 1. Site Concrete

1.03 STANDARDS

- A. Unless otherwise shown or specified, all materials and methods shall conform to the appropriate current sections of: he State of California Department of Transportation (CALTRANS) Standard Specifications, latest edition, except for measurement and payment requirements.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including:
 - 1. C1107 Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- C. Applicable ISO Testing Standards (latest revisions) as they apply to this Work.

1.04 SUBMITTALS

A. Documentation: product data for all standard site furnishings and accessories. Include material descriptions, recycled content, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details as applicable.

- B. Samples: manufacturer's sample chips of all finishes and colors specified.
- C. Shop Drawings: for all custom site furnishings and accessories. Show all locations, markings, quantities, materials, sizes, and shapes and indicate all methods of connecting, anchoring, fastening, bracing, and attaching to the Work of other trades. Revise and resubmit if required per review by the Owner's Representative.
- D. Maintenance Data: At Substantial Completion submit maintenance information for site furnishings and accessories where applicable for inclusion in the Owner's maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Instructions: Materials, products, processes, equipment or the like shall be installed or applied in strict accordance with printed instructions furnished by the manufacturer of the material for use under conditions similar to those at the job site.
- B. Perform all Work in accordance with all applicable State and local laws, codes and regulations.

1.06 DELIVERY, STORAGE & HANDLING

- A. Delivery & Handling: Transport, store and handle precast units and manufactured items in a manner to avoid hairline cracks, staining or other damage.
- B. Storage & Protection: Store units free of the ground and protected from mud or rain splashes. Cover units, secure covers firmly, and protect the units from dust, dirt or other staining material.

PART 2 - PRODUCTS

2.01 GENERAL

A. Trash & Recycling receptacles: Labeling as approved by the Owner.

2.02 FURNISHINGS

- A. Bench
 - 1. As shown on the Site Furnishings Legend
- B. Donor Bench
 - 1. As shown on the Site Furnishings Legend
 - 2. Donor Plaque, info to be provided by the Owner, each Plaque is unique.

C. Picnic Table

- 1. As shown on the Site Furnishings Legend
- D. Trash Receptacle
 - 1. As shown on the Site Furnishings Legend
 - 2. Owner may elect to have the flap removed by the Contractor on site.

- E. Recycling Receptacle
 - 1. As shown on the Site Furnishings Legend
 - 2. Owner may elect to have the flap removed by the Contractor on site.
- F. Pet Litter Station
 - 1. As shown on the Site Furnishings Legend
- G. Bike Rack
 - 1. As shown on the Site Furnishings Legend
- H. Bicycle Repair Station
 - 1. As shown on the Site Furnishings Legend
- I. Information Kiosk
 - 1. As shown on the Site Furnishings Legend
 - 2. All Bulletin Cases are to have the same master key
- J. Solar Bollard Light
 - 1. As shown on the Site Furnishings Legend
 - 2. Provide Security Fasteners, Pre-Ship Anchor Bolts

2.03 FITTINGS

- A. Anchors, Fasteners, Fittings, and Hardware: Stainless steel or noncorrodible materials; commercial quality; tamperproof, vandal and theft resistant; concealed, recessed, and capped or plugged. Provide as required for site furnishings' assembly, mounting, and secure attachment.
 - 1. Angle Anchors: For inconspicuously bolting legs of site furnishings to ongrade substrate; as indicated in the manufacturer's installation instructions.
 - 2. At pavers, use paver extenders to attach furnishings to concrete sub-slab or footing below pavers.
- B. Grout: Premixed, factory-packaged, non-shrink, non-staining, non-metallic grout complying with ASTM C1107. Provide grout as recommended by furnishings manufacturer for exterior applications. Color to match substrate being attached to.
- C. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with potable water at project site to create pourable anchoring, patching, and grouting compound. Formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by furnishings manufacturer for exterior applications.

PART 3 - EXECUTION

3.01 GENERAL

A. Pre-measure: Measure installed features of the project critical to the correct off-site fabrication of custom furnishings.

- B. Work Conditions: Examine areas and conditions for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Review and Adjustment: Locate all site furnishings as shown on the Plans. Review all site furnishing locations with the Owner's Representative prior to proceeding with any installation. Adjust as approved by the Owner's Representative.
- D. Install all embedded site furnishings in concrete paving areas prior to the concrete pour. Schedule the receiving of equipment in conjunction with the concrete pour. Any block outs of concrete pour due to scheduling conflicts shall be approved by the Owners Representative and at no additional cost to the Owner. Finish of any block out areas shall match adjacent paving.
 - 1. Furnishings damaged due to the concrete pour shall be replaced at the discretion and to the satisfaction of the Owners Representative, and not repaired or cleaned.

3.02 INSTALLATION

- A. General: install site furnishings as shown on the Plans and as specified herein.
- B. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- C. Install site furnishings level, plumb, true, and securely anchored. Provide spacers under furniture to level as acceptable to Owner's Representative.
- D. Cast-in place posts: Set cast-in-place support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
- E. Posts Set into Voids in Concrete or sleeves: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and maximum 3/4 inch larger than outer diameter of post, or use steel pipe sleeves preset and anchored into concrete for installing posts. Clean holes of loose material, insert posts, and fill annular space between post and concrete or sleeve with specified grout mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

3.03 CLEAN-UP

A. After completion of all operations, remove all excess soil, trash, and other debris. Clean all walks, walls, and pavement, leaving the entire area in a neat, orderly condition.

3.04 CLOSEOUT SUBMITTALS

A. Maintenance Data: cleaning and maintenance information for site furnishings and accessories.

END OF SECTION

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SECTION 13 11 30 CORROSION MONITORING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes Corrosion Test Stations (CTS) as shown on the Plans.
- B. The Contractor shall furnish all materials, install all equipment, and provide all labor necessary to complete the work shown on the drawings and/or listed below and all other Work and miscellaneous items not specifically mentioned but reasonably inferred, including all accessories and appurtenances required for a complete system.
 - 1. The intent of this specification is to provide for complete, functional corrosion monitoring systems for the steel sheet pile wall.
 - 2. The monitoring system shall consist of weight loss coupons and electrical resistance (ER) probes.
- C. The Work may include any or all of the following for the afore-mentioned structures:
 - 1. Trenching, drilling and other excavation including cleanup and restoration of surfaces.
 - 2. Installation of probes, coupons, conduits, cables, junction boxes and test stations.
 - 3. Drilling, installation of monitoring wells, and associated conduits.
 - 4. Backfill and compaction of backfill.
 - 5. Provide shop drawings, reports, permits, and obtain Engineer's approval where required.
 - 6. Correction of all deficiencies.
- D. The Work shall include the provision of all materials, equipment, and apparatus not specifically mentioned herein or noted on the plans, but which are necessary to complete the Work specified.

1.02 RELATED SECTIONS

- A. Section 01 30 00 Shop Plans, Product Data and Samples.
- B. Section 01 60 00 Product Requirements.
- C. Section 01 61 00 Warranties and Guarantees.

1.03 CODES AND REGULATIONS

- A. All materials, workmanship, and installation shall conform to all requirements of the legally constituted authority having jurisdiction. These authorities include, but are not limited to:
 - 1. State of California, Department of Industrial Relations.
 - 2. The National Electric Code.
 - 3. General Construction Safety Orders of the Industrial Accident Commission.
 - 4. Division of Industrial Safety Orders of the Industrial Accident Commission.
 - 5. All other applicable State, County, or City codes and regulations.
- B. Nothing in the Plans or Specifications shall be construed to permit Work not conforming to these regulations and codes.
 - 1. Where larger size or better grade materials than required by these regulations and codes are specified, the Specifications and Plans shall have precedence.
- C. Work shall be conducted by approved qualified personnel in a proper and workman like manner and shall conform to all codes and requirements mentioned herein and in accordance with the industry standards.
- D. All material and construction Work shall be carried out in conformity with the various applicable local, company, state, national or international standards, including but limited to the following:
 - National Association of Corrosion Engineers (NACE) SP-01-69 (Rev. 2007) -Recommended Practice, Control of External Corrosion of Underground and Submerged Metallic Piping Systems.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A34 Practice for Procurement, Testing and Sampling of Magnetic Materials.
 - b. C94 Ready-mixed Concrete.
 - c. D1248 Polyethylene Plastics, Molding and Extrusion Materials.
 - 3. National Electrical Manufacturers Association (NEMA):
 - a. 1-10 Type 3R and 4X Enclosures.
 - b. TC-2 Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80).
 - 4. Military Specification (Mil. Spec.)
 - 5. American National Standards Institute (ANSI) C80.1 Rigid Steel Conduit, Zinc-Coated.
 - 6. IEEE: Regulation for electrical installation.
 - 7. NFPA 70: National Fire Protection Code.
 - 8. NEC: National Electrical Code.

- 9. Underwriter's Laboratories, Inc. (U.L.):
 - a. 6 Rigid Metallic Conduit.
 - b. 83 Thermoplastic Insulated Wire.
 - c. 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.
 - d. 489 Molded Case Circuit Breakers and Circuit Breaker Enclosures.
 - e. 510 Insulating Tape.
 - f. 514A Outlet Boxes and Fittings.

1.04 PRODUCT QUALITY

A. The material and equipment furnished under these specifications shall be standard products from manufacturers regularly engaged in the manufacture of such products and shall be the manufacturer's latest standard design that complies with the specification requirements.

1.05 SUBMITTALS

- A. Submittals shall be furnished in accordance with Section 01 33 00.
- B. The Contractor shall submit a complete list of equipment and material, including name and manufacturer, catalog number, size, finish and any other pertinent data necessary for proper identification and to determine conformance with specifications for the following:
 - 1. Weight loss coupons.
 - 2. ER Probes with associated cables.
 - 3. Stainless steel conduits & fittings.
 - 4. PVC conduits & fittings.
 - 5. Junction Boxes.

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials shall conform to the requirements set forth herein or as designated on the Plans, unless otherwise specified.
- B. All materials shall be new, free from defects, and shall be of the best commercial quality for the purpose specified.
- C. The Contractor shall furnish all necessary items and accessories not shown on the drawings or specified herein, but which are required to fully carry out the specified intent of the Work, without additional cost to the City.

2.02 WEIGHT LOSS COUPONS

A. The weight loss coupons shall be flat coupons size 1" X 2" X 1/16" made of carbon steel, with a 3/16" hole, ¼" from one side.

- B. The coupons shall be weighed in an electronic balance and individually packaged with vapor phase inhibitor during transportation. Each coupon shall have a serial number embossed and the weight of each coupon shall be provided.
- C. Subject to Compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Metal Samples Part No. CO101.
 - 2. Approved equal.

2.03 ER PROBES

- A. The ER probes shall be designed for heavy duty service conditions for underground/underwater use.
 - 1. It shall have a cylindrical element with a 50-mil thickness carbon steel cylinder.
 - 2. The cable shall be installed in the factory and shall be have a high-density polyethylene jacket rated for direct burial.
 - 3. The cable length shall be adequate so that the preassembled connector can be installed in the junction box on top of the ER test station.
- B. Subject to Compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Metal Samples Part No. AP 40-50-375-20.
 - 2. Approved equal.

2.04 STAINLESS STEEL CONDUIT

- A. The conduits shall be of Alloy 316 and shall have UL certification.
- B. Conduit shall conform to ICEA NEMA S 61 402.
- C. Subject to Compliance with the Contract Documents the following manufacturers are acceptable:
 - 1. Calbrite Part No. S62010CT00.
 - 2. Approved equal.

2.05 RIGID PVC CONDUIT AND FITTINGS

A. Rigid polyvinylchloride (PVC) conduit and fittings shall be Schedule 80, manufactured to NEMA TC-2 and WC-1094 specifications and shall be U.L. approved.

2.06 JUNCTION BOXES

A. Junction boxes shall be rated NEMA 4X, stainless steel 316, 14-gauge waterproof enclosures.

B. Boxes shall have a cover with a continuous stainless-steel hinge and shall be suitable for padlocking.

PART 3 EXECUTION

3.01 COORDINATION

- A. Contractor shall coordinate and properly relate this Work to the Site and to the Work of all trades.
- B. The general locations of the facilities are shown on the Plans. However, the Contractor shall visit the premises and thoroughly familiarize himself with all details of the Work and working conditions, verify existing conditions in the field, determine the exact locations of existing pipelines and structures and advise the Engineer of any discrepancy that may prevent or hinder the specified Work from being completed.
- C. The Contractor shall be solely responsible for location and marking underground structures to avoid damage during construction.
- D. Prior to commencing construction of monitoring wells, the Contractor shall obtain all necessary permits not already in the City's possession.

3.02 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements. If warehouse storage cannot be provided, materials and equipment shall be stacked well above ground level and protected from the elements with plastic sheeting or other method as appropriate.

3.03 WORKMANSHIP AND SAFETY

- A. All materials, workmanship and installation shall conform to all requirements of the legally constituted authority having jurisdiction. These authorities include, but are not limited to, the latest revision of the State of California, Department of Industrial Relations, Division of Industrial Safety, Electrical Orders; The National Electric Code, General Construction Safety Orders of the Industrial Accident Commission; and all other applicable Federal, State, County, or City codes and regulations.
- B. Nothing in the drawings or specifications is to be construed to permit Work not conforming to the applicable regulations and codes.
- C. Compaction of backfill and trenches shall match the existing conditions and shall be approved by the Engineer.
- D. Qualification of Workmen: Provide enough skilled workmen and supervisors who shall always be present during execution of the portion of the Work involved and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

E. No excavation/holes shall be left overnight. When necessary, trench plates shall be utilized to cover any such excavations/holes.

3.04 CONDUIT AND PROBE INSTALLATION

- A. The conduit for the various monitoring systems shall be installed in water, riprap, rock, sand, and soil as shown in the drawings depending on the site conditions.
- B. The probe installation may require deep excavations and/or diver assistance so as to access the lower portions of the sheet piles. Dewatering may also be necessary.
- C. All probes shall be installed in accordance with the probe manufacturer's instructions.

3.05 SYSTEM COMMISIONING

- A. After installation of the corrosion monitoring system, the system shall be tested, and adjusted by the City's Corrosion Engineer to assure conformance with the Specifications.
- B. Testing shall include a determination of proper installation of each component, functional testing of all probes and cables.
- C. Upon completion of tests, a detailed report shall be submitted describing any deficiencies detected.
- D. All deficiencies shall be corrected by the Contractor and Site conditions restored prior to final acceptance.
- E. All retesting shall be at the Contractor's expense.

END OF SECTION

SECTION 13 31 16 SHADE STRUCTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of a Shade Structure as shown on the Plans and as specified in this Section. The Work includes:
 - 1. Shade structure footings
 - 2. Removable fabric roofing with vandal-resistant bolts and tools.
 - 3. Associated hardware / appurtenances
- B. Related Work:
 - 1. Earthwork and Grading
 - 2. Site Concrete

1.03 STANDARDS

- A. Engineering wind data: Structures shall be engineered to meet or exceed the requirements of the International Building Code (IBC) latest edition, and the following standard specifications:
 - 1. Wind Speed(Frame only): 150 m.p.h.
 - 2. Wind Speed (Frame w/canopy): 90 m.p.h.
- B. Engineering seismic data: Structures shall be engineered to meet or exceed the seismic requirements of the California Building Code.
- C. Steel: All steel members shall be designed according to the "American Institute of Steel Construction (AISC) specifications and the American Iron and Steel Institute (AISI) specifications for cold formed members.
- D. Fabric flammability: Shade Fabric shall be treated with fire retardants, and pass the flammability requirements established under the following protocols:
 - 1. NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films, Test Method 2.
 - California Code of Regulations (CCR) Title 19 Section 1237 Fire Resistance (Small Scale Test)
- E. Applicable ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including
 - 1. D1777 Test Method for Thickness of Textile Materials
 - 2. D3774 Test Method for Width of Textile Fabric
 - 3. D3776 Test Methods for Mass Per Unit Area (Weight) of Fabric
 - 4. E84 Test Method for Surface Burning Characteristics of Building Materials

- F. Applicable ISO Testing Standards (latest revisions) as they apply to this Work.
- G. Local Standards: Shade Structure shall be manufactured and installed in accordance with all applicable laws.
 - 1. Reference to "Standard Specifications" shall mean the current standards set forth by the City, Standard Specifications, UBC and all codes adopted by the City.

1.04 QUALITY CONTROL

- A. Manufacturer qualification: Manufacturer shall have fabricated similar structures to that which is specified. Provide photo documentation of at least three (3) such installations.
- B. Bid-Submittals: furnish a list and clarification of deviations from this specification. Those bidders not providing a list of deviations will be deemed to have bid exactly in accordance with these specifications.
- C. Warranty: Manufacturer shall warrant all materials and workmanship for a period of five (5) years from date of acceptance by the Owners Representative. Manufacturer shall repair or replace any part found to be defective upon written notice to the Manufacturer by the Owners Representative.
- D. Fabric Warranty: materials shall not degrade or show serious evidence of material breakdown as a result of exposure to normal ultra-violet (UV) light for a period of ten (10) years from the date of purchase.

1.05 COORDINATION

- A. Permits and Fees: Obtain all non-City licenses, permits and fees required to carry on and complete Work included in Plans and Specifications.
 - 1. Arrange for all inspections and approval that are required by public agencies having jurisdiction over Work herein.
- B. Site Coordination: Relocate as directed by the Owners Representative all material, equipment, and apparatus which are placed and which result in interference with other installations.

1.06 SUBMITTALS & SAMPLES

- A. Shop Drawings: All Shop Drawings including the concrete foundation / footings and steel structure.
 - 1. Shop Drawings shall be created, stamped, and signed by a Structural Engineer licensed in the State of California.
- B. Product Data: Complete product data on fabric, fastening system, and all related accessories.
- C. Mill Certificates: Mill test reports certifying that reinforcing bars for concrete Work conform to the Structural Engineer's Shop Drawing Specifications and reveal the chemical composition of the reinforcing bar and mechanical properties.

- D. Fabric flammability Tests:
 - 1. California State Fire Marshal (CSFM) certificate (must be current) for Registered Flame-Resistant Product
 - 2. Certificate by independent and qualified testing laboratory for fabric tested under NFPA 701 Test Method 2.
- E. Samples: 6"x6" sample of the proposed roof fabric to be used, in final color. Submit a color chip of the final color to be used on the poles.
- F. Delivery Certification: Material, equipment, and apparatus may be taken from stock, but submission shall be included in manufacturer's identification and statements indicating conformation with specified Codes, Regulation, Standards, referenced Specification, and requirements specified herein.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Material, delivery, storage and handling: Furnish and install all new material, equipment, and apparatus hereinafter specified unless noted otherwise.
- B. Delivery: Shade Structures shall be shipped knocked-down, with complete assembly instructions, and ready for easy installation.
 - 1. Shade Fabric shall be delivered complete with independent cables preinserted in fabric hems.
 - 2. All material, equipment and apparatus shall be identified by the manufacturer's name, nameplate and pertinent data.
- C. Storage: Provide temporary storage facilities for all material and equipment as necessary.
- D. Protection: Protect all material, equipment, and apparatus provided under this Section, both in storage and installed, until acceptance of contract. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected. Remove from the site and provide new, duplicate material, equipment, or apparatus in replacement of that rejected.

PART 2 - PRODUCTS

2.01 SHADE STRUCTURE

- A. Shade Structures: Aquarius Custom Framed Arch Sail, 36' x 24' x 15'-4" (9'-6" Entry Height) as supplied by USA Shade & Fabric Structures, Dallas TX, <u>www.usa-shade.com</u>, local office Orange, CA (800) 507-4233
 - 1. Shade Structures as provided by supplier shall include steel posts, complete, as shown on the Plans.
 - 2. Posts: powder coated to be selected from RAL color, TBD.
 - 3. Fabric: UV-resistant high-density polyethylene mesh, ALNET Extrablock, standard color TBD.
- B. General Requirements:

- 1. All members shall be designed according to the American Institute of Steel Construction (AISC) specifications and the American Iron and Steel Institute (AISI) specifications for cold formed members.
- 2. Frame members shall be steel tube. (Some compression rings are of structural channel.) All frame connections shall be bolted together, conceal bolts where possible. Anchor bolts for surface mount structures shall be inside posts.
- 3. Footings shall be per the Structural Plans.
- 4. Paint: All frame members shall be sand blasted to a white finish removing all rust, scale, oil and grease. Polyester powder coat all frame members, minimum 4-5 mil finish. Finish shall be a smooth uniform surface with no pits, runs or sags.

2.02 STRUCTURAL POSTS AND FOOTINGS

- A. General: All materials shall be structurally sound and appropriate for safe use. Product durability shall be ensured by the use of corrosion-resistant metals such as stainless steel, and coatings such as zinc-plating, galvanizing, and powder-coating on steel parts, subject to the project-specific requirements below.
- B. Weldments: All tubing members shall be factory-welded by Certified Welders to American Welding Society (AWS) specifications. Weldments shall be finished with a zinc-rich galvanized coating. Field-welding shall not be permitted.
- C. Posts, Structural Frame Tubing, And Hardware: All tubing used shall be coldformed and milled per ASTM A-135 and ASTM A-500. Material testing shall be in accordance with ASTM E-8. Minimum yield shall be 40,000 psi with a minimum tensile strength of 45,000 psi on all posts.
 - 1. All tubing shall be pre-cut to appropriate lengths, and all outside surfaces shall be galvanized, with an interior corrosion-resistant zinc-rich coating.
 - 2. Where required, support pipes shall be schedule 40 hot-dip galvanized or powder-coated black steel.
 - 3. All fastening hardware shall be stainless steel.
- D. Polyester Powder-Coating Process: Where applicable, all powder-coated parts shall be completely cleaned and a hot zinc phosphate pretreatment with non-chromic sealer applied.
 - 1. Powder-coating shall be electro-statically applied and oven-cured at 375 to 425 degrees Fahrenheit.
 - 2. Polyester powders shall meet or exceed ASTM standards for Adhesion, Hardness, Impact, Flexibility, Overbake Resistance, and Salt Spray Resistance.
- E. Footings: Posts shall be provided as standard direct embedment or base plates below finish grade and covered with concrete caps in landscape areas. In paved areas, top of footings shall be installed to be below finished paved surface.

2.03 SHADE FABRIC

- A. Fabric Roofing: Fabric shall be a high density, flame retardant, high density polyethylene (HDPE) shade fabric knitted of monofilament and tape construction with UV stabilizers, minimum UV-Block Factor 90%.
 - 1. All hems and seams shall be double row lock stitched using exterior grade UV-stabilized polyethylene sewing thread.
 - Pre-approved product: Alnet Extrablock, distributed by Alnet Americas, Lake Mary FL (954) 540-4103 and available from most shade structure manufacturers. CSFM approved color TBD.
- B. Fastening System: Fabric shall be attached to frame using a vinyl covered minimum ¼" diameter galvanized and clear vinyl coated cable.
 - 1. Fastening system shall be designed so that fabric may be removed periodically.
 - Cable fasteners shall be zinc-plated copper for maximum corrosion resistance. Each cable shall be looped and clamped at each end. Continuous one-piece cables, cables which are not independent per side and pre-looped and clamped at the factory, and/or cables which must be tensioned with the use of turnbuckles or tools not provided by the manufacturer are not acceptable.
 - 3. Fastening System at each roof rafter corner to consist of a factory installed concealed and adjustable fastening device, with vandal vandal-resistant bolt and locking cap.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Pre-installation: Follow Shade Structure manufacturer's installation guidelines for specific products delivered. Examine all Plans, Shop Drawings and all Sections of these Contract Documents and become familiar with them as necessary for proper and prompt coordination of all installations.
 - 1. Clarify in writing with the Manufacturer as to any discrepancies or deviations, prior to the start of installation.
 - 2. Provide the Owners Representative with a copy of all such clarification correspondence for approval prior to the start of installation.
- B. Install all material, equipment and apparatus in an orderly, correlated and neat appearing manner, with like elements and appurtenances in similar location, position, and elevation
- C. Verify in field exact size, location, and clearances regarding all existing material, equipment, and apparatus, and advise the Owners Representative, in writing, of any discrepancies between that indicated on the Plans and that existing in the field, prior to any installation related thereto.

3.02 CLEAN UP

A. Clean all surfaces according to manufacturer's recommendations.

B. Remove all packaging and construction debris.

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END OF SECTION
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SECTION 31 00 00 EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Loosening, excavating, filling, grading, borrow, hauling, preparing subgrade, compacting in final location, wetting and drying, dewatering, and operations pertaining to site grading for embankments, fills, roads, trails and other structures.
 - 2. Pumping and draining of excavations.
 - 3. Backfilling and compacting around structures.
- B. Related Sections:
 - 1. Section 01 35 29 Hazardous Material Procedures
 - 2. Section 01 57 23 Stormwater Pollution Prevention
 - 3. Section 03 30 00 Cast-In-Place Concrete
 - 4. Section 31 10 00 Site Preparation
 - 5. Section 31 05 19 Filter Fabric and Geotextiles
 - 6. Section 31 23 16 Structural Excavation
 - 7. Section 31 23 19 Dewatering
 - 8. Section 31 23 30 Cellular Concrete Fill
 - 9. Section 31 23 33 Trenching and Backfilling
 - 10. Section 31 50 00 Excavation Support and Protection
 - 11. Section 31 52 00 Cofferdams
 - 12. Section 32 11 23 Aggregate Base

1.02 REFERENCES

- A. Associated General Contractors (AGC):
 - 1. Manual of Accident Prevention in Construction (Section 9).
- B. American Society for Testing and Materials (ASTM):
 - 1. C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - 2. C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 3. D 422 Standard Test Method for Particle Size Analysis of Soils.

- 4. D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m).
- 5. D 2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- 6. D-6938 Test Methods for Density of Soil and Soil-Aggregate In-place by Nuclear Methods (Shallow Depth).
- 7. D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- C. Division of Industrial Safety (DIS).
- D. Institute of Makers of Explosives (IOMOE).
- E. Occupational Safety and Health Act (OSHA).
- F. State of California Department of Transportation (Caltrans).
- G. ENGEO, "Foster City Levee Improvement Project FEMA 65.10 (b) Levee Evaluation," March 5, 2020.

1.03 DEFINITIONS

- A. Excavation: Consists of satisfactory loosening, removing, loading, transporting, depositing, and compacting in final location, wet and dry materials, necessary to be removed for purposes of construction, or as required for ditches, grading, roads, and such other purposes as are indicated on the Plans.
- B. Backfill Adjacent to Structure: Is backfill around the exterior surfaces of a structure from the bottom of the excavation to finish grade.
- C. In-Place Density of Compacted Backfill: Is density determined in accordance with ASTM D 6938.
- D. Maximum Density: Is maximum density obtained in laboratory when tested in accordance with ASTM D 1557.
- E. Definitions Related to Compaction of Coarse Fill:
 - 1. One Pass: Defined as one movement of roller over area being compacted.
 - 2. Measurement of Pass Width: Measure width of pass between centers of outside tires or outside edge of roller wheel.
- F. Optimum Moisture Content: Is the optimum content at the maximum density when tested in accordance with ASTM D 1557.
- G. Backfill: Soil, rock or soil-rock material used to fill excavations and trenches.
- H. Fill: Soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

- I. Engineered Fill: Fill upon which the Geotechnical Engineer has made enough observations and tests to confirm that the fill has been placed and compacted in accordance with geotechnical engineering recommendations.
- J. Levee Fill: Fill material used for flood protection, generally where a floodwall is not constructed.
- K. Imported Material: Approved soil and/or rock material which is brought to the site from other areas.
- L. Onsite Material: Soil and/or rock which is obtained from the site.
- M. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.
- N. Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill or backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557.
- O. Select Material: Onsite and/or imported material approved by the Geotechnical Engineer as a specific-purpose fill.

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. General:
 - a. Obtain acceptable material from other sources if surplus or borrow materials obtained within project site do not conform to specified requirements or are not sufficient in quantity for structural backfill.
 - b. No extra compensation will be made for hauling of fill materials nor for water required to compact fills.
 - 2. Subgrade Stabilization:
 - a. Where soft, wet, or otherwise unstable material is encountered, overexcavate such material to a depth of 6 to 18 inches below the subgrade elevation shown on the Plans as determined by the Engineer. The bottom of the over-excavation shall then be completely covered with approved highstrength woven stabilization geotextile and backfilled with approved granular base material. The granular base material shall be wrapped with approved filter fabric. Proof roll tests shall be performed to confirm improved subgrade conditions. Other alternatives may be acceptable and shall be reviewed by the Engineer.
 - 3. Structural Backfill:
 - a. Material for Backfill:
 - 1) Earth materials to be used as engineered fill and backfill shall be cleared of debris, rubble, and deleterious matter.
 - 2) Rocks and aggregate exceeding the maximum allowable size shall be removed from the site.

- a) Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of the Engineer.
- 3) Backfill material under other concrete structures, under pavement, or where heavy compaction equipment, such as a pneumatic tired roller, cannot be used satisfactorily shall consist of aggregate base course, except areas indicated on the Plans as cellular concrete fill, control density fill, lightweight aggregate or concrete encasement.
- 4) Backfill in any area under concrete structures, shall extend from undisturbed native soil or rock to the bottom surface of the structure.
- 4. Embankments:
 - a. Material for Fills: Unless otherwise specified or indicated on the Plans, material shall be approved surplus material from excavation for structures or other construction for embankments or, if accepted by the City, approved borrow material excavated from source within Project Site may be used for embankments; or shall be approved imported fill.
 - b. Whatever source is used, provide fill material conforming with specified requirements.
 - c. Obtain acceptable material from other sources if surplus or borrow materials obtained within Project Site do not conform to specified requirements or are not sufficient in quantity for construction of embankments.
- 5. Compacted Fills Including Levee Fills:
 - a. Provide specified compaction for backfill, fill, and other earthwork.
 - b. Perform confirmation tests to confirm that work has complied with requirements specified in this Section concerning initial compaction demonstration, and field quality control testing.
- 6. Borrow Area:
 - a. Where borrow material is required, provide such material from source selected by the Contractor, subject to acceptance by the Engineer, but not necessarily from within Project Site.
 - b. Use of imported borrow shall not cause additional cost to the Contract.
- B. Environmental Requirements:
 - 1. Keep excavations reasonably free from water and any other potential pollutants.
 - 2. Provide standby power to ensure continuous dewatering in case of power failure.

1.05 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00.
- B. Property Owner's Permission Agreements: Submit copy of property owner's agreements to allow placement of surplus material on their property.
- C. Product Data: Submit material source, gradation, and testing data for all materials, including imported and on-site materials.

- 1. Materials for filling and backfilling shall be submitted to the Engineer no fewer than 10 days prior to intended delivery to site.
- D. Excavation Plan: Submit proposed excavation plan in accordance with Section 31 50 00.
- E. Test Reports: Submit certified test reports of all tests specified to be performed by the Contractor. Test reports shall be signed and sealed by a registered civil or geotechnical engineer in the state of California.
- F. Dewatering Plan: Proposed dewatering plan including arrangement, location, and depths of system components, type, and sizes of filters, and required permits.

1.06 QUALITY ASSURANCE

- A. The Contractor shall perform their work complying with applicable occupational safety and health standards, rules, regulations, and orders
- B. All site preparations for site grading and improvements shall be done under the observation of the Geotechnical Engineer's field representative. The Geotechnical Engineer's field representative should observe all graded area preparation, including demolition and stripping.
- C. Initial Compaction Demonstration:
 - Adequacy of Compaction Equipment and Procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:
 - a. 200 linear feet of trench backfill.
 - b. 50 cubic yards of structural backfill.
 - c. 100 cubic yards of embankment work.
 - d. 50 cubic yards of base material.
 - 2. Compaction Sequence Requirements: Until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.
 - After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under Subsection 3.04, "Field Quality Control".
- D. Regulatory Requirements: The Contractor shall assume responsibility for obtaining water discharge permits for his dewatering activities.
- E. Tests for compaction shall be made in accordance with test procedures outlined in ASTM D-1557, as applicable, unless other testing methods are deemed appropriate by the Geotechnical Engineer's field representative.
 - 1. These and other tests shall be performed in accordance with accepted testing procedures, subject to the engineering discretion of the Geotechnical Engineer's field representative.

- F. Dispose of water from dewatering in such manner as not to be a menace to public health and in compliance with the regulatory permits obtained by the City for this work.
 - 1. Follow the requirements set forth in Section 01 57 23, "Stormwater Pollution Prevention."
- G. **Geotechnical Reports**: City has prepared the following geotechnical report describing site conditions and construction recommendations that are available to the Contractor. The referenced reports are complimentary to these Provisions, but the Provisions govern in case of conflict.
 - 1. ENGEO, Foster City Levee Improvement Project FEMA 65.10 (b) Levee Evaluation, March 5, 2020.
 - 2. Supplemental design reports and memoranda prepared by ENGEO.

1.07 SEQUENCING AND SCHEDULING

- A. If necessary, stockpile excavated material in order to use it in specified locations in accordance with Section 01 57 23, Storm Water Pollution Prevention.
- B. Excavation and Filling: Perform excavation and filling, during construction, in manner and sequence that always provides drainage.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Water for Compacting Fills: Use water from source acceptable to Engineer.
- B. Fill Materials:
 - 1. General Requirements for Fill from Any Source:
 - a. Provide aggregate base course, select material, bedding, engineered fill and native material, where required for fill and backfill.
 - b. Obtain material for fills from cut sections, from onsite borrow sources, or from offsite borrow sources
 - c. Levee fill material shall consist of lean clay, sandy clay, silty clay or clayey silt with a maximum total unit weight of 125 pounds per cubic foot when compacted to the specifications provided herein and conform to recommendations contained in referenced Geotechnical Report.
 - d. After compaction, levee fills shall have a vertical hydraulic conductivity less than 10-4 cm/sec.
 - e. Fill material shall not contain rock or aggregate larger than 3 inches in greatest dimension, with no more than 15 percent larger than 1 inch by weight.
 - f. Fill material shall consist of clean soils free of trash, lumber, debris, leaves, grass, roots, stumps, and other vegetable matter; with an organic content of 3 percent or less.

- g. Fill material shall have a Plasticity Index of no less than 10 and no greater than 30, and a maximum liquid limit of 45.
- h. Fill materials shall be free of environmental contaminates.

2. Gradation

a. Comply with the grading requirements shown in the following table:

US Standard Sieve	Percentage Passing
3"	100
No. 4	35 – 100
No. 30	20 - 100

- b. Earth materials to be used as engineered fill and backfill shall be cleared of debris, rubble, and deleterious matter.
- c. Rocks and aggregate exceeding the maximum allowable size shall be removed from the site.
- d. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of the Engineer.
- 3. The Engineer shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials.
- 4. The Engineer shall be notified at least 72 hours prior to the start of filling and backfilling operations. Materials to be used for filling and backfilling shall be submitted to the Engineer no less than 10 working days prior to intended delivery to the Site.
- 5. Crushed Rock: Crushed rock for foundation underlayment where shown on the Plans or where necessary to stabilize excavation bottoms shall be a clean, durable uniformly graded rock between ³/₄ inch and 1¹/₂ inch size.
- 6. Aggregate Base Course: As specified in Section 32 11 23. Aggregate base may also be used to stabilize excavation bottoms, and for MSE wall leveling pads.
- 7. Native Material:
 - a. Existing levee fill material that meets these specification requirements is suitable as fill material once stripped of vegetation, debris, and other deleterious material.
 - b. The use or reuse of Bay Mud as a fill material is unacceptable, unless approved in advance by the Geotechnical Engineer.
- 8. Imported Material:
 - a. Imported material meeting the requirements specified herein may be used for fill and embankment construction.
 - b. A sample of all proposed imported fill from alternative borrow sources shall be submitted for compliance testing at least four weeks prior to the proposed date of import. Consideration will also be given to the environmental characteristics of imported soils per Paragraph 2.02 below.
 - c. Recycled asphalt, aggregate base, or portland cement concrete may be used within engineered fills if ground finely and thoroughly mixed with onsite or imported material.

- 1) The use of recycled materials is subject to observation by the Engineer and his approval.
- 2) Minor asphaltic concrete inclusion is acceptable.
- 3) Recycled fill material shall not be used within two (2) feet of finish grade.
- d. Imported material shall meet the above requirements, and shall not be more corrosive than native material or existing levee fill as sampled by the City, and shall not have:
 - 1) chloride ion concentrations >3,600 mg/kg
 - 2) sulfate ion concentrations >190 mg/kg
 - 3) pH outside the range of 7.9 to 8.2
 - 4) redox potential > 460-mV
- e. Imported fill materials shall not be anaerobic.
- 9. Rock Slope Protection:
 - a. Existing rock slope protection (RSP) on the water side of the levee may be used to replace RSP disturbed by grading activities as shown on the Plans.
 - b. Additional material imported to the site to place RSP as shown on the Plans shall conform to State Standard Specification Section 72-2.02 for ½ Ton Class Rock Slope Protection, Method B Placement.
- C. Geotextile:
 - 1. As specified per Section 31 05 19.
- D. Filter Fabric:
 - 1. As specified per Section 31 05 19.

2.02 IMPORTED SOIL SUITABILITY

- A. Contractor shall sample and test soil from off-site sources prior to importing soil to the site for use in levee construction or as general backfill. Tests will evaluate soil contamination, corrosivity, and toxicity that would limit the soil's use as imported fill and a revegetation substrate.
 - 1. Contractor shall submit analytical data from enough samples to quantify the characteristics of potential import sources with analytical data. Sampling shall be performed at a frequency consistent with the DTSC 2001 Import Advisory guidance.
 - a. Collect samples in accordance with DTSC and/or EPA protocols.
 - b. Submit figures showing the sampling locations and export area and a report or summary that details the sampling collection and methods.
 - c. Submit other relevant environmental related reports for the proposed export site (such as Phase I Environmental Site Assessments) with the test data and sample location maps. Submittals not meeting these minimum requirements will not be accepted.
 - 2. The following local sources for soil import are listed for convenience only. All imported soil shall meet the requirements of this Specification.
 - a. UFES project site in San Mateo.
 - b. Barnard Bessac Joint Venture Gravity Pipeline Project

- B. Imported soil shall meet DTSC requirements for residential use.
- C. Sample Schedule per Volume of Imported Material
 - 1. (1) sample per 250 cubic yards (cy) up to 1,000 cy
 - 2. 1,001 to 5,000 cy: (4) samples for first 1,000 cy then (1) sample for each additional 500 cy up to 5,000 cy
 - 3. >5,000 cy: (12) samples for first 5,000 cy then (1) sample per each additional 1,000 cy
- D. At a minimum, the analyses submitted for evaluation shall include CAM-17 metals (EPA Test Method 6010B/7471A), polynuclear aromatic hydrocarbons (PAHs) (EPA Test Method 8270SIM), PCBs (EPA Test Method 8082), organochlorine pesticides (OCPs) (EPA Test Method 8081), TPHd and TPHo (EPA Test Method 8015), VOCs/TPHg (EPA Test Method 8260B), and asbestos (CARB preparation method 435; PLM 400 point count).
 - 1. Submittals not including these analyses may be rejected.
- E. Additionally, the contractor shall provide documentation of sample details (e.g. depth, location, stockpile sample, or in-place sample) along with the corresponding analyses.
- F. Corrosivity Testing: Imported material shall be tested for conformance to the requirements of this specification using the following standards:
 - 1. AASHTO T-290 Standard Method of Test for Determining Water-Soluble Sulfate Ion Content in Soil.
 - 2. AASHTO T-291 Standard Method of Test for Determining Water-Soluble Chloride Iron Content in Soil.
 - 3. ASTM D1125 Standard Test Methods for Resisitivity and Conductivity of Water and Soils.
 - 4. ASTM D1293 Standard Test Methods for pH of Water.
 - 5. ASTM D4972 Standard Test Methods for pH of Soils.
- G. Imported Topsoil: Form 430-C as determined by Testing Laboratory (Soil and Plant Laboratory or accepted equal).

Particle Size	Range	Percent
Coarse sand	0.5 – 2.0 mm	0 – 15%
Silt plus clay	<0.05 mm	25 – 50%
Silt	0.002 – 0.05 mm	10 – 30%
Clay	0 – 0.002 mm	10 – 25%
Gravel	2 – 13 mm	0 – 15%
Rock by volume	1⁄2 - <1 inch	0 - 10%
Organic matter		0 – 15%

1. Physical properties: USDA sandy loam, sandy clay loam or loam.

- 2. Chemistry:
 - a. Salinity: less than 3.0 dS/m @ 25°C
 - b. Sodium adsorption: less than 6.0

- c. Boron: Less than 1.0 ppm
- d. pH of saturated paste: 5.5 7.5
- 3. Qualitative lime level shall be low in opinion of testing laboratory.
- 4. Fertility characteristics shall be modifiable by the incorporation of conventional fertilizers to provide fertility levels to sustain normal growth.
- H. The lab report shall indicate any constituent that is at a level toxic to plants.
- I. Submit soil test results to Engineer for review.
- J. The Landscape Architect may deem soil unsuitable for use as a planting medium in the Work. If soil is deemed unsuitable, the Contractor shall identify a different source of soil and the analysis described above shall be repeated.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify character and quantity of rock, gravel, sand, silt, water, and other inorganic or organic materials to be encountered in work to be performed.
- B. Determine gradation and shrinkage of excavation and fill material, and suitability of material for use intended in work to be performed.
- C. Determine quantity of material, and cost thereof, required for construction of excavations and fills, whether from on-site excavations, borrow areas, or imported materials. Include in cost of work to be performed.
- D. Include wasting of excess material, if required, in cost of work to be performed.
- E. Excavated material that may be suitable for fill will likely require segregation, cleaning, and/or screening to meet embankment fill (engineered fill) requirements.
- F. Fills used for embankments shall be composed of clean soils free of oversize material, construction debris, organics and contamination and shall meet the specified gradation and quality requirements for engineered fill.

3.02 EQUIPMENT LIMITATIONS

- A. The Contractor shall utilize methods and equipment suitably sized for soft soil conditions.
 - 1. Contractor shall organize its operations in such a manner to avoid adverse subgrade disturbance, slope instability, settlement, the movement of or damage to existing structures and the Work, including the levee and existing utilities.
 - a. Contractor shall be responsible for restoring damaged structures to their original conditions.
 - 2. The contractor shall minimize the use of rubber-tired equipment.

- B. Light equipment with mud tracks may be required by the Engineer.
- C. Contractor shall be aware of the potential for slope failures due to presence of Young Bay Mud.
 - 1. Stockpiles, construction equipment, and other loads shall be appropriately setback from slopes as recommended by the Engineer.
 - 2. Recommended setback distances may vary depending upon the specific stockpile and staging locations.
- D. Temporary haul routes for trucks and other equipment shall be designed for their intended use by the Contractor and shall be maintained regularly. The maximum allowable speed for construction equipment at the Project Site is 10 miles per hour.

3.03 SURFACE PREPARATION

- A. Preparing Ground Surfaces for Fill or Concrete:
 - 1. After clearing, grubbing and stripping is completed, scarify entire areas which underlie fill sections or structures to a depth of 10 inches and until surface is free of ruts, hummocks, and other features which would prevent uniform compaction by equipment to be used.
 - 2. Moisture condition and re-compact areas to densities specified in Subsection 3.04G.01 "Compacted Fills", before placing of fill material or concrete.
 - 3. Where cemented rock, cobbles, or boulders compose a large portion of foundation material underlying structures, slabs, or paved areas, it may not be advisable to scarify the top 10 inches prior to compaction. If the Engineer deems it advisable not to scarify existing natural ground, then moisten the native soil and compact it as specified in Subsection "Compaction of Coarse Fill."
 - 4. Where subgrade stabilization is required, scarification and compaction of native soils is not practical. In these instances, stabilize the subgrade by placing geotextile and granular material as shown on the plans and/or specified herein.
 - 5. Finished compacted subgrade shall be firm and non-yielding under the weight of compaction equipment. If the relative compaction of the subgrade is less than specified, or the surface of the subgrade exhibits significant yielding, over-excavate the area and rebuild or rework the area until the subgrade compaction conforms to this specification.
- B. Preparing Sloped Surfaces for Fill or Foundations:
 - 1. Foundations for Fill Having Slopes in Excess of One Vertical to Four Horizontal:
 - a. Bench or terrace to adequately key existing ground and fill built thereon.
 - b. Slopes of Old Fills: Bench minimum of 2 feet horizontally as fill is placed or as shown on the Plans and recommended by the Geotechnical Engineer in the field.
 - c. Provision of New Benches:
 - 1) Start new bench wherever vertical cut of next lower bench intersects existing ground.

- 2) Re-compact material thus cut out along with new embankment material at no additional cost to the Contract.
- 2. Preparing for Structural Backfill:
 - a. After completion of foundation footings and walls and other construction below the elevation of the final grades and prior to backfilling, all forms shall be removed, and excavation shall be cleaned of all trash and debris.
 - b. After inspection of foundation, walls, and pipes, backfill shall be placed symmetrically to prevent eccentric loading upon or against structures.
 - c. To prevent damage to structures, structural backfill shall be placed with equipment which does not exceed H-20 loading, within 2:1 (horizontal to vertical). Outside this distance, normal compaction equipment may be used.
 - d. All backfill shall be compacted per this specification.

3.04 GENERAL EARTHWORK APPLICATIONS

- A. Dispose of excavated materials which are not required or unsuitable for fill and backfill in lawful manner.
- B. Dispose of surplus material on private property only when written permission agreement is furnished by owner of property. Submit copies of such agreements.
- C. Obtain material required for fills in excess of that produced by excavation from borrow areas subject to the fill material requirements specified herein.
- D. Rocks, broken concrete, or other solid materials larger than 3 inches in greatest dimension shall not be placed in fill areas but removed from Project Site at no additional cost to the Contract.
- E. Stabilization of Subgrade: Provide materials used or perform work to stabilize subgrade so it can withstand loads which may be placed upon it by Contractor's equipment.
 - 1. The upper 12 inches of the subgrade in pavement areas shall be compacted to 95 percent relative compaction.
 - 2. No material larger than 1 inch in greatest dimension shall be placed in the first two feet below subgrade.

3.05 EXCAVATION

- A. Excavations for Structures:
 - 1. All excavations shall comply with Section 31 50 00, Excavation Support and Protection.
 - 2. Dimensions and Elevations of Excavations: Provide excavations conforming to dimensions and elevations indicated on the Plans for each structure, including trenching for adjacent piping and all work incidental thereto.
 - 3. Soil of Unsuitable Bearing Value: Where soil is encountered having unsuitable bearing value, Engineer may direct in writing that excavation be carried to elevations above or below those indicated on the Plans.

- 4. Unless directed by the Engineer, excavations shall not be carried below elevations indicated on the Plans.
- 5. Where excavations are made below elevations indicated on the Plans, adjust elevations of excavations in accordance with requirements following:
 - a. Under Slabs: Restore to proper elevation in accordance with procedure specified for backfill in this Section.
 - b. Under Footings: Restore to proper elevation in accordance with procedure specified for backfill in this Section.
- 6. Excavation Width: Extend excavations at least 24 inches clear from walls and footings to allow for placing and removal of forms, installation of services, and inspection. Undercutting of slopes will not be permitted.
- 7. Bottom of Excavations for Structures: Consist of native material with top 6 inches compacted to 95 percent of maximum density and graded to conform to outside limits of structures as indicated on the Plans, except where otherwise indicated on the Plans or specified.
- 8. Difficulty of Excavation: No extra compensation will be made for removal of rock or any other material due to difficulty of excavation.
- 9. Location of Structures on Different Substrates: Where structure will be located partially on fill and partially on undisturbed or natural material, over-excavate entire area to depth of 12 inches below elevations indicated on the Plans and recompact to 95 percent of maximum relative density.
- B. Necessary Over Excavation:
 - 1. General:
 - a. Where it becomes necessary to excavate beyond normal lines of excavation in order to remove boulders or other interfering objects, backfill voids remaining after removal as specified in Backfilling of Voids, or as acceptable to the Engineer.
 - b. Perform necessary excavation beyond normal lines as specified above and backfill such voids.
 - 2. Backfilling of Voids:
 - a. Fill voids with suitable material acceptable to the Engineer, placed in manner and to same uniform density as surrounding material.
 - b. With approval of the Engineer, lightweight concrete may be used.

3.06 EMBANKMENT CONSTRUCTION

- A. Embankment slopes shall be overbuilt and then trimmed back to expose compacted engineered fill. Compaction by track walking of slopes shall not be allowed.
- B. Earth materials to be used as engineered fill and backfill shall be cleared of debris, rubble, and deleterious matter.
- C. Rocks and aggregate exceeding the maximum allowable size shall be removed from the site.

- D. Construct fills, embankments, and backfills, designated herein as fills, at locations and to lines and grades indicated on the Plans.
- E. Where required, provide the necessary fill material from outside sources to complete embankments as shown on the Plans.
 - 1. Compacted Fill Shape and Sections: Provide completed fill that corresponds to shape of typical sections indicated on the Plans or that meets requirements for each case.
 - 2. Preparation of Areas Designated to Receive Fill Material: Scarify to minimum depth of 10 inches, unless otherwise indicated on the Plans, moisture condition and re-compact to the density of fill material as specified herein, to provide adequate bonding with the initial lift of fill.
 - 3. Fills and Backfills and Upper 6 Inches in Cuts: Compact to percentage of maximum density as follows and as determined by ASTM D1557:
 - a. Backfill adjacent to structures: 95 percent.
 - b. Under present and future structures: 95 percent.
 - c. Under roadways and parking areas subject to traffic loading: 95 percent to three feet under subgrade.
 - d. Under paved areas not subject to traffic loading, curbs, and sidewalks: 90 percent.
 - e. Revegetation areas not on embankments: 85 percent.
 - f. Compacted embankments: 90 percent.
 - g. Demolition areas: 95 percent.
 - 4. Placing Compacted Fills:
 - a. Placement: Place loose material in successive layers that do not exceed the depth of penetration of the compaction equipment used or 10 inches in thickness after compaction.
 - b. Moisture Content: Bring each layer to specified moisture content for maximum density before compaction by rolling.
 - c. Each successive lift shall be firm and non-yielding under the weight of construction equipment.
 - d. Defective Compacted Fills: Remove and re-compact.
 - 5. Compaction of Embankments and Roadway Fills:
 - a. Construction and Compaction of Fills:
 - 1) Construct in layers of thickness specified above.
 - 2) Compact by rolling with power rollers, tamping rollers or pneumatic tire rollers.
 - a) Vibratory compaction equipment shall not be used.
 - b. Moisture Content:
 - Where the moisture content of fill is too low to permit the specified degree of compaction, water shall be added before or during spreading, at the Contractor's expense, until the moisture content is satisfactory to achieve the required compaction requirements.
 - 2) Where the moisture content of fill is too high to permit the specified degree of compaction, the material shall be dried, at the Contractor's

expense, until the moisture content is satisfactory to achieve the required compaction requirements.

- For soil materials, the final soil moisture content after wetting or drying shall be no less than 2 percent over optimum moisture content as determined by ASTM D 1557.
- F. Placement of Rock Slope Protection:
 - 1. Rock slope protection (RSP) shall be placed in a two-foot thick section per State Standard Specification 72-2.03, Method B.
 - 2. Newly place RSP shall be underlain with a geotextile stabilization fabric as specified in Section 31 05 09.

3.07 FIELD QUALITY CONTROL

- A. All site preparations for site grading and improvements shall be done under the observation of the Geotechnical Engineer's field representative.
- B. The Geotechnical Engineer's field representative shall observe all graded area preparation, including demolition and stripping.

C. Tests:

- 1. Confirmation Tests:
 - a. Contractor shall accomplish specified compaction for backfill, fill, and other earthwork.
 - b. Contractor may, at his option, arrange for conformation testing through his own forces or a testing laboratory.
 - c. Confirmation testing is only for the Contractor's benefit and shall not substitute for Compliance Tests as specified herein.
 - d. Control operations in response to confirmation tests and City Compliance Testing to verify that compaction work complies, , with requirements specified in this Section concerning compaction, control, and testing.
 - e. Cost of Confirmation Tests: Paid for by the Contractor.
 - f. Confirmation Test submittals are not required.
- 2. Compliance Tests:
 - a. Compliance tests will be made by the Engineer to verify that compaction is meeting requirements specified herein.
 - b. City's Testing Laboratory will perform compliance testing as acceptable to the Engineer.
 - c. Contractor shall coordinate with Engineer regarding the frequency of Compliance Testing and testing results.
 - 1) Compliance Testing will be performed not less than as follows:
 - a) For embankment and structure backfill, no less than 1 test for every 2 feet of vertical fill thickness and no less than 1 test for every 200 cubic yards of fill placed for embankment fill and 100 cubic yards of fill placed for structure backfill.
 - b) For base material, no less than 1 test for every 100 cubic yards of base placed.

- 2) Copies of Compliance Test Reports will be submitted promptly to the Engineer for disbursement to Contractor.
- d. Coordination with Engineer during Testing: Remove overburden above level at which the Engineer to test and backfill and re-compact excavation after testing is completed.
- e. If compaction fails to meet specified requirements, perform remedial work by one of the following methods:
 - 1) Remove and replace backfill at proper density.
 - 2) Bring density up to specified level by other means acceptable to the Engineer.
- f. Retesting:
 - Costs of Retesting: Costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements shall be borne by the Contractor.
 - 2) City's compliance tests during the performance of remedial work will be performed as follows:
 - a) Tests will be performed in a manner acceptable to the Engineer.
 - b) Frequency: Double amount specified for initial confirmation tests.
- D. Tolerances:
 - 1. Finish Grading of Excavations, Backfill and Fills:
 - a. Perform fine grading under concrete structures such that finished surfaces are never above established grade or approved cross section and are never more than 0.1 foot below.
 - b. Provide finish surface areas outside of structures that are not more than 0.1 foot above or below established grade or accepted cross section.
 - 2. Areas Which Are Not under Structures, Concrete, Asphalt, Roads, Pavements, Walks, Dikes and Similar Type Items:
 - a. Provide finish graded surfaces of either undisturbed natural soil, or cohesive material not less than 6 inches deep.
 - b. Intent of preceding is to avoid sandy or gravelly areas.
 - 3. Finished Grading Surfaces:
 - a. Reasonably smooth, compacted, and free from irregular surface changes.
 - b. Provide degree of finish that is ordinarily obtainable from blade grader operations, except as otherwise specified.
 - c. Uniformly grade areas which are not under concrete.
 - d. Finish gutters and ditches so that they drain readily.

3.08 WET WEATHER AND WET SOIL CONDITIONS

- A. To the maximum extent possible within schedule constraints, major excavation should take place during periods of suitable weather conditions.
- B. When the moisture content of fill materials is significantly above optimum, wet soil conditions can be mitigated by one or multiple of the following options:
 - 1. Frequent spreading or mixing during warm, dry weather.

- 2. Scarify and air dry until fill materials have a suitable moisture content for compaction; or
- 3. Over-excavate the fill and replace with suitable on-site or import materials with an appropriate moisture content; or
- 4. Mix with drier materials; or
- 5. Install a geotextile or geogrid to reinforce soft fill; and/or
- 6. Chemically treat with lime, kiln-dust, or cement to reduce the moisture content and increase the strength of the fill.

3.09 SETTLEMENT MONITORING OF FILL PLACEMENT

- A. The following geotechnical instrumentation shall be installed during construction to record deflection and settlement.
 - 1. At least one settlement monitoring plate or monitoring pin shall be installed on maximum intervals of 500 linear feet.
 - 2. Settlement monitoring plates and pins shall be measured at least once every two weeks.
- B. If movement is not recorded over any three post-construction monitoring intervals, the monitoring may cease.

3.10 ADJUSTING

- A. Finish Grades of Excavations, Backfilling and Fill:
 - 1. Repair and reestablish grades to required elevations and slopes due to any settlement or washing way that may occur from action of the elements or any other cause prior to final acceptance.

3.11 PROTECTION

- A. Finish Grades of Excavations, Backfilling and Fill:
 - 1. Protect newly graded areas from action of the elements.
- B. Ditches and Gutters:
 - 1. Maintain ditches and gutters excavated free from detrimental quantities of debris that might inhibit drainage until final acceptance.

3.12 DISPOSAL OF SURPLUS MATERIAL

- A. All excavated material not approved for use in the Work and used in the Work shall be removed from the Project Site.
- B. Bay Mud material shall be kept segregated from other surplus material.
- C. Contractor is solely responsible for the off-site disposal of surplus material in full conformance with applicable laws and regulations.

- D. Contractor shall arrange for loading, transportation, and unloading at a permitted stockpile or disposal site, including gate fees and other charges.
- E. Contractor shall test soils on-site, prior to off-haul, as required to demonstrate to the Engineer that the classification of surplus soil for disposal will be accepted by proposed stockpile or disposal site prior to loading the material for transportation offsite.
- F. Soil that will be stockpiled for reuse offsite, or directly reused offsite, shall meet the California Department of Toxic Substances Control (DTSC) requirements applicable to the soil's ultimate reuse.
- G. Submit verification that material has been accepted for stockpile or disposal.

END OF SECTION

SECTION 31 05 19 FILTER FABRIC, GEOCOMPOSITE DRAINAGE, AND GEOTEXTILES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Engineering fabrics and geotextiles
 - 2. Geogrid reinforcement
 - 3. Synthetic drainage panels
- B. Related Sections:
 - 1. Section 31 00 00 Earthwork.
 - 2. Section 31 23 30 Cellular Concrete Fill.
 - 3. Section 31 23 23 Trenching and Backfilling.
 - 4. Section 32 05 00 Mechanically Stabilized Earth Walls.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D 1388 Test Method for Stiffness of Fabrics.
 - 2. D 3776 Test Methods for Mass per Unit Area (Weight) of Woven Fabric.
 - 3. D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity.
 - 4. D 4632 Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 5. D 5262 Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics.
 - 6. D 6567 Test Method for Measuring the Light Penetration of a Turf Reinforcement Mat (TRM).
 - 7. D 6637 Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method.
 - 8. D 6818 Test Method for Linear Thermal Expansion of Electrode Carbons.
 - D 7322 Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.
- B. Erosion Control Technology Council (ECTC):
 - 1. ECTC Guidelines

- C. Geosynthetic Research Institute:
 - 1. Standard Practice GG4(a) Standard Practice for the Determination of the Long-Term Design Strength of Stiff Geogrids.
 - 2. Standard Practice GG4(b) Standard Practice for the Determination of the Long-Term Design Strength of Flexible Geogrids.
 - 3. Standard Practice GT7 Standard Practice for the Determination of the Long-Term Design Strength of Geotextiles.

1.03 DEFINITIONS

- A. Filter Fabric: Nonwoven filter fabric manufactured from polyester, nylon, or polypropylene material, or any combination thereof.
- B. Geotextile: Woven fabric to provide separation, stabilization, and/or reinforcement.
- C. Geogrid: Soil reinforcement consisting of regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock
- D. Geocomposite drainage: Prefabricated material that includes filter fabric and plastic pipe.

1.04 PROJECT CONDITIONS

A. Take field measurements to determine the exact lengths and dimensions of the surfaces to receive the fabric.

1.05 SUBMITTALS

- A. Product Data.
- B. Samples.
- C. Quality Control Submittals:
 - 1. Certificates of Compliance.
 - 2. Manufacturer's Instructions.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection: Furnish engineering fabrics in protective covers capable of protecting the fabric from ultraviolet rays, abrasion, and water.

PART 2 PRODUCT REQUIREMENTS

2.01 PRODUCT REQUIREMENTS

A. Filter Fabric:

Grab Strength (ASTM D-4632)	
Mass per Unit Area (ASTM D-4751)	6 oz/yd ²
Apparent Opening Size (ASTM D-4751)	70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491)	80 gal/min/ft ²
Puncture Strength (ASTM D-4833)	80 lbs

B. Geotextile:

- 1. Approved, high-strength, woven polyester geotextile for stabilization over soft and wet Young Bay Mud subgrade soil conditions
- 2. Approved woven polypropylene geotextile for stabilization over other unstable subgrade conditions or for rock slope protection underlayment.
- C. Geogrid:
 - 1. The geogrid shall be a regular network of high-density polyethylene or polyester yarns encapsulated in a protective coating specifically fabricated for use as a soil reinforcement material. The geogrid shall have aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock.
 - 2. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction to ultraviolet degradation and to chemical and biological degradation encountered in the soil being reinforced.
 - 3. The ultimate tensile strength of the geogrid shall be as specified in the Plans and shall be determined in accordance with ASTM D6637.
 - 4. The creep limited strength of the geogrid shall be as specified in the Plans and shall be determined in accordance with ASTM D5262.
 - 5. Determine the long-term design strength of geogrid from the ultimate tensile strength in the primary strength direction divided by reduction factors. Calculate long-term design strength from the guidelines in Geosynthetic Research Institute Standard Practice GG4(a), GRI GG4(b), or GRI GT7.
 - a. The product of the reduction factors shall be at least 1.30. Determine the reduction factor for creep using a 75-year design life. Determine the installation damage reduction factor from the characteristics of backfill materials used.
 - b. If test data is not available, use default values of reduction factors in the Geosynthetic Research Institute Standard Practice to determine long-term design strength.
- D. Erosion Control Blanket for slope protection.
 - 1. Synthetic erosion control mat and/or degradable erosion control blanket that shall be pre-approved by Engineer.

- E. Geocomposite Drainage is a prefabricated material that includes filter fabric and plastic pipe.
 - 1. Filter fabric shall be Class A.
 - 2. The drain shall be of composite construction consisting of a supporting structure or drainage core material surrounded by a geotextile.
 - 3. The geotextile shall encapsulate the drainage core and prevent random soil intrusion into the drainage structure.
 - 4. The drainage core material shall consist of a three-dimensional polymeric material with a structure that permits flow along the core laterally.

2.02 ADDITIONAL REQUIREMENTS

A. Product material suppliers shall provide a qualified and experienced representative onsite to assist the Contractor and Engineer at the start of construction with directions on the use of product(s). If there is more than one application on a project, this criterion will apply to construction of the initial application only. The representative shall also be available on an as-needed basis, as requested by Engineer, during construction of the remaining applications.

PART 3 EXECUTION

3.01 PREPARATION

- A. Surface Preparation: During grading operations, take care not to disturb or scarify the subgrade. This may require use of lightweight dozers for low strength soils such as saturated, cohesionless, or low cohesion soils. Re-compact to minimum 95 percent at maximum density if subgrade is scarified.
- B. Prior to placement of product; prepare surface to smooth conditions free of debris, depressions, or obstructions which may damage the fabric.

3.02 INSTALLATION

- A. Follow manufacturer's installation instructions and as complimented herein.
- B. Place the products smoothly without folds or wrinkles.
- C. Use special care when placing the products in contact with the soil so that no void spaces occur between the products and the prepared surface.
- D. Overlap the fabric sheets as indicated on the Plans or according to manufacturer's installation, whichever is greater.
- E. Place fill on the products as specified.
- F. Refer to Section 32 05 00 for additional requirements for geogrid at mechanically stabilized earth walls.

3.03 FIELD QUALITY CONTROL

A. Inspection: Before covering, the conditions of the products will be observed by the Engineer to determine that no holes or rips exist in the products. Repair all such occurrences by placing a new layer of product extending beyond the defect in all directions a distance equal to the minimum overlap required for adjacent rolls.

END OF SECTION

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SECTION 31 10 00 SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Clearing, grubbing, and stripping Project Site areas in preparation for the construction of improvements.
- B. Related Sections:
 - 1. Section 01 35 29 Hazardous Materials Procedures.
 - 2. Section 01 50 00 Temporary Facilities and Controls.
 - 3. Section 01 56 39 Tree Care and Protection.

1.02 DEFINITIONS

- A. Clearing: Consists of removal of natural obstructions and existing foundations, buildings, fences, lumber, walls, stumps, brush, weeds, rubbish, trees, boulders, utility lines, pavement, and any other items which shall interfere with construction operations or are designated for removal.
- B. Grubbing: Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems greater than 1 inch in diameter or thickness.
- C. Stripping: Stripping shall include the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped. The depth of stripping shall be 6 inches, subject to field conditions and the Engineer's approval.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: Verify and comply with applicable regulations governing noise, dust, nuisance, drainage and runoff, fire protection, and disposal.
- B. Pre-construction Conference: Discuss order and method of Work.

1.04 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. For suspected hazardous materials found, comply with Section 01 35 29, Hazardous Materials Procedures.
- B. Existing Conditions:
 - 1. Verify character and amount of clay, sand, gravel, quicksand, Bay Mud, water, rock, hardpan, and other material involved and Work to be performed.

C. The Contractor shall adhere to appropriate methods recommended by the Bay Area Air Quality Management District to minimize airborne pollution, including but not limited to frequent watering of open trenches, covering of excavated dirt and related actions.

1.05 SEQUENCING AND SCHEDULING

A. Clearing and Grubbing: Perform clearing and grubbing in advance of grading operations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examine site and verify existing conditions for beginning Work.

3.02 PREPARATION

A. Protect existing improvements from damage by site preparation work. Install fence at drip line of trees to remain as indicated on the Plans.

3.03 INSTALLATION

- A. Site Clearing:
 - 1. Clear work areas of all surface and subsurface deleterious materials, including abandoned buried structures, utilities, irrigation lines, pavements, debris, trees, shrubs and associated roots.
 - a. Tree root balls shall be removed down to a depth of at least 3 feet below finished grade.
 - 2. Remove all associated foundations, as well as buried utilities unless otherwise noted on the Plans.
 - 3. All vegetation, debris, and deleterious materials shall be removed from areas to be graded.
- B. Site Stripping:
 - 1. Strip the site to remove surface organic materials.
 - 2. Strip organics from the ground surface to a depth of at least 2 to 3 inches below the surface.
 - a. Actual depth of stripping should be evaluated by the Geotechnical Engineer's field representative during construction.

- b. The use of organics in future landscape areas shall be approved by the Geotechnical Engineer's field representative.
- c. The Geotechnical Engineer's field representative shall evaluate site vegetation at the time of grading to assess the feasibility of mulching organics in place.
- C. Grubbing:
 - 1. From Excavated Areas: Grub stumps, roots, and other obstructions 1 inch or over in diameter to depth of not less than 36 inches below finish grade.
 - 2. Backfill and compact cavities left below subgrade elevation by removal of stumps or roots to density of adjacent undisturbed soil.

3.04 PRESERVATION OF PROPERTY

- A. The Project area shall be cleared and grubbed **only** to the extent necessary to accommodate the work in conformance with the notes and details shown on the plans. Trees or growth shall not be trimmed back unnecessarily. Attention is directed to Section 01 56 39 regarding the protection of trees.
- B. Contractor shall take extreme care not to damage shrubs, trees, fences, irrigation systems and other improvements of adjacent property owners.
- C. All existing improvements not specifically designated on the Plans to be removed or relocated shall remain in their original condition and location undisturbed. However, upon written permission by the Engineer, existing improvements may, for the convenience of the Contractor, and at his expense, be removed and temporarily relocated during construction and shall be replaced in their original location in as good or better condition as when the Contractor entered upon the work site

3.05 DEMOLITION OF SURFACE IMPROVEMENTS

- A. Removal of sidewalks, curbs and gutters, driveways, concrete slabs and pavement if necessary, shall be in accordance with the provisions of Section 15-3 of the State Standard Specifications.
- B. Curbs, gutters, sidewalks, driveways, slabs and pavement shall be removed by full depth saw cut to the nearest joint from the lines shown on the plans or as directed by the Engineer.
- C. Where the plans indicate construction under existing asphalt pavement or the replacement of existing asphalt pavement, the existing pavement shall be removed and disposed of off-site.

3.06 DEMOLITION OF SUBSURFACE IMPROVEMENTS

A. Removal of buried boxes, utilities, previously abandoned facilities, and other obstructions to the Work shall be in accordance with provisions of Section 15 of the State Standard Specifications.

- B. Buried obstructions shall be removed to the extent necessary to safely prosecute the Work. Portions of the obstruction may be left in place if the Work can be completed per the Plans and Specification.
- C. Demolished subsurface structures, or portions thereof, shall not become part of the Work and be removed from the site and disposed of legally.
- D. The excavation created to demolish subsurface improvements shall be backfilled in accordance with the Plans and Specifications, to match the surrounding backfilled areas.
- E. Areas that are over-excavated to facilitate subsurface demolition shall be backfilled to the subgrade elevation as specified in Section 31 00 00.

3.07 REMOVAL OF DEBRIS

- A. All demolished and cleared material and equipment shall become the property of the Contractor and shall be legally disposed of by the Contractor.
- B. Demolished concrete shall not be buried in structure backfill areas.

SECTION 31 23 16 STRUCTURAL EXCAVATION

PART 1 GENERAL

1.01 SUMMARY

- A. Excavation below existing grade for footings, slabs-on-grade and site structures.
- B. Related Sections:
 - 1. Section 31 23 23 Structural Fill.

1.02 REFERENCES

- A. State of California, Department of Transportation (Caltrans):
 - 1. Caltrans Standard Specifications (2018).
- B. ENGEO, "Foster City Levee Improvement Project FEMA 65.10(b) Levee Evaluation," March 5, 2020.

1.03 QUALITY ASSURANCE

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. Caltrans Standard Specifications.
 - 2. CAL-OSHA the Division of Occupational Safety and Health.
- B. Project Geotechnical Reports are available and should be reviewed prior to excavation or any other earthwork.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 **PREPARATION**

- A. Structure excavation shall be done in accordance with the requirements of Section 19-3, "Structure Excavation and Backfill," of the Caltrans Standard Specifications and the requirements of the Geotechnical Reports.
- B. Identify required lines, levels, contours, and datum locations.

- C. Locate, identify, and protect utilities that remain and protect from damage. All contractors shall call (800) 227-2600, 48 hours before digging. Excavation for underground facilities shall not be permitted prior to underground service alert's identification of existing utilities.
- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Prior to any earthwork being performed, the Geotechnical Engineer of Record shall review and confirm that the earthwork and foundation requirements defined by the structural plans and specifications are in conformance with the requirements of the Geotechnical Reports.

3.02 EXCAVATING

- A. See the project Geotechnical Reports for anticipated excavating conditions.
- B. Excavation and shoring is solely the Contractor's responsibility.
- C. Underpin adjacent structures that could be damaged by excavating work.
- D. Excavate to accommodate new structures and construction operations.
- E. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Cut utility trenches wide enough to allow inspection of installed utilities.
- H. Hand trim excavations. Remove loose matter.
- I. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 23 23.
- J. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- K. See project Geotechnical Reports for requirements to use on-site soils as engineered fill.

SECTION 31 23 19 DEWATERING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Dewatering required to lower and control ground water table levels and hydrostatic pressures, including seepage from adjacent facilities, to permit the execution of Work including excavation, backfill, and installation of structures, pipelines, conduit, and other work indicated on the Plans.
 - 1. Groundwater may need to be removed using sumps, pumps, or other methods.
 - a. The water level at excavation locations shall be maintained 2 feet below the bottom of the excavations.
 - b. The selection of equipment and method is solely the Contractor's responsibility.
 - c. The dewatering system implemented shall have minimal impact on the groundwater level surrounding the proposed excavations and prevent pumping soil fines with the discharge water.
 - d. Uncontrolled dewatering that causes settlement of the general area and affects existing improvements in the vicinity of the dewatered sites is unacceptable.
 - 2. Groundwater management including temporary storage in Baker tanks (or similar) and testing is required by the Regional Water Quality Control Board and other agencies prior to discharge of site-generated water.
 - a. Requirements of potential receiving facilities shall be determined in advance of construction.
 - b. Impacted groundwater may require discharge to a specialty facility.
 - c. See additional requirements in the Regional Water Quality Control Board authorization referenced in Section 01 41 00.
 - 3. Dewater excavations, channels and other structures including for seepage and precipitation.
 - 4. Provide all materials, equipment, labor and services necessary for care of water and erosion control. Excavation work shall not begin before the Erosion and Sedimentation Control Plan is in place.
- B. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 01 41 00 Regulatory Approvals.
 - 3. Section 01 35 29 Hazardous Materials Procedures.
 - 4. Section 01 57 23 Stormwater Pollution Prevention.
 - 5. Section 31 23 16 Structural Excavation.
 - 6. Section 31 23 33 Trenching and Backfilling.

- 7. Section 31 50 00 Excavation Support and Protection.
- 8. Section 31 52 00 Cofferdams.

1.02 REFERENCES

A. Occupational Safety and Health Act (OSHA).

1.03 QUALITY ASSURANCE

- A. Generate and implement an Erosion and Sedimentation Control Plan.
- B. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation of at least two (2) feet below the lowest foundation subgrade or bottom of pipe trench or prevailing excavation surface, and to allow material to be excavated in a reasonably dry condition.
 - 1. Assessment of dewatering and subsurface water migration and rates should be made during initial construction excavation procedures to determine the level of groundwater control and dewatering necessary.
 - 2. Materials to be removed from excavations shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required.
 - 3. Operate dewatering system continuously until backfill work has been completed.
- C. Permitting Requirements: The Contractor shall comply with and obtain the required State, County, and City permits where dewatering Work is performed.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Submit copy of Cal/OSHA excavation permit prior to excavation Work.
- C. Submit drawings and data showing the method to be employed in dewatering excavated areas 30 days before commencement of excavation.
 - 1. Materials shall include location, depth and size of well points, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.
 - 2. Include a written report outlining control procedures to be adopted if dewatering problem arises.
 - 3. Material submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water.
- D. Inspection reports.
- E. All required permits.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 ANTICIPATED FIELD CONDITIONS

- A. Groundwater may be encountered in excavations extending into or in close proximity to Young Bay Mud deposits.
- B. Temporary dewatering during construction may be necessary.
 - 1. Assessment of dewatering and subsurface water migration and rates shall be made by the Contractor during initial construction excavation procedures to determine the level of groundwater control and dewatering necessary.
 - 2. Responsibility for project dewatering is solely the Contractor's.

3.02 INSTALLATION

A. Install a dewatering system to lower and control all sources of water to permit the execution of Work to be performed under dry conditions as specified herein.

3.03 OPERATION

- A. Prior to any excavation or any other Work below the ground water table, place system into operation to lower water table as required and operate it continuously 24 hours a day, 7 days a week until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
- B. Place an adequate weight of backfill materials to prevent buoyancy prior to discontinuing operation of the system.
- C. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
- D. Maintain stability of sides and bottom of excavation.
- E. Construction operations shall be performed in the dry.
- F. Control of surface and subsurface water is part of dewatering requirements. Maintain adequate controls so that:
 - 1. The stability of excavation and constructed slopes are not adversely affected by saturated soil, including water entering prepared sub-base and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
 - 2. Erosion is controlled.
 - 3. Flooding of excavations or damage to structures does not occur.

- 4. Surface water drains away from excavations.
- 5. Excavations are protected from becoming wet from surface water or ensure excavations are dry before additional Work is undertaken.

3.04 WATER DISPOSAL

- A. Dispose of water removed from channels, excavation or other structures in a manner that:
 - 1. Will not endanger portions of work under construction or completed.
 - 2. Will cause no inconvenience to general operations or others working near site.
 - 3. Will comply with the stipulations of required permits for the disposal of water.
 - 4. Will Control Runoff: The Contractor shall be responsible for control of runoff in all Work areas including but not limited to excavations, access roads, parking areas, lay down, and staging areas. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the Work areas. All water shall be removed from the immediate work areas and shall be disposed of in accordance with applicable permits.
- B. Excavation Dewatering:
 - 1. The Contractor shall be responsible for providing all facilities required to divert, collect, control, and remove water from all construction Work areas and excavations.
 - 2. Drainage features shall have enough capacity to avoid flooding Work areas.
 - 3. Drainage features shall be so arranged altered as required to avoid degradation of the final excavated surface(s).
 - 4. The Contractor shall utilize all necessary erosion and sediment control measures as described herein to avoid construction related degradation of the natural water quality.
- C. Direct Discharge of Dewatering Effluent to Bay Prohibited:
 - 1. Regulatory permits prohibit the direct discharge of water removed from construction Work areas and excavations into San Francisco Bay, including temporary cofferdams.
 - 2. Contractor shall direct dewatering effluent to one of the following:
 - a. City of Foster City storm drain system inlet.
 - b. Foster City Central Lagoon.
 - c. An upland location surrounded by hay wattles for sheet flow into San Francisco Bay.
 - 3. Do not exceed storm drain capacities or cause public nuisance or damage.

3.05 CORRECTIVE ACTION

A. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or

damage to foundations or structures), perform Work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor at no additional cost to the City.

3.06 DAMAGES

A. Immediately repair damages to adjacent facilities caused by dewatering operations.

3.07 DISCONTINUING DEWATERING OPERATIONS

- A. Ensure compliance with all conditions of regulating permits and provide such information to the Engineer. Obtain written approval from the Engineer before discontinuing operation for dewatering system.
- B. Remove all facilities associated with dewatering systems from the project site after operations are discontinued.

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SECTION 31 23 23 STRUCTURAL FILL

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Filling, backfilling, and compacting for footings, pile caps, slabs-on-grade, site structures, and utilities constructed in below-grade excavations.
 - 2. Filling holes, pits, and excavations generated as a result of removal (demolition) operations
- B. Related Sections:
 - 1. Section 03 30 00 Cast-in-Place Concrete.
 - 2. Section 31 23 16 Structural Excavation.
 - 3. Section 31 23 30 Cellular Concrete Fill.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. C 136 Test Method for Sieve Analysis of Fine and Course Aggregates.
 - 2. D 1556 Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
 - D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 5. D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- B. ENGEO, "Foster City Levee Improvement Project FEMA 65.10(b) Levee Evaluation," March 5, 2020.

1.03 SUBMITTALS

- A. Site location for earthwork materials: The Contractor shall submit a list of sites and location of each, proposed to be used by contractor to provide each of the following materials:
 - 1. Imported Borrow
 - 2. Structure Backfill
 - Backdrain/Subdrain Material: Caltrans Class 2 permeable material shall be used as drainage material. Prefabricated geocomposite drainage may also be used if approved by the Engineer.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. State Standard Specifications, current governing edition.
- B. Testing and Inspection
 - 1. Contractor:
 - a. Will cooperate with and notify Engineer at least 48 hours in advance of inspections required.
 - b. Should the materials at the site proposed by the Contractor fail to meet the specified requirements, the Contractor shall propose another site to provide required material and pay for any subsequent inspections and testing necessary to verify compliance of proposed materials to those specified.
 - c. At least 60 days before any backfill Work is to be done, the Contractor shall clear the site proposed to provide imported borrow, structure backfill, or pervious backfill and allow the Engineer to take samples as required to test materials for conformance to these specifications.
 - d. Testing requirements shall be those described in Section 31 00 00-3.07C.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. Structural Fill: Conforming to the requirements of Section 19-3, "Structure Excavation and Backfill," of the Caltrans Standard Specifications and the requirements of the Geotechnical Reports.
- B. Imported Borrow: Conforming to the requirements of Section 19-7, "Borrow Excavation," of the Caltrans Standard Specifications and the requirements of the Geotechnical Reports.
- C. Backdrain/Subdrain Material: Caltrans Class 2 permeable material shall be uses as drainage material. Prefabricated geocomposite drainage may also be used if approved by the Engineer.
- D. Concrete for Fill: Cellular concrete as defined in Section 31 23 30.
- E. Granular material must contain at least 90 percent crushed particles when tested under California Test 205.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Retaining walls shall not be backfilled for at least 10 days after the last concrete and until concrete has attained 3,000 psi minimum.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify sub-drainage, damp-proofing, or waterproofing installation has been inspected.
- D. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- E. The geocomposite core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain.

3.02 PREPARATION

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.
- D. The filter fabric shall overlap a minimum of 3 inches at all joints, or per manufacturer's recommendations, whichever is greater, and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.
- E. The damaged filter fabric shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a minimum 6-inch overlap.

3.03 FILLING

- A. Maintain optimum moisture content of fill materials to attain required compaction density.
- B. Slope grades as noted on the Plans.
 - 1. Make gradual grade changes.
 - 2. Blend slope into level areas.
- C. Correct areas that are over-excavated.

SECTION 31 23 30 CELLULAR CONCRETE FILL

PART 1 GENERAL

1.01 SUMMARY

A. Lightweight cellular concrete classifications as designated on the Plans corresponds to the following cast densities and minimum compressive strength values:

Cellular Concrete Class	Cast Density (pcf)	Minimum Compressive Strength at 28 days* (psi)
	30-35	60
II	41-46	120
	55-60	160
IV	90-95	300

*Compressive Strength determined using ASTM C495 as modified herein.

- B. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 01 35 29 Hazardous Material Procedures.
 - 3. Section 01 57 23 Stormwater Pollution Prevention.
 - 4. Section 31 00 00 Earthwork.
 - 5. Section 31 10 00 Site Preparation.
 - 6. Section 31 05 19 Filter Fabric, Geocomposite Drainage, and Geotextiles.
 - 7. Section 31 23 19 Dewatering.
 - 8. Section 31 23 33 Trenching and Backfilling.
 - 9. Section 31 50 00 Excavation Support and Protection.
 - 10. Section 32 05 00 Mechanically Stabilized Earth Walls.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C150 Standard Specification for Portland Cement.
 - 2. ASTM C495 Test Method for Compressive Strength of Lightweight Insulating Concrete.
 - 3. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 4. ASTM C796 Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam.

- 5. ASTM C869 Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete.
- 6. ASTM C989 Standard Specification for Slag Cement for Use in Concrete and Mortars.
- B. State of California, Department of Transportation (Caltrans):
 - 1. Caltrans Standard Specifications (2018).

1.03 SUBMITTALS

- A. Submit mix design and quality control and placement plan at least 30 working days before placement of embankment material. Do not start work until authorized.
- B. Mix Design
 - 1. Submit a mix design that will produce a cast density at point of placement and a minimum compressive strength for the class described. Include laboratory data using the mix design verifying cast density and strength requirements.
 - 2. Field qualification test reports shall be certified with a signature by an official in responsible charge of the laboratory performing the tests.
- C. Quality Control and Placement Plan
 - 1. Placement of cellular concrete shall be in accordance with the information provided in the quality control plan.
 - 2. The submitted plan shall provide, as a minimum, the following elements:
 - a. An organization chart including names, telephone numbers, current certifications and/or titles, and roles and responsibilities of all those involved in the quality control program.
 - b. The process of communication by which quality control information will be disseminated to the appropriate persons, including materials suppliers.
 - c. Written evidence that cellular concrete installer is certified by and approved by the foam agent manufacturer
 - d. Location of equipment and batching areas.
 - e. Proposed construction sequence and schedule.
 - f. Type of equipment and tools to be used.
 - g. Material list of items and manufacturer's specifications
 - h. A copy of the AASHTO accreditation for the laboratory conducting the testing for compressive strength testing of cellular concrete cylinders.
 - i. Form work for installation of cellular concrete. Temporary form systems shall conform to manufacturer's specifications.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with all Federal, State and Local Codes and Safety Regulations. In addition, comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials shall be delivered, stored and handled per recommendations of cellular concrete manufacturer.
- B. Mix design shall be in accordance with the manufacturer's recommendations to achieve the required cast density at the point of placement and required compressive strength at 28 days.
- C. Mix design shall result in an essentially impermeable concrete matrix after cure.

2.02 ADMIXTURES

- A. Admixtures for accelerating the set time may be used under the manufacturer's recommendations.
- B. A foaming agent shall be used and tested in accordance with ASTM C796 and ASTM C869.

2.03 WATER

A. Mixing water shall be potable and free of deleterious amounts of acids, alkali, salts, oils, and organic materials.

2.04 PORTLAND CEMENT

- A. Portland cement shall comply with ASTM C150, Types II or V.
- B. Pozzolans and other cementitious materials may be used when approved by the manufacturer of the foaming agent.
- C. Fly ash and natural pozzolans shall comply with ASTM C618.
- D. Ground granulated blast furnace slag shall comply with ASTM C989, grade 100 or 120.

PART 3 EXECUTION

3.01 SPECIALIZED BATCHING, MIXING, AND PLACING EQUIPMENT

- A. Batching, mixing and placing equipment shall be capable of producing material that meets the requirements of this Section.
- B. Cement and water may be premixed and delivered to the site.
- C. Foam shall be added and mixed at the site using the aforementioned equipment.

3.02 PERSONNEL REQUIREMENTS

- A. The cellular concrete installer shall be certified and approved in writing by the foam agent manufacturer.
 - 1. The installer's foreman shall have a minimum of two years' experience in this work and shall have worked on at least three prior successful cellular concrete projects.
 - 2. The installer shall use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work.
- B. The Contractor's Representative shall be experienced in the placement of cellular concrete and shall be present on site full-time during placement.

3.03 QUALITY CONTROL AND QUALITY ASSURANCE TESTING

- A. Cast Density
 - 1. During placement of the initial batch, the installer shall check the density and adjust the mix as required to obtain the specified cast density at point of placement.
 - 2. At the point of placement, the density shall comply with the specified cast density. A single cast density test shall represent the lesser of 100 cubic yards or 2 hours production.
- B. Compressive Strength
 - 1. The compressive strength of cast cellular concrete fill shall be tested under ASTM C495 except as follows:
 - a. Furnish a sufficient quantity of molded and cured cylinders specimens. Unless otherwise approved, the specimens shall be 3 x 6 inch cylinders. During molding, place the concrete in 2 equal layers and raise and drop the cylinders 1 inch, 3 times on a hard surface or lightly tap the side or bottom of the cylinder to close any accidental entrained air. No rodding is allowed.
 - b. At a minimum, prepare a set of 3 test cylinders for each 300 CY of cellular concrete placed or a minimum of 2 sets of 4 cylinders each per day (whichever is greater). Specimens shall be covered and protected immediately after casting to prevent damage and loss of moisture. Specimens shall be cured in the molds for up to 7 days and then removed from the mold and moist cured. Stop moist curing specimens from 24 to 72 hours before the 28 day compressive strength test and allow to air dry. Specimens shall not be oven dried.

3.04 SITE PREPARATION

A. Surfaces to receive lightweight cellular concrete material shall be free of all loose and extraneous material. Surfaces shall be uniformly moist, and any excess water standing on the surface shall be removed before placing lightweight cellular concrete material.

- B. Because cellular concrete is lighter than water, it will be buoyant when cast below the groundwater level. Where groundwater is encountered in areas to receive cellular concrete, the groundwater shall be temporarily lowered to allow casting the cellular concrete and kept dewatered until the material has cured and engineered fill has been placed on top to prevent uplift.
- C. A cellular concrete lift is at risk of collapsing under its own weight. The cellular concrete shall be allowed to cure at least 24 hours before placing the next lift. If any collapse of a cellular concrete lift occurs, the entire lift of material shall be removed and disposed of prior to placing the next lift.

3.05 PLACEMENT

- A. Cellular concrete shall be a homogeneous mixture and all materials shall be approved prior to placement.
- B. Cellular concrete shall be jobsite mixed with foaming agent and placed with equipment specialized for cellular concrete lightweight material.
 - 1. Cement and water may be premixed and delivered to the job site and foaming agent added on site.
 - 2. Once mixed, the cellular concrete shall be conveyed promptly to the location of placement without excessive handling.
- C. Prior to placing each lift of cellular concrete, all intermediate surfaces shall be free of all soil debris and standing water. Cellular concrete lift thicknesses shall not exceed 4 feet or as recommended by the manufacturer without approval from Engineer. After curing for a time period as recommended by the manufacturer, any crumbling area on the surface shall be removed and scarified before the next layer is placed. Surface stepping to achieve grade and super-elevation under areas to be paved shall be between 5 inches and 6 inches in thickness. If more than one lift is required, scarify the layer to receive the next lift with a broom or rake. The last lift of cellular concrete shall not be less than 2 feet in thickness.
 - The curing period between lifts shall be as recommended by the manufacturer. If ambient temperatures are anticipated to be below 32 degrees F within 8 hours after cellular concrete placement, mixing water shall either be heated as approved by foaming agent the manufacturer or placement shall be prohibited. Cellular concrete shall not be placed on frozen ground. Cellular concrete shall not be placed in wet ground conditions. Dewatering is necessary where groundwater is present.
 - 2. Any material that does not meet the minimum specified strength within 28 days shall be removed and replaced by the Contractor at no additional cost.
 - 3. Paving machines and heavy construction equipment are not be permitted on cellular concrete until it has attained the specified 28 days compressive strength, or as recommended by the manufacturer.

3.06 ACCEPTANCE AND CORRECTION

- A. The contractor shall rectify any cellular concrete material rejected by the Engineer that does not meet the minimum required material properties or is not installed in accordance with this specification.
- B. Corrective measures are subject to the approval of the Engineer.
- C. Accepted corrected measures shall be performed by the contractor at no additional cost or extension of the contract time. This includes removal and replacement of rejected cellular concrete material not meeting the minimum material requirements or installed in accordance with this specification.

SECTION 31 23 33 TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Trench excavation, fine grading, pipe bedding, backfilling, and compaction for the following:
 - 1. Utility relocation.
 - 2. Irrigation supply connections.
 - 3. Street lighting restoration.
- B. Related Sections:
 - 1. Section 22 11 10 Irrigation Supply Piping.
 - 2. Section 31 00 00 Earthwork.
 - 3. Section 31 05 19 Filter Fabric and Geotextiles.
 - 4. Section 31 50 00 Excavation Support and Protection.
 - 5. Section 33 40 00 Storm Drains.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. C 131 Test Method for Resistance to Degradation of Small-Size Course Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - 2. C 136 Test Method for Sieve Analysis of Fine and Course Aggregates.
 - 3. D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft.lbf/ft^3 (2,700 kN.m/m^3)).
 - 4. D-6938 Test Methods for Density of Soil and Soil-Aggregate In-place by Nuclear Methods (Shallow Depth)
 - 5. D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.03 SUBMITTALS

- A. Products Data: For all proposed bedding and backfill materials.
 - 1. Material source.
 - 2. Gradation.
 - 3. Testing data and testing laboratory qualifications including lab certification.
- B. Trench excavation plan, drawings, and calculations as specified in Section 31 50 00.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General:
 - 1. Provide material having maximum particle size not exceeding 4 inches and that is free of leaves, grass, roots, stumps, and other vegetable matter.
 - 2. Materials derived from processing demolished or removed asphalt concrete are not acceptable.
- B. Geotextile Filter Fabric: As specified in Section 31 05 19.
- C. Crushed Rock: As specified in Section 32 11 23.
- D. Bedding: Class 2 Aggregate Base as specified in Section 32 11 23.
- E. Backfill: Structural backfill as specified in Section 31 23 23.

2.02 CONTROLLED DENSITY FILL

- A. Pending approval from Engineer and Geotechnical Engineer, controlled density fill may be used for trench bedding and backfill when specified compaction cannot otherwise be met due to field conditions such as conflicting utilities.
- B. Controlled Density Fill Components:
 - 1. Portland Cement: Type II low alkali portland cement as specified herein.
 - 2. Fly Ash: Class F fly ash conforming to ASTM C618.
 - 3. Water: As specified in Section 03 30 00.
 - 4. Admixture: Air entraining admixture conforming to ASTM C260.
 - 5. Fine Aggregate: Concrete sand, but need not conform to ASTM C33. No more than 12 percent of aggregate shall pass a No. 200 sieve, and no plastic fines shall be present.
 - 6. Coarse Aggregate: Lightweight aggregate conforming to ASTM C330.

Material	Weight	Specific Gravity	Absolute Volume Cubic Foot
Cement	30 pounds	3.15	0.15
Fly Ash	300 pounds	2.30	2.09
Water	283 pounds	1.00	4.54
Coarse Aggregate	613 pounds	1.12	8.76
Fine Aggregate	1,465 pounds	2.68	8.76
Admixture	4-6 ounces	-	2.70
TOTAL	2,691 pounds	-	27.00

C. Mix Design Criteria:

PART 3 EXECUTION

3.01 PREPARATION

- A. General:
 - 1. Trench Condition:
 - a. Install pipe and materials as specified herein and detailed on the Plans.
 - 2. Embankment Condition:
 - a. Exists where width of pipe trench exceeds limits specified herein.
 - b. Before laying pipes or electrical conduits in fill, place fill and compact it to not less than 2 feet above top of pipe or conduit.
 - c. After placing and compacting fill, excavate through fill and fine grade as required in this Section.
- B. Protection: Stabilize excavation as specified in Section 31 00 00.

3.02 INSTALLATION

- A. Trench Excavation:
 - 1. General Requirements:
 - a. If because of soil conditions, safety requirements or other reasons, trench width at top of pipe is increased beyond width specified in this Section, upgrade laying conditions or install stronger pipe designed in conformance with Specifications for increased trench width, without additional cost.
 - b. Pipe and Electrical Conduits:
 - 1) Lay pipe and electrical conduits in open trench.
 - 2) If bottom of excavation is found to consist of rock or any material that by reason of its hardness cannot be excavated to provide uniform bearing surface, remove such rock or other material to a depth of not less than 4 inches below bottom of pipe and refill to grade with bedding material placed at uniform density, with minimum possible compaction, at no additional cost.
 - 3) If bottom of excavation is found to consist of soft or unstable material which is incapable of properly supporting pipe, overexcavate trench 12 to 18 inches, as determined by the Engineer, place approved geotextile stabilization fabric and then refill trench to bottom of excavation with compacted approved granular material.
 - 4) Where indicated on the Plans, cradle pipe or conduit in concrete.
 - c. Trench Widths:
 - 1) Minimum Clear Width of Trench for Pipes shown on the Plans (Measured at Top of Pipe):
 - a) For pipe sizes 4 inches to and including 24 inches in diameter: Not less than outside diameter of pipe plus 24 inches.
 - b) For pipe sizes larger than 24 inches in diameter: Not less than outside diameter of pipe plus 24 inches.
 - 2) Maximum Clear Width of Trench for Pipe (Measured at Top of Pipe):
 - a) For pipe sizes 4 inches to and including 24 inches in diameter: Not to exceed outside diameter of pipe plus 30 inches.

- b) For pipe sizes larger than 24 inches in diameter: Not to exceed outside diameter of pipe plus 36 inches.
- d. For Manholes, Valves, or Other Accessories:
 - 1) Provide excavations sufficient to leave at least 12 inches clear between their outer surfaces and embankment or shoring which may be used to hold banks and protect them.
 - 2) Do not backfill with earth under manholes, vaults, tanks, or valves.
 - 3) Fill any unauthorized excess excavation below elevation indicated on the Plans for foundation of any structure with foundation material at no additional cost. Backfill material may be substituted for foundation material in areas where foundation material is not required and when approved by the Engineer.
 - 4) Backfilling of Manhole Excavation: Conform to backfilling requirements as specified for trenches in this Section.
- e. Water Pipe Appurtenances:
 - 1) Lay in trenches separate from those used for sewers.
 - 2) Unless otherwise specified or indicated on the Plans, lay in trenches having cover of not less than 3 feet below surface of ground and located at distance of not less than 10 feet from any parallel sewer trench.
- f. At Road Crossings or Existing Driveways:
 - 1) Make provision for trench crossings at these points, either by means of backfills, tunnels, or temporary bridges.
- B. Pipe Foundation:
 - 1. Over excavate bottom of trench to allow installation of approved geotextile stabilization fabric, pipe foundation material, and trench fine grading material as specified. Fill over-cut with foundation material as specified.
 - 2. Foundation Material:
 - a. Foundation material shall be as scheduled herein unless otherwise specified and shall be provided at all locations where Young Bay Mud is encountered or where other unstable soils are present at the bottom of the excavation.
 - b. Minimum thickness shall be 24 inches unless otherwise indicated on the Plans.
 - c. Approved geotextile stabilization fabric shall be placed beneath, on the sides, and on top of the foundation material. Minimum overlap of the filter fabric shall be 12 inches. Approved filter fabric may also be use on top of foundation material
 - d. Pipe foundation material shall be compacted to 90 percent maximum density at optimum moisture content or above according to ASTM D1557 before placing filter fabric on top of foundation material.
- C. Pipe Bedding:
 - 1. Bedding material shall be as scheduled herein unless otherwise specified.
 - 2. General:
 - a. Over excavate bottom of trench to allow installation of at least 6 inches, or 1/12 outside diameter of pipe, whichever is greater.

- b. Place bedding material at uniform density, with minimum possible compaction.
- 3. Bell or Coupling Holes:
 - a. Dig holes after trench fine grading has been placed.
 - b. Provide holes of sufficient width to provide ample room for grouting, banding, or welding.
 - c. Excavate holes only as necessary in making joints and to ensure that pipe rests upon prepared trench bottom and not supported by any portion of the joint.
- 4. Depressions for Joints, Other than Bell-and-spigot:
 - a. Make in accordance with recommendations of joint manufacturer for particular joint used.
- D. Pipe Bedding:
 - 1. Bedding material shall be as scheduled herein unless otherwise specified.
 - 2. After Pipe Laid:
 - a. Place bedding material under, around, and above pipe to 12 inches above top of pipe in maximum 6-inch lifts and compact to 90 percent of maximum density.
 - 3. Pipe Displacement:
 - a. Take necessary precautions in placement and compaction of bedding material to prevent displacement of piping.
 - b. In event there is movement or floating, re-excavate, re-lay, and backfill the pipe.
 - 4. Consolidation:
 - a. Bedding shall be mechanically compacted at optimum moisture content or above according to ASTM D1557 with vibratory or other compaction equipment. Water settling methods such as flooding and poling or jetting are prohibited.
- E. Trench Backfill:
 - 1. Backfill material shall be as scheduled herein unless otherwise specified.
 - 2. Place and compact backfill in accordance with following requirements and Section 31 00 00 (whichever is greater):
 - a. From 12 inches above top of pipe to natural surface level. Match finish grade as indicated on the Plans.
 - b. Backfill for Trench Cuts across Roadways and Paved Streets: Backfill trench to underside of specified pavement section with backfill material compacted to 90 percent relative compaction. Final backfill material for roadways and paved street sections to be compacted to 95 Percent relative compaction.
 - c. Trench Backfill for Longitudinal Trench Cuts in Roadways, Paved Areas, and Storage Areas. Backfill trench to underside of specified pavement replacement section with backfill material compacted to 90 percent relative compaction.

- d. Trench Backfill for Trench Cuts in Areas outside the Improved Section of Roadways and in Open Country: Backfill trench from 12 inches above top of pipe to finish grade with backfill material compacted to 90 percent relative compaction.
- e. Trench Backfill through Earth Slopes or Embankments Supporting Structures, Through Structural Fill, or Adjacent to and/or Under Structures: Backfill trench from 12 inches above top of pipe to finish grade with backfill material compacted to 95 percent relative compaction.
- f. Existing Conditions: Where existing underground pipes or conduits larger than 3 inches in diameter cross trenches above new work:
 - Backfill from bottom of intersecting trench to spring line of intersecting pipe or conduit with backfill material compacted to 90 percent of maximum relative density when tested in accordance with ASTM D 1556 or ASTM D 2922.
 - a) Provide controlled density fill material as specified in Section 02312 below existing pipe or conduit where backfill cannot be placed and compacted as specified. Controlled density fill shall have a minimum thickness of 12 inches beneath the existing pipe or conduit and shall extend up to the spring line of the pipe or conduit. Controlled density fill shall extend a minimum of 12 inches beyond the outside of the pipe or conduit in either direction and as a minimum shall extend to the edge of the trench crossing the pipe or conduit.
 - 2) Extend backfill material 2 feet on either side of intersecting pipe or conduit to ensure that material remains in place while other backfill is placed.
- g. Backfill shall be mechanically compacted at optimum moisture content or above according to ASTM D1557 with vibratory equipment weighing no more than 12 tons static weight. All backfill shall be placed in maximum 8-inch lifts. Water settling methods such as flooding and poling or jetting are prohibited.
- 3. Where excavations for utilities remove Young Bay Mud, the lower portions of trench backfill shall consist of light weight cellular concrete. The thickness of the cellular concrete should be at least equal to the thickness of Young Bay Mud removed. Since lightweight cellular concrete is lighter than water, buoyancy concerns should be considered in trench backfill design.
- F. Select or Native Material:
 - 1. Select or native material shall not be used as backfill unless otherwise approved by the Engineer.
- G. Excess Material:
 - 1. Remove excess excavated material and any excavated Bay Mud from the Project Site and dispose of legally off-site.

3.03 FIELD QUALITY CONTROL

- A. Tests:
 - 1. Confirmation Tests:
 - a. Contractor's Responsibilities:
 - 1) Accomplish specified compaction of trench backfill.

- Control operations by confirmation tests to verify and confirm that compaction work complies, and is complying at all times, with requirements specified in this Section concerning compaction, control, and testing.
- 3) Cost of Confirmation Tests: Paid for by the Contractor.
- 4) Qualifications of Contractor's Testing Laboratory: Provide lab certification.
- 5) Copies of Confirmation Test Reports: Submit promptly to the Engineer.
- b. Frequency of Confirmation Testing:
 - 1) Perform testing not less than as follows:
 - a) For Trenches: At each test location include tests for each type or class of backfill from bedding to finish grade.
 - b) In Open Fields: Two every 1,000 linear feet.
 - c) Along Dirt or Gravel Road or off Traveled Right-of-way: Two every 500 linear feet.
 - d) Crossing Paved Roads: Two locations along each crossing.
 - e) Under Pavement Cuts or within 2 Feet of Pavement Edges: One location every 400 linear feet.
- 2. Compliance Tests:
 - a. Frequency of Testing: Periodic compliance tests will be made by the Engineer to verify that compaction is meeting requirements previously specified.
 - b. If Compaction Fails to Meet Specified Requirements: Perform remedial work by one of the following methods:
 - 1) Remove and replace backfill at proper density.
 - 2) Bring density up to specified level by other means acceptable to the Engineer.
 - Properly moisture condition by mixing water into backfill or allowing the material to air dry, if necessary, under the observation of the Engineer or Engineer's representative.
 - c. Retesting:
 - 1) Costs of Retesting: Costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements shall be borne by the Contractor.
 - 2) Contractor's Confirmation Tests During Performance of Remedial Work:
 a) Performance: Perform tests in manner acceptable to the Engineer.
 - b) Frequency: Double amount specified for initial confirmation tests.
- 3. Water Testing Pipe:
 - a. After bedding the pipe, Contractor has the option to:
 - 1) Water-test pipe; or
 - 2) Backfill to surface, at his own risk, before water-testing pipe.
 - b. If pipe does not pass test, uncover pipe, locate leaks, repair and retest, repeating until pipe section under test passes.

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SECTION 31 50 00 EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for designing, furnishing and installing, maintaining, and removing excavation support and protection.
- B. Related Sections:
 - 1. Section 01 57 23 Storm Water Pollution Prevention.
 - 2. Section 31 23 16 Structural Excavation.
 - 3. Section 31 23 23 Trenching and Backfilling.
 - 4. Section 31 23 19 Dewatering.
 - 5. Section 31 52 00 Cofferdams.

1.02 REFERENCES

- A. American Institute of Steel Construction, Inc. (AISC):
 - 1. Manual of Steel Construction Allowable Stress Design.
- B. American Society of Civil Engineers:
 - 1. Guidelines of Engineering Practice for Braced and Tied-Back Excavations.
- C. California Code of Regulations (CCR):
 - 1. Title 8 Construction Safety Orders.
- D. California Labor Code Sections 6705 to 6707 (CLC).
- E. Department of the Navy Naval Facilities Engineering Command (NAVFAC):
 - 1. NAVFAC Design Manual 7.2 Foundations and Earth Structures.
 - 2. NAVFAC Design Manual 7.3 Soil Dynamics Deep Stabilization and Special Geotechnical Construction.
- F. State of California Department of Transportation (CALTRANS):
 - 1. CALTRANS California Trenching and Shoring Manual.
- G. United States Steel Corporation (USS):
 - 1. USS Steel Sheet Piling Design Manual.

1.03 DEFINITIONS

- A. General Engineering Design Practice: General engineering design practice in area of the Project, performed in accordance with recent engineering literature on subject of shoring and stability of excavations.
- B. Shoring: A temporary structural system designed to support vertical faces, or nearly vertical faces, of soil or rock for purposes of excavation. Shoring includes internally braced sheet piling, slurry walls, soldier piles and lagging, and other similar shoring systems. Sloping of the soil is not shoring.

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor assumes full and complete responsibility for excavation support and protection, including shoring design and installation.
- B. The review of Contractor's shoring system design, submittals and/or installations by the Engineer does not relieve Contractor of his responsibility for excavation safety. This requirement shall apply continuously and is not limited to normal working hours.
- C. Contractor's reliance upon documents furnished by City does not provide relief from these requirements.

1.05 SYSTEM DESCRIPTION

- A. Where General Engineering Design Practice is specified, provide drawings and signed calculations and have design performed by a Civil or Structural Engineer registered in California.
 - 1. Provide design calculations that clearly disclose assumptions made, criteria followed, and stress values used for the materials being used.
 - 2. Furnish references acceptable to Engineer substantiating appropriateness of design assumptions, criteria, and stress values.
- B. Design Requirements:
 - 1. General:
 - a. Design means for safe and stable excavations in accordance with general engineering design practice.
 - The preceding requirement shall not apply to trench excavation support conforming to standards set forth in CCR Title 8 - Construction Safety Orders.
 - b. Perform design in accordance with soil characteristics and design recommendations contained in the Project Geotechnical Reports issued by the City as referenced in these Provisions.
 - c. Design shoring and sheeting systems to resist additional lateral loads including loads induced by construction equipment or material stockpiles near the top of excavation.
 - d. Generally acceptable references for the design of shoring and excavations are as follows:
 - 1) CALTRANS California Trenching and Shoring Manual.

- 2) NAVFAC Design Manual 7.2 Foundations and Earth Design.
- 3) NAVFAC Design Manual 7.3 Soil Dynamics Deep Stabilization and Special Geotechnical Construction.
- 4) USS Steel Sheet Piling Design Manual.
- 5) Guidelines of Engineering Practice for Braced and Tied-Back Excavations published by American Society of Civil Engineers.
- e. Shoring design shall be performed by a Civil or Structural Engineer licensed to practice in California. Include costs for this shoring design in the bid.
- C. Performance Requirements:
 - 1. General:
 - a. Support faces of excavations and protect structures and improvements in vicinity of excavations from damage and loss of function due to settlement or movement of soils, alterations in ground water level caused by such excavations, vibration associated with installation and removal of excavation support structures, and related operations.
 - b. Herein Specified Provisions:
 - Complement, but do not substitute or diminish, obligations of Contractor for the furnishing of a safe place of work pursuant to provisions of the Occupational Safety and Health Act of 1970 and its subsequent amendments and regulations and for protection of the Work, structures, and other improvements.
 - 2) Represent minimum requirement for:
 - a) Number and types of means needed to maintain soil stability.
 - b) Strength of such required means.
 - c) Methods and frequency of maintenance and observation of means used for maintaining soil stability.
 - 2. Provide safe and stable excavations by means of sheeting, shoring, bracing, sloping, and other means and procedures, such as draining and recharging groundwater and routing and disposing of surface runoff, required to maintain the stability of soils and rock.
 - 3. Provide support for trench excavations for protection of workers from hazard of caving ground.

1.06 SUBMITTALS

- A. Shop Drawings and Calculations:
 - 1. In accordance with requirements in California Labor Code for trench excavations 5 feet or more in depth and for trenches less than 5 feet in depth when there is potential for cave-in. Submit in advance of excavation work, detailed drawings showing means for safe and stable excavations.
 - a. Where such drawings vary from excavation support standards set forth in California Code of Regulations Title 8 Construction Safety Orders, submit design calculations pursuant to general Engineering design practice.
 - b. Provide means for safe and stable excavations that are not less effective than required in CCR Title 8 Construction Safety Orders.

- 2. For excavations other than trenches, submit, in advance of excavation work, design calculations as performed pursuant to general engineering design practice, as specified in this Section, and detail drawing showing means for safe and stable excavations. In design calculations and detail drawing, cover, as a minimum:
 - a. Excavations adjacent to structures and other improvements, and
 - b. Excavations 5 feet or more in depth, or less than 5 feet in depth when there is potential for cave-in, at other locations.
- 3. Submit Following:
 - a. Provide calculations for the different load, support, and other conditions that occur during the sequence of installation of shoring, construction of facilities protected by the shoring, and sequence of removal of shoring.
 - b. Provide sketches showing the condition at various stages of installation and removal of shoring.
 - c. Show structures, pipelines, and other improvements located near the shoring, and the shoring on a plan.
 - d. When utilities penetrate the shoring, submit an elevation of all sides of the shoring showing the locations of the penetrations. Submit details on ground support and sealing around utility penetrations.
- B. Detailed dewatering plan showing all proposed facilities to protect excavations from groundwater intrusion, methods of discharge, and provisions for complying with the Storm Water Pollution Prevention Plan and regulatory permits.
- C. Control Points and Schedule of Measurements:
 - 1. Submit location and details of control points and method and schedule of measurements in accordance with requirements of this Section.
 - 2. Promptly upon constructing control points and making measurements at such control points, as specified in this Section, submit copy of field notes with such measurements. The field notes shall show the current measurement and the change in measurement from the first measurement taken.
- D. Vibration Monitoring and Schedule of Measurements:
 - 1. Submit location and details of vibration monitoring points and method and schedule of measurements in accordance with requirements of this Section and Section 01 57 00, Environmental Control.
 - 2. Promptly upon constructing vibration monitoring points and making measurements at such points, as specified in this Section, submit copy of field notes with such measurements. The field notes shall show the current measurement and the change in measurement from the first measurement taken.
- E. Detailed Sequence of Installation and Removal of Shoring:
 - 1. Consider effects of ground settlement in the sequence of installation and removal of shoring.
 - 2. Provide sketches showing the conditions at various stages in the sequence of installation and removal of shoring.

- 3. Clay and silt may stick to sheet piles when sheet piles are removed.
- F. Submit submittals for stability of excavations as a complete package and include all items required in this section. Incomplete submittals will not be reviewed and will be returned for resubmittal as a complete package. Complete submittal shall include information regarding the dewatering system specified in Section 31 23 19.

1.07 SEQUENCING AND SCHEDULING

- A. Do not begin Work on excavations, trenches, and means for providing stability of excavation and trenches until submittals have been accepted by Engineer and until materials necessary for installation are on site.
- B. Submit submittals a minimum of 30 days prior to the scheduled date to begin excavation work.
- C. Do not begin construction of any shoring or excavation operations until:
 - 1. Control points as specified in this Section and as indicated in the Plans for existing structures and other improvements have been established and surveyed to document initial elevations and locations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 INSTALLATION AND REMOVAL

- A. Install means for providing safe and stable excavations as indicated in the submittals.
- B. Except for concrete encased soldier piles, slurry walls, and similar shoring systems, remove shoring by completion of the Work. Select shoring system and method of removal, which will minimize soil that sticks to shoring from creating large voids and causing settlement. To prevent settlement caused by pulling shoring, fill voids with sand, pea gravel, or pressure injected grout. The methods used shall prevent settlement. Pressure preservative treated wood lagging may be left in place when acceptable to the Engineer.

3.02 MAINTENANCE

- A. Where loss of soil occurs, plug gap in shoring and replace lost soil with fill material acceptable to Engineer.
- B. Where measurements and observations indicate possibility of failure or excessive movement of excavation support, determined in accordance with general engineering design practice, take appropriate action immediately.

3.03 CONTROL POINTS

- A. Establish control points on shoring and on structures and other improvements in vicinity of excavation for measurement of horizontal and vertical movement.
 - 1. Set Control Points On Shoring Support System:
 - a. Set points at distances not exceeding 25 feet at each support level.
 - b. Support levels shall be levels of tie-backs, wales, bottom of excavation, and other types of supports.
 - 2. Set control points in corners of existing structures and on curbs, manholes, and other improvements as required.
- B. Provide plumb bobs with horizontal targets indicating original position of plumb bobs in relation to shoring at control points located on shoring.
- C. Perform horizontal and vertical survey and measurement of control points at least once every week.

3.04 VIBRATION MONITORING

- A. Establish vibration monitoring points on structures and other improvements in vicinity of excavation for measurement of vibration velocities.
 - 1. Set points at corners and along sides of existing structures and other improvements as required. Points along sides shall be set at distances not exceeding 25 feet.
- B. Perform vibration monitoring at least once every two hours during installation and during removal of shoring.
SECTION 31 52 00 COFFERDAMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: All labor, materials, equipment, facilities, transportation, and services for all cofferdams necessary at the site to work in the dry.
- B. **Work Included:** All Work necessary to protect excavations and construction from water flowing into the Work area from San Francisco Bay and interfering with the progress of the Work.
 - 1. Also included are all equipment and construction necessary for cofferdams including sheeting and shoring, grout seals, falsework, and other related appurtenances.
- C. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 01 57 23 Stormwater Pollution Prevention.
 - 3. Section 31 23 16 Structural Excavation.
 - 4. Section 31 23 19 Dewatering.
 - 5. Section 31 50 00 Excavation Support and Protection.

1.02 REFERENCES

- A. Cofferdams shall be in accordance with the provisions of Section 19-3.03 of the State Standard Specifications, except as modified herein.
- B. Occupational Safety and Health Act (OSHA).

1.03 **PERMITTING REQUIREMENTS**

- A. The Contractor shall comply with the applicable Federal, State and local permits obtained by the City where work is performed.
- B. Follow NMFS requirements for cofferdam installation and removal.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Submit copy of Cal/OSHA excavation permit prior to installation of cofferdams.
- C. Prior to beginning any demolition or clearing activities, the Contractor shall submit a cofferdam and/or shoring plan to the Engineer for review.

- 1. The cofferdam/shoring plan shall be part of an overall excavation management plan as specified in Section 31 50 00 and include shoring plans, cofferdam plans; and dewatering provisions as specified in Section 31 23 19.
- 2. Contractor shall incorporate his overall working schedule into the cofferdam/shoring plan, and account for predicted tides and other factors.
- 3. Shoring and/or cofferdam plans shall be prepared and stamped by a Registered Civil or Structural Engineer in the State of California.
- 4. The Owner's review of any cofferdam or shoring plan shall not relieve the Contractor from his obligation to meet these Specifications and applicable OSHA and Cal OSHA requirements for excavation safety.
- D. Equipment List: Submit list of proposed equipment, including loaded weights, to be used on the job sites and their weights.
- E. Inspection reports.
- F. All required permits.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EQUIPMENT

- A. Equipment shall be suitable for the Work to be done and shall be in good operating condition. Equipment operators and workmen are to be skilled in such operations and shall be competently supervised.
- B. Weight of construction equipment shall be adequately distributed or limited to reduce the potential for subgrade disturbance, slope instability, and damage to buried utilities. Contractor shall submit a description of all proposed equipment, including gross vehicle weights and weight distribution methods, prior to bringing any equipment to the site.
 - 1. Construction equipment shall maintain slow velocities; 10 miles per hour maximum.
 - 2. The Contractor shall use lightweight low-ground-pressure equipment. See Section 31 00 00 3.02 for additional requirements.
 - 3. Haul routes for trucks as well as pile driving equipment shall be kept level and smooth to prevent equipment from bouncing and imposing high dynamic loads on subgrades or fill.
- C. Construction equipment shall not remain parked within 50 feet of a levee slope.

3.02 SITE CONDITIONS

- A. Prior to bidding on the Work, the Contractor shall familiarize himself with Project Site conditions. No allowance will be made by the City for any unfavorable conditions or events which should have been foreseen from a thorough examination of the contract documents, the Geotechnical Report and the Site.
- B. The Contractor shall be prepared to encounter sandy and gravelly soils as well as some concrete debris, and the work may require additional excavation to complete cofferdam installation.
- C. Project ground elevations range from approximately -2 feet to +12 feet mean sea level (NAVD on the project datum). Depending upon the daily tide, water could always be present.

3.03 METHODS

- A. Methods used to control the entrance of water to work sites are solely at the discretion of the Contractor, insofar as those methods are in accordance with relevant provisions of the Safety Orders.
- B. Cofferdam construction shall be considered in conjunction with other dewatering provisions.

3.04 COFFERDAM LOCATION AND ELEVATION

- A. Cofferdams constructed to control tidal water from San Francisco Bay and Belmont Slough shall be constructed within the general footprints shown on the Plans.
- B. The minimum top of cofferdam elevation shall be 11 feet NAVD.
- C. Cofferdams shall not be constructed within environmentally sensitive areas identified on the Plans or fenced in the field.
- D. Cofferdam locations are subject to review and approval by the City.

3.05 COFFERDAM INSTALLATION

- A. To prevent fish entrainment during installation, cofferdam sheet piles shall be installed beginning from the upslope end. Place the final closure piece under the direction of the City's Biologist.
- B. Cofferdams shall be installed in a single day during low tide. Low tide is defined as a tidal elevation below the bottom of coffer dam.
- C. If the coffer dam cannot be installed within one day and tidal water enters the Work area, pile driving shall cease until the next low tide.
- D. If tidal water remains inside of the unfinished coffer dam at the next low tide, the City will inspect the Work prior to the commencement of activities to ensure fish are not present.

- E. If fish are present, reasonable efforts shall be made to capture and move the stranded aquatic life observed in the dewatered areas.
- F. Measures shall be taken to minimize harm and mortality resulting from dewatering activities.
- G. Capture methods may include fish landing nets, dip nets, buckets and by hand.
- H. Captured aquatic life shall be released immediately in the closest body of water adjacent to the Work site.
- I. These measures do not allow for the take or disturbance of any State or federally listed species.

3.06 COFFERDAM REMOVAL

- A. All facilities constructed to protect excavations and control water during construction are temporary, the property of the Contractor, and shall be removed from the Project Site upon completion of all work necessitating the cofferdam.
- B. Before removing cofferdams, allow suspended sediment to settle as directed by the Engineer.
- C. The provisions of Paragraph 3.05 apply to cofferdam removal activities.

3.07 COFFERDAMS AT LAGOON OUTFALL

- A. Contractor shall install cofferdams at the Lagoon Outfall as required to complete the Work.
- B. At the request of the Contractor, the City will shut down the Central Lagoon Pump Station for up to three weeks, during the period between April 15 and November 15, to allow the Contractor to install a cofferdam system at the outlet.
 - 1. Cofferdams may not be initially installed at the Lagoon outfall during the winter, defined as November 15 through April 15.
- C. C.Once installed, the cofferdam system shall provide for unobstructed flow through at least one of the three existing 12-foot by 5-foot reinforced concrete box culvert outfalls at all times.
- D. D.Anticipating heavy rainfall or other extenuating circumstances, the City may direct the Contractor to rapidly remove any obstructions to outfall discharge through all box culverts. This could occur any time during winter months.
- E. E.Cofferdam installation and removal shall conform to Articles 3.05 and 3.06, respectively, of this Section.

END OF SECTION

SECTION 32 01 16 PAVEMENT RESTORATION AND REHABILITATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Resurfacing roads and paved surfaces in which surface is removed or damaged by installation of new Work.
 - 2. Depth of aggregate base course shall match depth of existing aggregate base course or shall be a minimum of 6 inches, whichever is greater, unless otherwise indicated on the Plans.
 - 3. Full width slurry seal of Beach Park Boulevard from Teal Street to Wheel House Lane.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-in-place Concrete.
 - 2. Section 32 11 23 Aggregate Base Course.
 - 3. Section 32 12 16 Asphaltic Concrete Paving.

1.02 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Limiting Dimensions:
 - a. Determine the exact lengths and dimensions of such roads, pavements, parking areas, and walks that will require removal and replacement for new Work.
 - b. Join existing surfaces to terminals of new surfacing in smooth juncture.

1.03 SUBMITTALS

- A. Mix Designs:
 - 1. Prior to placement of asphalt concrete, submit full details, including design and calculations for the asphalt concrete mix proposed.
 - 2. Submit gradation of aggregate base.
 - 3. Submit proposed mix design of portland cement concrete.
 - 4. Submit certificates from the slurry seal supplier stating that materials comply with the requirements of this Section.
- B. Submit schedule of slurry application by segment of Beach Park Boulevard, notated by intersecting streets.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aggregate Base Course: As specified in Section 32 11 23.
- B. Asphalt Pavement: As specified in Section 32 12 16.
- C. Portland Cement Concrete Replacement Material: Class F concrete as specified in Section 03 30 00.
- D. Slurry Seal
 - 1. Aggregate shall be Type II black aggregate per Section 37-3.02 of the State Standard Specifications.
 - Asphaltic Emulsion shall be LMCQS1H per State Standard Specification Section 94.
 - 3. Type II slurry seal shall be 13 to 15 pounds of aggregate per square yard of slurry applied. The mix shall be applied within 10 percent of this rate. Asphalt emulsion shall be 13% to 18% of dry aggregate weight.

2.02 EQUIPMENT

- A. Roads, Pavements, Parking Areas, and Walks:
 - 1. Equipment Requirements: Good condition, capable of performing work intended in satisfactory manner.

2.03 ACCESSORIES

- A. Material for Painting Asphalt Concrete Pavement: Tack coat as specified in Section 32 12 16.
- B. Temporary Pavement Markers for Slurry Seal Operations: Cataphote or equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Aggregate Surface Removal Replacement:
 - 1. When trench cut is in aggregate surfaced areas, replace the aggregate base course material with material matching the existing material, at 95 percent relative compaction. Depth of aggregate base course shall match depth of existing aggregate base course or shall be a minimum of 6 inches, whichever is greater, unless otherwise indicated on the Plans.
- B. Pavement Removal and Temporary Asphalt Replacement:
 - 1. Install temporary asphalt pavement or first course of permanent pavement replacement immediately following backfilling and compaction of trenches that have been cut through existing pavement.

- 2. Except as otherwise provided, maintain this temporary pavement in a safe and reasonably smooth condition until required permanent pavement is installed.
- 3. Remove and dispose of temporary paving from project site.
- 4. Where longitudinal trench is partly in pavement, replace pavement to original pavement edge, on a straight line, parallel to centerline of roadway.
- 5. Where no part of longitudinal trench is in pavement, surfacing replacement shall only be required where existing surfacing materials have been removed.
- C. Asphalt Pavement Replacement:
 - 1. Replace asphalt pavement to same thickness as adjacent pavement and match as nearly as possible adjacent pavement in texture, unless otherwise indicated on the Plans.
 - 2. Cut existing asphalt pavements to be removed for trenches or other underground construction by wheel cutter, clay spade, or another device capable of making neat, reasonably straight, and smooth cut without damaging adjacent pavement. Cutting device operation shall be subject to acceptance of Engineer.
 - 3. Cut and trim existing pavement after placement of required aggregate base course and just prior to placement of asphalt concrete for pavement replacement, and paint trimmed edges with material for painting asphalt concrete pavement immediately prior to constructing new abutting asphalt pavements. No extra payment will be made for these items, and all costs incurred in performing this Work shall be incidental to pipe laying or pavement replacement.
 - 4. Conform replacement of asphalt pavement to contour of original pavement.
- D. Portland Cement Concrete Pavement Replacement:
 - 1. Where trenches lie within Portland cement concrete section of streets, alleys, sidewalks, and similar concrete construction, saw cut such concrete (to a depth of not less than 1-1/2 inches) to neat, vertical, true lines in such manner adjoining surfaces are not damaged.
 - 2. Place portland cement concrete replacement material to dimension as indicated on the Plans.
 - 3. Provide expansion joints that match existing.
 - 4. Before placing replacement concrete, thoroughly clean edges of existing pavement and wash with neat cement and water.
 - 5. Surface Finish: Wood float finish.
- E. Curb, Gutter, and Sidewalk Replacement:
 - 1. Where any concrete curb, gutter, or sidewalk has been removed or displaced, replace to nearest construction joints with new Class B curb, gutter, or sidewalk to same dimensions and finish as original construction that was removed.
 - a. Provide expansion joints of same spacing and thickness as original construction.

- F. Pavement Matching:
 - 1. Trim existing asphalt pavements which are to be matched by pavement widening or pavement extension to neat true line with straight vertical edges free from irregularities with saw specifically designed for this purpose. Minimum allowable depth of cut shall be 1-1/2 inches.
 - 2. Cut and trim existing pavement after placement of required aggregate base course and just prior to placement of asphalt concrete for pavement widening or extension, and paint trimmed edges with material for painting asphalt concrete pavement immediately prior to constructing new abutting asphalt concrete pavements. No extra payment will be made for these items and all costs incurred in performing this work shall be incidental to widening or pavement extension.
- G. Slurry Seal:
 - 1. For work in street areas, at least five working days prior to commencing Work, the Contractor shall submit his spreading schedule to the Engineer for approval. Based upon the spreading schedule, the Contractor shall notify residents and businesses of the proposed work by fliers and shall post temporary "No Parking" signs at least 72 hours prior to start of work on the street. "No Parking" signs shall post one week prior to start of work on the Parking lots to be slurry sealed. The distance between the "No Parking" signs shall not exceed 50 feet. Requests for changes in the schedule shall be submitted by the Contractor to the Engineer for approval at least 72 hours prior to the scheduled sealing of the streets affected. Work shall be coordinated with the Parks and Recreation Department to avoid conflict with their scheduled events.
 - 2. Prior to beginning work, all existing pavement striping and markings shall be removed by grinding as to leave the surface free of striping material, without damaging the existing pavement. Any damage to the existing pavement shall be repaired by the Contractor at his expense.
 - a. The Contractor is notified that the existing yellow thermoplastic striping may contain lead. Contractor shall be responsible for the removal and legal disposal of the ground material necessitated by the work. Payment for this work shall be considered included in other items of work and no additional compensation shall be made.
 - b. Immediately prior to the application of the slurry seal, the street shall be thoroughly cleaned of all foreign material such as, but not limited to, leaves, sand, gravel, dirt and vegetation. The roots of any vegetation growing in the roadway shall be treated with an herbicide (Roundup or approved equal), following the manufacturer's recommendations for application.
 - c. The method of street cleaning shall be by power vacuum broom and hand broom and shall be performed so as to remove all visible loose materials on the existing pavement surface to be slurry sealed. The Engineer shall approve surface preparation before slurry sealing proceeds.
 - 3. Rims and covers for all manholes, utility and monument boxes shall be masked and covered to prevent their coverage with asphalt slurry. If covers are defaced, Contractor shall clean to the satisfaction of Engineer.

- 4. Work shall be in conformance with applicable portions of Section 37-2 of the State Specifications and shall not be placed when atmospheric temperature is less than 65^o F. or during foggy, rainy or unsuitable weather.
- 5. The application of slurry shall not commence until after 9:00 a.m. and shall be sufficiently cured to be open to traffic by 4:00 p.m. Areas which have been freshly slurried shall be closed from the time the application begins until the Engineer determines the mixture has achieved sufficient set to be opened to traffic. Slurry sealed streets shall be properly compacted using Pneumatic roller. All loose aggregate shall be swept.
- 6. Temporary pavement markers shall be placed per manufacturer's standards at locations of existing striping on all slurry sealed streets. Slurry sealed streets shall be swept two times after the application of the slurry seal: two weeks, and six weeks after the application of the slurry seal to remove the loose aggregate. The method of street cleaning shall be by power vacuum broom and hand broom and shall be performed so as to remove all visible loose materials on the newly slurry sealed streets.
- 7. The contractor shall roll all streets with a self-propelled 10-ton Pneumatic roller with a tire pressure of 50 PSI and equipped with a water spray system. The contractor shall make four complete passes on the streets the same day they are slurried before opening for traffic. The contractor shall be responsible for proper scheduling of the work such that the rolling can be properly done before the street is opened to traffic. All costs associated with this item shall be included in the bid price of slurry and no additional payment shall be allowed therefore.
- 8. Slurry sealed areas that have been improperly prepared, are not uniform in color, have been improperly sealed, or have failed for any other reason prior to final acceptance shall be redone at Contractor's expense to the satisfaction of the Engineer. Slurry seal deposited on other than asphalt concrete surfaces shall be cleaned to the satisfaction of the Engineer.
- 9. When necessary to provide vehicular or pedestrian crossings over the fresh slurry, the Engineer may direct the Contractor to spread sufficient sand or rock dust on the affected area or place a wood walkway to eliminate tracking or damage to the slurry. Sand or rock dust used for this purpose shall be at the Contractor's expense.
- 10. Contiguous street segments (defined by intersections) shall not be slurry sealed on the same day, unless authorized by the Engineer.
- 11. Striping Cat-Tracks shall be placed no later than seven (7) calendar days after the completion of the slurry seal work. Final striping shall be started no later than fourteen (14) calendar days form the completion of slurry seal work.

3.02 FIELD QUALITY CONTROL

- A. Tests:
 - 1. Asphalt concrete as specified in Section 32 12 16.
 - 2. Concrete as specified in Section 03 30 00.

- B. Inspection:
 - 1. Asphalt Concrete:
 - a. Lay 10-foot straightedge parallel to centerline of trench when the trenches run parallel to street and across pavement replacement when trench crosses street at angle.
 - b. Remove and correct any deviation in cut pavement replacement greater than 1/4 inch in 10 feet.
 - 2. Portland Cement Concrete Replacement Pavement:
 - a. Lay 10-foot straightedge either across pavement replacement or longitudinal with centerline of gutter or ditch.
 - b. Remove and correct any deviation in cut pavement replacement greater than 1/4 inch in 10 feet.

END OF SECTION

SECTION 32 01 90 MITIGATION PLANTING MAINTENANCE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to the work of this Section.
- B. Mitigation and Monitoring Plan (MMP) referenced in Specification Section 01 11 00.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for Mitigation Planting Maintenance as specified in this Section during the planting maintenance period, referred to herein as the Maintenance Period. The work includes establishing the plantings, providing pest and disease control, plant replacement, weed and invasive plant removal, and maintaining the irrigation system during the Maintenance Period.
 - 1. Mitigation planting areas include the hydroseeded areas and mitigation plantings include the seeded species.
- B. Related Work:
 - 1. Irrigation
 - 2. Hydroseeding
 - 3. Mitigation Planting

1.03 QUALITY ASSURANCE

- A. Biologist: The Owner will provide a Biologist (Owner's Representative) who will review mitigation planting maintenance work.
- B. Licensing & Experience: See Specification Section Mitigation Planting
- C. Plant and Planting Materials: See Specification Section Mitigation Planting.
- D. Phytophthora Protections: See Specification Section Mitigation Planting.
- E. Guarantee: Guarantee the mitigation plantings throughout the Maintenance Period. Guarantee does not include damage or loss of restoration plantings caused by fires, floods, freezing rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.

1.04 MAINTENANCE PERIOD

- A. Time Limits: The Maintenance Period commences from the date of approval of substantial completion and extend for 365 calendar days (1-year), or until final completion approval, whichever is later.
- B. After the expiration of the 1-year mitigation maintenance period, the Owner will require an additional 4-years of maintenance and monitoring, which will be under a separate contract. The Contractor or its landscaping subcontractor will be granted this contract, unless the Owner is dissatisfied with performance under this Contract.

1.05 REVIEWS

- A. <u>Substantial Completion Review:</u> Specifically request this review at least (5) five days in advance of the proposed start of the Maintenance Period. The Owner's Representative will review for a final checklist of minor items to be completed. The Maintenance Period commences once the items are completed and approved by the Owners Representative. Items to be checked during this review include all mitigation planting and hydroseed areas.
- B. <u>Final Review</u>: Specifically request this review at least (5) five days in advance of the end of the Maintenance Period. Failure to request this notice automatically extends the date of completion. The Maintenance Period will continue until final completion is approved by the Owners Representative. Items to be checked during this review include all mitigation planting and hydroseed areas including all punch-list items identified at Substantial Completion Review.

1.06 MAINTENANCE PERIOD SUBMITTALS

A. Pesticides: If pesticides are used, submit written certificate showing rates, materials, and date to the Owner within five (5) days of each application.

PART 2 MATERIALS

2.01 WATER

- A. Water for irrigation to be paid for by the Owner.
- B. The Owner will provide water source locations as close as may be feasible to the planting sites. Hoses or other methods of transportation of water to planting sites are the sole responsibility of the Contractor.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor's Responsibility: Work installed under this Contract damaged by vandalism, vehicular damage and/or theft during the installation of the work and

up to the Substantial Completion approval, is to be repaired or replaced without additional cost to the Owner.

B. Owner's Responsibility: Throughout the Maintenance Period, these damages and similar factors such as excessive litter, abuse and defacement will be the Owner's responsibility to repair or replace and will not be a part of this Contract. No planting is to be guaranteed beyond the Maintenance Period, except as to conformance to specified species and variety, and as specified in Specification Section Mitigation Planting.

3.02 BASIC REQUIREMENTS

- A. Irrigation: Maintain all planting areas at optimum moisture for plant growth.
 - 1. Adjust and clean all emitters and other equipment as necessary to maintain the system.
 - 2. Hand water plants not adequately served by the irrigation system, and hand water plants where no irrigation system is present.
 - 3. For bid purposes, assume 3-5 gallons per container plant every two weeks during the dry months, and assume 8 dry months in the year. Additional visits as determined by the Owner's Representative to be paid for on a per event basis.
- B. Erosion: Repair settlement of soil and plants and soil erosion and replant areas to the satisfaction of the Owner's Representative. Repair eroded soil berms as required to assist in irrigation.
- C. Protection of Work: Take particular precautions to protect structures, fencing, overhead and underground utilities, and all existing trees to remain. All damaged, stained, or disturbed items are to be replaced or repaired at no additional expense to the Owner, and to the satisfaction of the Owner's Representative, prior to Final Review.
- D. Clean-Up: Keep all mitigation planting areas reasonably free from accumulation of debris, as well as topsoil, and other materials resulting from planting maintenance activities.
- E. Inspections:
 - 1. Inspection and documentation of mitigation plantings for MMP compliance is to take place every January, April, July, and October. See project MMP for more details.
 - 2. Report preparation for MMP compliance is to take place in January following the monitoring year. See project MMP for more details.
 - 3. Check mitigation planting areas at least once every two weeks when irrigation is required and at least once a month when rainfall alleviates the need for irrigation.
 - 4. At each mitigation planting area examine conditions of plants, plant protection devices, stability of the soil, weed growth and organic mulch.

5. At times when irrigation is required, examine the soil moisture around each mitigation planting area to ensure that irrigation is providing adequate moisture to each plant.

3.03 WEED AND INVASIVE PLANT CONTROL

- A. Weeds: Complete mandatory weeding of the mitigation planting areas during the first two weeks of January, March, May and July as occurring during the Contract maintenance period. Remove all weeds, regardless of height or coverage, at these times.
- B. Invasive Plants: Take action, using the removal methods listed below, if invasive plants cover more than 5 percent of the mitigation planting area. See the project MMP for more details.
- C. Removal Methods:
 - 1. Weeding within planting basins / beds: remove weeds by hand pulling only.
 - 2. Weeding between planting basins / beds: mechanically remove weeds to within one inch of the soil surface using hand clippers / hand-held mechanical mowers / weed whips before they set seed.
 - 3. Focused grazing with sheep or goats to remove invasive plants before they set seed.
 - 4. Apply herbicides only as a last resort, and with the written approval of the Owner's Representative. See project MMP for more details.
 - 5. Weed removal is to cause minimal disruption to the root systems of installed plants, keep the weed fabric / erosion control fabric intact, and not expose large areas of bare soil.
 - 6. Do not remove any healthy material planted under this Contract.
 - 7. Do not remove any native species that colonize gaps between plantings.
 - a. Train all maintenance personnel to differentiate between native and nonnative species.
 - b. Take care to avoid damaging naturally recruiting native riparian and wetland species during maintenance and non-native species removal.
 - 8. See clauses on Phytophthora Protections in Specification Section Mitigation Planting with reference to use of weed removal equipment.

3.04 PLANT REPLACEMENTS

- A. Performance Criteria: For MMP compliance, the total plant cover in mitigation planting areas resulting from planted vegetation and native / naturalized plant recruitment, at the end of the first year of monitoring, is to be equal or greater than 80 percent of the mitigation planting areas. See project MMP for more details.
- B. General: Immediately replace any dead or damaged plants as they become apparent or as directed by the Owner's Representative. This includes plants in an unhealthy or

unsightly condition and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence.

- 1. Carry out replacements to the specifications and as required to match adjacent plantings at no additional cost to the Owner.
- 2. Plants are to be from the same nursery source as the original plants. If an alternate nursery source is to be used, obtain the written approval of the Owner's Representative prior to bringing plant material to site.
- C. Plant species chosen as replacement materials for dead plants will be based on a critical evaluation of the vigor and growth of the plantings by the Owner's Representative. Species that are evidently well adapted to the plantings site and are rapidly establishing will generally be used to replace dead plants.
- D. For bid purposes assume that 30 percent of the hydroseed area will need to be reseeded, assuming a 50% first year mortality rate and compliance with the MMP to provide 80 percent cover.
- E. Inform the Owner's Representative prior to replacing any plant material.

3.05 CONDITION OF PLANTING AT END OF MAINTENANCE PERIOD

- A. Complete the following tasks prior to Final Review, and bring all planting areas to a satisfactory condition before final acceptance of the work.
- B. Clean all planting basins of all broadleaf and grass weeds including those sprouting from root balls.
- C. All hydroseeded areas are to be free of broadleaf weeds and mowed to specified height. Re-seed hydroseeded areas with minimal germination (less than 50% germination coverage).

3.06 FINAL INSPECTION

- A. Inspection of mitigation plantings will be made by the Owner's Representative on or near the end of the Maintenance Period.
- B. Minimum long-term target survival for the various plant materials and/or coverage is described by the project Mitigation and Monitoring Plan.

END OF SECTION

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SECTION 32 02 90 LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for Landscape Maintenance as specified in this Section during the landscape maintenance period, referred to herein as the Maintenance Period. The work includes establishing the plantings, providing pest and disease control, mowing, and maintaining the irrigation system and related construction elements during the Maintenance Period.
 - 1. Mowing is to include the hydroseeded areas to control weeds.
- B. Related Work:
 - 1. Irrigation
 - 2. Irrigation Control System
 - 3. Planting

1.03 MAINTENANCE PERIOD

A. <u>Time Limits: The Maintenance Period commences from the date of approval of</u> <u>substantial completion and extend for 120 calendar days, or until final completion</u> <u>approval, whichever is later.</u>

1.04 REVIEWS

- A. <u>Substantial Completion Review:</u> Specifically request this review at least (5) five days in advance of the proposed start of the Maintenance Period. The Owners Representative will review for a final checklist of minor items to be completed. The Maintenance Period commences once the items are completed and approved by the Owners Representative. Items to be checked during this review include but are not limited to:
 - 1. All planted areas including turf and hydroseeded areas.
 - 2. Valve boxes, spray head / emitter / tree bubbler installation.
 - 3. Overall operation of the irrigation system.
 - 4. For point-source drip-irrigated areas, do not apply mulch until the system has been inspected unless permitted otherwise by the Owner's Representative.
 - 5. For sub-surface drip irrigated areas, ensure that the system was inspected earlier by the Owner's Representative prior to soil backfill over the drip lines.
- B. <u>Punch-list Check:</u> This review will be conducted by the Owners Representative halfway through the Maintenance Period, at the request of the Owner, when punch-list items identified at Substantial Completion have been corrected and are ready for inspection. The Final Review may be rescheduled at the discretion of the Owners Representative, if additional time beyond the scheduled date of final completion is needed to correct Punch-list items.

- C. <u>Final Review</u>: Specifically request this review at least (5) five days in advance of the end of the Maintenance Period. Failure to request this notice automatically extends the date of completion. The Maintenance Period will continue until final completion is approved by the Owners Representative. Items to be checked during this review include but are not limited to:
 - 1. All planted areas including turf and hydroseeded areas, including all punch-list items identified at Substantial Completion Review and Punch-list Check
 - 2. All irrigation punch-list items identified at Substantial Completion Review, and Punch-list Check.

1.05 MAINTENANCE PERIOD SUBMITTALS

- A. Fertilizer: Submit written certificate showing rates, materials, and date of fertilizer application, to the Owner within five (5) days of each application.
- B. Pesticides / herbicides: If pesticides / herbicides are used, submit written certificate showing rates, materials, and date to the Owner within five (5) days of each application.
- C. Mowing: Submit mowing occurrences to the Owner each time mowings are completed.

1.06 CLOSE-OUT DOCUMENTATION

- A. Submit <u>prior to the Final Review</u>, the following additional documents for the Maintenance Binder.
 - 1. Work tags / reports, countersigned by the Owner's Representative:
 - a. Fertilizer applications, including initial application.
 - b. Pesticide and herbicide applications, including initial application.
 - c. Mowing occurrences
 - d. In-service meeting discussion / decisions.
- B. Controller Schedule: 8.5x11 size type-written and laminated irrigation schedule for established (mature) landscape at end of Maintenance Period for reference purposes inside the controller. Schedule is to include run-times and frequency for each station.
 - 1. Attach irrigation schedule to laminated valve stationing plan see Specification Section Landscape Irrigation.
- C. The Final Review will take place only after additional submittals and documents have been reviewed and approved by the Owners Representative.

PART 2 - MATERIALS

2.01 FERTILIZER

A. For maintenance fertilization: as specified in Specification Section Landscape Planting.

2.02 WATER

A. Water for irrigation to be paid for by the Owner.

2.03 CHEMICALS

A. Insecticides, fungicides, pre- and post-emergent herbicides as recommended by licensed Pest Control Operator and approved by the Owners Representative.

PART 3 - EXECUTION

3.01 GENERAL

- A. Contractor's Responsibility: Work installed under this Contract damaged by vandalism, vehicular damage and/or theft during the installation of the work and up to the Substantial Completion approval, is to be repaired or replaced without additional cost to the Owner.
- B. Owner's Responsibility: Throughout the Maintenance Period, these damages and similar factors such as excessive litter, abuse and defacement will be the Owner's responsibility to repair or replace and will not be a part of this Contract. No planting is to be guaranteed beyond the Maintenance Period, except as to conformance to specified species and variety, and as specified in Specification Section Landscape Planting.

3.02 BASIC REQUIREMENTS

- A. Irrigation: Maintain all planting areas at optimum moisture for plant growth.
 - 1. Schedule and monitor controller stations as necessary to minimize water consumption while still providing adequate water for the plant material.
 - 2. Adjust and clean all heads, emitters, valves, filters, regulators and other equipment as necessary to maintain the system.
 - 3. Hand water planting not adequately served by the automatic irrigation system.
- B. Erosion: Repair settlement of soil and plants and soil erosion and replant areas to the satisfaction of the Owner's Representative. Repair eroded soil berms as required to assist in irrigation.
- C. Protection of Work: Take particular precautions to protect structures, fencing, overhead and underground utilities, and all existing trees to remain. All damaged, stained, or disturbed items are to be replaced or repaired at no additional expense to the Owner, and to the satisfaction of the Owner's Representative, prior to Final Review.
- D. Cultivating and Clean-Up: Keep all planting areas neat and free from debris at all times and cultivate at not more than ten (10) day intervals.
 - 1. Keep Project Site reasonably free from accumulation of debris, topsoil, and other materials resulting from landscape maintenance work.
 - 2. Remove soil and related amendments and fertilizers from walks and paving daily.
 - 3. Broom and hose down areas daily as necessary to maintain clean adjacent structures and pavements.
- E. Weed control: Keep all planting areas weed-free at all times during the Maintenance Period.
 - 1. Hydroseeded areas may require the application of post-emergent herbicides, by a licensed pest control operator, at the Contractor's discretion to provide the

weed-free condition specified. Herbicide applications only with the prior approval of the Owner's Representative.

- F. Insect, Pest, and Disease Control: Control insects, pests, rodents and diseases by the use of insecticides and fungicides, as applied by a licensed pest control operator with the prior approval of the Owners Representative.
- G. Fertilizer: Application for all planting areas including turf: as specified in Specification Section Landscape Planting. Excludes hydroseeded areas.
- H. Mowing Schedule:
 - 1. Winter Mow grass to 1-1/2" when it reaches a height of 2-1/2".
 - 2. Other Seasons Mow grass to 2" when it reaches a height of 3".
 - 3. Should the grass reach a height of more than 1" above the specified height, mow the grass in multiple passes, lowering the grass height by no more than 1" with each pass.
 - 4. Spray mower decks and blades with water and thoroughly clean these of grass clippings and dirt prior to mowing. Have the Owners Representative inspect the equipment prior to mowing operations.
- I. Pruning: Prune new trees and shrubs as directed by the Owners Representative. Do not remove lower branches from multi-trunk or low branching trees unless directed.
- J. Replace dying or deficient plants

3.03 REPLACEMENTS

- A. General: Immediately replace any dead or damaged plants as they become apparent or as directed by the Owner's Representative.
 - 1. Repair or replace turf areas not fully established and healthy as directed by the Owners Representative.
 - 2. Carry out replacements to the specifications and as required to match adjacent plantings at no additional cost to the Owner.

3.04 CONDITION OF PLANTING AT END OF MAINTENANCE PERIOD

- A. Complete the following tasks prior to Final Review, and bring all planting areas to a satisfactory condition before final acceptance of the work. Replace plantings that do not conform to specifications.
- B. Clean all mulched planting areas of all broadleaf and grass weeds including those sprouting from root balls. Remove all basal growth and tree suckers from tree trunks and branches.
- C. Remove all nursery tree stakes and associated tying materials.
- D. Mulch: Rake out watering basins from all plants under a permanent irrigation system and re-spread the mulch, keeping mulch away from the plant stem.
- E. All turf areas are to be completely covered at the time of final acceptance, free of all weeds (broadleaf and grass weeds) and mowed to specified height. Patch up low spots

and/or bare patches with sod, to be equivalent to the sod used during planting operations.

3.05 IN-SERVICE MEETING

- A. Specifically request, prior to Final Review, an In-Service meeting with the Owner's maintenance staff to identify any landscape maintenance issues and verify mowing schedules, and irrigation station sequence / run-times (controller schedule).
 - 1. Document any discussions / decisions at the in-service meeting and provide this to the Owners Representative. Include a copy in the Maintenance Binder. See Specification Section Landscape Irrigation for other documents to be included in the Maintenance Binder.
 - 2. The Final Review will take place only after the in-service meeting is completed, and final approval is contingent on the in-service meeting taking place to the satisfaction of the Owners Representative.

3.06 HARDWARE

- A. Provide the Owner at the in-service meeting the following:
 - 1. Quick Couplers (2) quick coupler key / hose swivels
 - **2.** Irrigation Controller (2) enclosure keys
 - 3. Other enclosures / back flow preventers (2) enclosure lock keys

END OF SECTION

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SECTION 32 05 00 MECHANICALLY STABILIZED EARTH WALLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Materials and installation of mechanically stabilized earth (MSE) walls as shown on the Plans and specified herein. Work includes geogrid reinforcement, modular concrete block retaining wall units, and backfill to the lines and grades shown on the Plans.
- B. Related Sections:
 - 1. Section 31 00 00 Earthwork.
 - 2. Section 31 05 19 Filter Fabric, Geocomposite Drainage, and Geotextiles.
 - 3. Section 31 23 30 Cellular Concrete Fill.
 - 4. Section 32 11 23 Aggregate Base Course.
 - 5. Section 32 12 16 Asphaltic Concrete Paving.

1.02 REFERENCE STANDARDS

- A. American Concrete Institute (ACI):
 - 1. ACI 530.1/ASCE 6/TMS 602 Specification for Masonry Structures; American Concrete Institute International.
- B. ASTM International (ASTM):
 - 1. ASTM C140 Sampling and Testing Concrete Masonry Units and Related Units.
 - 2. ASTM C150 Standard Specification for Portland Cement.
 - 3. ASTM C404 Standard Specification for Aggregates for Masonry Grout.
 - 4. ASTM C476 Standard Specification for Grout for Masonry.
 - 5. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - 6. ASTM C1019 Test Method for Sampling and Testing Grout for Masonry.
 - 7. ASTM C1372 Standard Specification for Dry-Cast Segmental Retaining Wall Units.
 - 8. ASTM D698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³(600 kN-m/m³)).
 - 9. ASTM D4595 Test Methods for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

- 10. ASTM D5262 Test Method for Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics.
- 11. ASTM D6638 Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units (Modular Concrete Blocks).
- 12. ASTM D6706 Test Method for Measuring Geosynthetic Pullout Resistance in Soil.
- 13. ASTM D6916 Test Method for Determining the Shear Strength Between Segmental Concrete Units (Modular Concrete Blocks).
- C. ASTM C140 Sample and Testing Concrete Masonry Units.
- D. ASTM C1372 Standard Specification for Segmental Retaining Wall Units.
- E. ASTM D422 Gradation of Soils.
- F. ASTM D698 Moisture Density Relationship for Soils, Standard Method.
- G. ASTM D4595 Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- H. ASTM D5262 Test Method for Evaluating the Unconfined Creep Behavior of Geogrids.
- I. ASTM D6638 Grid Connection Strength (SRW-U1).
- J. ASTM D6706 Grid Pullout of Soil.
- K. ASTM D6916 SRW Block Shear Strength (SRW-U2).
- L. GRI-GC4 Grid Long-Term Allowable Design Strength (LTADS)

1.03 SUBMITTALS

- A. Material Lists:
 - 1. Modular concrete block units.
 - 2. Submit gradation for wall rock.
 - 3. Submit gradation and soil properties for infill soil.
 - 4. Geogrid reinforcement.
 - 5. Cellular concrete fill. Refer to Section 31 23 30 for requirements.
- B. Block Color: Submit Manufacturer's standard block color options for City selection.
- C. Certificates of Compliance:
 - 1. The Contractor shall provide Certificates of Compliance for each type of aggregate, cement and admixture to be used in grout.
 - 2. Submit a Certificate of Compliance for epoxy.

- 3. Certificates of Compliance shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds specified requirements. Material certificates shall include laboratory test reports showing compliance for the material proposed for use.
- 4. Where Certificates of Compliance cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material proposed for use. The cost of testing shall be paid for by the Contractor.
- D. Laboratory Test Reports: Laboratory test reports shall show the name of testing agency, date of testing and shall be signed by an agent of the testing agency. Laboratory test shall not be older than eight (8) months. Submit laboratory test reports for grout materials and mix designs as specified.
- E. Mix designs: Mix designs shall be submitted for each grout mix. Mix designs shall show names and types of all materials, proportions, slump, strength and location to be used on job. Provide manufacturer's catalog sheets, including instructions for use and description of applications, for admixtures.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall inspect geogrid upon delivery to assure that the proper material has been received.
- B. Geogrid shall be stored above -10°F.
- C. Contractor shall prevent excessive mud, cementitious material or other foreign materials from contacting the materials.
- D. Protect materials from damage. Damaged material shall not be incorporated into the Work.

1.05 CONTRACTOR QUALIFICATIONS

A. Contractor or subcontractor responsible for MSE wall construction shall be trained by the modular concrete block retaining wall manufacturer or an equivalent accredited organization.

PART 2 PRODUCTS

2.01 MODULAR WALL UNITS

- A. Wall units shall be Allan Block Retaining Wall units or equal, as produced by a licensed manufacturer regularly employed in the manufacture of such units.
- B. Wall units shall have a minimum 28-day compressive strength of 3,000 psi in accordance with ASTM C1372. Concrete units shall have adequate freeze-thaw protection with an average absorption rate in accordance with ASTM C1372.
- C. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 inch.

- D. Wall units shall provide a minimum of 110 pounds total weight per square foot of wall face area. Hollow cores to be filled with compacted wall rock shall be provided.
- E. Exterior face shall be textured. City to select color from manufacturer's standard colors.

2.02 BLOCK UNIT FILL

A. Fill for the modular units shall be Class 2 permeable material.

2.03 REINFORCED SOIL MASS

- A. Infill soil placed within the reinforced soil mass must meet acceptable fill requirements in the Geotechnical Report for soil fill conditions, or cellular concrete specifications for cellular concrete conditions.
- B. Infill material placed within the area of geogrid reinforcement shall be specifically reviewed by the Engineer prior to placement.

2.04 DRAINAGE MATERIAL

- A. Caltrans Class 2 permeable material.
- B. Conform to Section 31 23 23.

2.05 GEOGRID

- A. Geogrid products shall be of a high-density polyethylene or polyester yarns encapsulated in a protective coating specifically fabricated for use as a soil reinforcement material and approved by the Engineer.
- B. Refer to Section 31 05 19 for additional requirements.

2.06 BAR REINFORCING STEEL

- A. Comply with requirements of Section 03 20 00.
- B. All concrete bar reinforcement shall be epoxy coated.

2.07 GROUT MATERIALS

- A. Portland Cement: ASTM C150, Type II or V.
 - 1. The C3S content of Type II cement must not exceed 65 percent.
 - The alkali content must not exceed 0.60 percent by mass of alkalies as Na2O + 0.658 K2O when determined under AASHTO T 105.
 - 3. Autoclave expansion must not exceed 0.50 percent.
- B. Fly Ash: ASTM C618, Class F.

- C. Natural Pozzolan: Raw or calcined natural pozzolans complying with AASHTO M 295, Class N, and either of the following:
 - 1. Available alkali as Na2O + 0.658 K2O must not exceed 1.5 percent when tested under ASTM C311.
 - 2. Total alkali as Na2O + 0.658 K2O must not exceed 5.0 percent when tested under AASHTO T 105.
- D. Ground-granulated Blast-furnace Slag:
 - 1. ASTM C989 grades 100 or 120
- E. Aggregate: ASTM C404, Table 1. Fine aggregate part shall not be greater than 80% of the total aggregate weight.
- F. Water: All water used for mortar and grout shall be clean and free from deleterious amounts of acids, salts, alkali, and organic materials.

2.08 GROUT MIX

- A. The Contractor shall hire a professional testing laboratory to provide a grout mix design. The mix design shall be verified by test and certified to by a principal of the laboratory who is a registered Civil Engineer in the State of California and submitted to the Engineer for review.
- B. Grout: Coarse grout shall conform to ASTM C476 and shall have a minimum compressive strength equal to or greater than f'm at 28 days but no less than 2,000 psi minimum in accordance with ASTM C1019. Slump shall be 8 inches to 11 inches.
- C. Admixtures:
 - 1. Do not use additives and admixtures in grout unless approved by the Engineer.
 - 2. No antifreeze compounds.
 - 3. No admixtures containing chlorides.
- D. Minimum Cementitious Material Content:
 - 1. Concrete shall contain at least 675 pounds of cementitious material per CY.
- E. The cementitious material must be composed of one of the following, by weight, unless noted otherwise:
 - 1. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement.
 - 2. 50 percent ground-granulated blast-furnace slag and 50 percent portland cement.

2.09 EPOXY

A. ASTM C881/C881, Type IV, Grade 1, Class B or C. Use Class B whenever the surface temperature is from 40 to 60 degrees Fahrenheit. Use Class C whenever the surface temperature is above 60 degrees Fahrenheit.

2.10 POST-INSTALLED ANCHORING SYSTEMS

A. Comply with requirements of Section 03 90 00.

PART 3 EXECUTION

3.01 EXCAVATION

- A. Verify locations of existing structures and utilities prior to excavation.
- B. Protect existing utilities and structures and completed work.
- C. Excavate to the lines and grades shown on the Plans.

3.02 FOUNDATION SOIL PREPARATION

- A. Foundation soil shall be excavated to the lines and grades as shown on the Plans, or as directed by the Engineer.
- B. Over-excavated areas shall be filled prior to wall installation as specified in Section 31 00 00.
- C. Foundation soil shall be compacted to a minimum of 95% Modified Proctor prior to the placement of base material.
- D. Prior to the placement of base material, the Engineer will examine the prepared foundation soils to ensure that the requirements of these specifications have been met. Soil not meeting the required strength shall be removed and replaced with acceptable material.

3.03 MSE WALL BASE

- A. Base material shall be Class 2 aggregate base meeting the requirements of Section 31 23 23, wrapped in filter fabric. Filter fabric shall meet the requirements of Section 31 05 19.
- B. Place base material as detailed on the Plans to provide a level hard surface on which to place the first course of blocks
- C. Compact base material to 95% Modified Proctor.

3.04 WALL UNIT INSTALLATION

- A. Install units in accordance with the manufacturer's instructions and recommendations and as specified herein.
- B. Ensure that units are in full contact with the base course.
- C. Fill all wall cores and cavities and a minimum of 12 inches behind the base course with wall rock, unless specified otherwise herein or shown on the Plans.

- 1. Some walls will have a blanket drain layer below the wall and reinforced soil zone.
- 2. Use infill soils behind the wall rock and approved soils in front of the base course to firmly lock the units in place.
- D. Where shown on the Plans, fill wall cores and cavities with grout.
- E. Any obstructions or debris shall be removed from the inside of the cells before grouting.
- F. Consolidate grout in the cells by vibrating and reconsolidating after excess moisture has been absorbed and before plasticity is lost. Do not slice grout with a trowel.
- G. Wall units shall be installed level and on the alignments shown on the Plans.
- H. Epoxy bond capstone to wall unit below.
- I. Grout Placement:
 - 1. Place grout within 1-1/2 hours from introducing water in the mixture and prior to initial set.
 - 2. Discard field-mixed grout that does not meet the specified slump without adding water after initial mixing. See ACI 530.1/ASCE 6/TMS 602 for transit-mixed grout regarding adding water.
 - 3. Grout lift height shall be limited in accordance with ACI 530.1/ASCE 6/TMS 602 specification. Regardless of grout lift height, wall units shall be cured at least 4 hours before grout placement.
 - 4. Grout shall be consolidated in accordance with ACI 530.1/ASCE 6/TMS 602 specification.
- J. Bar Reinforcing Steel:
 - 1. Reinforcing steel shall be placed in accordance with the requirements of Section 03 20 00 and the requirements of this section.
 - Before placing grout, securely hold the reinforcing steel in position at the top and bottom with wire ties or spacing devices. Wire shall be 16 gage or heaver. Wooden, aluminum, or plastic spacing devices shall not be used.
 - 3. Maintain position within 1/2 inch of dimensioned position. Place vertical bars within 2 inches of the required location along the length of the wall. Notify the Engineer if it is necessary to move bars beyond mentioned tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
 - 4. Unless authorized by the Engineer, do not bend reinforcing steel after it is embedded in grout or mortar.
 - 5. Horizontal reinforcing steel shall have contact lap splices and be wired tight together. Center of lap splice shall be centered between railing posts.
 - 6. Notify the Engineer if it is necessary to move bars to avoid interference with other reinforcing steel, conduits, or embedded items.

- K. Protection:
 - 1. Protect work under construction using heavy moisture-resistant coverings well secured in place when rain or frost is imminent; when day's work is stopped; when lay-up work is subjected to extremely hot winds within 72 hours after placing; or when the work is waiting for grouting.
 - 2. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.05 GEOGRID INSTALLATION

- A. Install block wall to designated height of first geogrid layer. Backfill and compact wall rock and infill earthen fill material in lifts not to exceed 8 inches behind the wall to a depth equal to the designed grid length before the grid is installed.
- B. Cut geogrid to designed embedment length and place on top of the block units to the back edge of the raised front lip or within one inch of the concrete retaining wall face. Extend away from wall at an approximately 3 percent above horizontal on the compacted infill material.
- C. Lay geogrid at the elevations and orientations shown on the Plans or as directed by the Engineer.
- D. Follow manufacturer's guidelines for geogrid overlap requirements and curve and corner layouts.
- E. Place next course of block on top of the geogrid and fill block cores with wall rock. Remove slack and folds in grid and stake to hold in place as required.
- F. Butt adjacent sheets of geogrid against each other at the wall face to achieve full coverage.
- G. Geogrid lengths shall be continuous. Splicing parallel to the block wall face is not allowed.

3.06 FILL PLACEMENT

- A. Earthen Fill:
 - 1. Infill material shall be placed in maximum 8-inch lifts and compacted in such a manner that minimizes the development of slack or movement of the geogrid.
 - 2. Only hand-operated compaction equipment shall be allowed within 3 feet behind the wall. Compaction within this zone shall begin by running a plate compactor directly on the block and then compacting in parallel paths from the wall face back, until the entire consolidation zone has been compacted. A minimum of two passes of the plate compactor shall be required with maximum lifts of 8 inches.
 - 3. Tracked equipment shall not be operated directly on the geogrid. A minimum fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Minimize turning of tracked vehicles to prevent the displacement of fill or geogrid damage.

- 4. Compact infill soil to achieve 95% Modified Proctor or as indicated on the Plans and Geotechnical Report.
- B. Cellular Concrete Fill:
 - 1. Infill cellular concrete material shall be placed in lifts not greater than two block courses.
 - 2. Refer to Section 31 23 30 for additional cellular concrete fill placement requirements.

3.07 COMPACTION TESTING

- A. Contractor is responsible for achieving the specified compaction requirements and shall submit soil tests to demonstrate compliance.
- B. The Engineer may direct the Contractor to remove, correct or amend any soil found to be not in compliance with these specifications.
- C. The City may hire an independent testing firm to verify Contractor-submitted compaction tests.
- D. Testing frequency for compaction:
 - 1. One test for every 8 inches of vertical fill placed and compacted, for every 25 lineal feet of retaining wall length, starting on the first course of block.
 - 2. Compaction test locations shall be varied to cover the entire area of the reinforced soil zone and include areas compacted by hand-operated equipment.

END OF SECTION

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SECTION 32 11 23 AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Aggregate base course.
- B. Related Sections:
 - 1. Section 31 00 00 Earthwork.
 - 2. Section 32 01 16 Pavement Restoration.
 - 3. Section 32 12 16 Asphaltic Concrete Paving.

1.02 REFERENCES

- A. American Society of Testing and Materials (ASTM):
 - 1. C 117 Test Method for Material Finer than 75 Φ M (Number 200) Sieve in Mineral Aggregate by Washing.
 - 2. C 136 Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 3. D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- B. State of California Department of Transportation.
 - 1. CALTRANS Standard Specifications.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Source, gradation, and testing data for aggregate base course.
- B. Quality Control:
 - 1. Test Reports: Reports for tests required by Sections of CALTRANS Standard Specifications.
 - 2. Certificates of Compliance: Certificates as required by Sections of CALTRANS Standard Specifications.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Storage and Protection: Protect from segregation and excessive moisture during delivery, storage, and handling.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aggregate Base Course:
 - 1. Class 2, 3/4-inch maximum aggregate size free from vegetative matter and other deleterious substances and of such nature that aggregate can be compacted readily under watering and rolling to form a firm, stable base.
 - 2. Coarse aggregate material retained in Number 4 sieve shall consist of material of which at least 25 percent by weight shall be crushed particles when tested in accordance with California Test 205.
 - 3. Aggregate shall not be treated with lime, cement, or other chemical material before the Durability Index test is performed.
 - 4. Aggregate grading and sand equivalent tests shall be performed to represent not more than 500 cubic yards or one day's production of material, whichever is smaller.
 - 5. Grade within the limits and conform to quality requirements as follows when tested in accordance with California Test 202:

Sieve Sizes (Square Openings)	Percent by Weight Passing Sieve	
1 inch	100	
3/4 inch	90-100	
Number 4	35-55	
Number 30	10-30	
Number 200	2-9	

Quality Requirements		
Description	California Test	Minimum Test Result
Resistance (R Value)	301	78
Sand Equivalent	217	22
Durability Index	229	35

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine conditions upon which the Work specified in this Section depends for defects that may influence installation and performance.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Subgrade Preparation: Prepare as specified in Section 31 00 00, "Earthwork."

3.03 INSTALLATION

- A. Furnish, spread, and compact aggregate base course material to the lines, grades, and dimensions indicated on the Plans.
 - 1. Spreading: Spread in accordance with sections of CALTRANS Standard Specifications.
 - 2. Compacting: Compact in accordance with sections of CALTRANS Standard Specifications.

3.04 FIELD QUALITY CONTROL

A. Tests: Perform field tests as required by sections of CALTRANS Standard Specifications.

END OF SECTION

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SECTION 32 12 16 ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Asphaltic concrete pavement on prepared subgrade or aggregate base course or on existing pavement to lines, grades and compacted thickness as indicated on the Plans.
- B. Related Sections:
 - 1. Section 31 00 00 Earthwork.
 - 2. Section 32 01 16 Pavement Restoration and Rehabilitation.
 - 3. Section 32 11 23 Aggregate Base Course.
 - 4. Section 32 17 23 Pavement Markings.

1.02 REFERENCES

- A. State of California Department of Transportation Standard Specifications, latest edition (Caltrans Standard Specifications).
 - 1. Section 37 Bituminous Seals.
 - 2. Section 39 Asphalt Concrete.
 - 3. Section 92 Asphalts.
 - 4. Section 93 Liquid Asphalts.
 - 5. Section 94 Asphaltic Emulsions.
- B. Caltrans Standard Test Methods:
 - 1. Calif Test 202 Sieve Analysis of Fine and Coarse Aggregates.
 - 2. Calif Test 304 Preparation of Bituminous Mixtures for Testing.
 - 3. Calif Test 362 Determining Asphalt Content in Bituminous Mixtures by Vacuum Extraction.
 - 4. Calif Test 375 Determining the In-Place Density and Relative Compaction of AC Pavement.
 - 5. Calif Test 379 Determining Asphalt Content in Bituminous Mixtures (Troxler Nuclear Gage Model 3241).
- C. American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
 - 2. ASTM D1561 Practice for Preparation of Bituminous Mixture Test Specimens by Means of California Kneading Compactor.

1.03 SYSTEM DESCRIPTION

- A. This Work shall consist of furnishing and mixing aggregate and asphalt binder at a central mixing plant, spreading and compaction of the mixtures as specified and as indicated on the Plans.
- B. In general, asphalt concrete and asphalt concrete base shall conform to Section 39 "Asphalt Concrete" and all applicable referenced sections of the Caltrans Standard Specifications.
 - 1. Where conflicts exist, this specification shall govern.

1.04 DEFINITIONS

- A. "Asphalt Concrete" as used by Caltrans shall be considered the "Surface Course," or the final lift of the pavement section.
- B. "Asphalt Concrete Base" as used by Caltrans shall be the remaining portion of the asphalt pavement section excluding the final lift.
- C. "Asphalt Pavement" shall be the total pavement section of asphalt including Asphalt Concrete and Asphalt Concrete Base.

1.05 SUBMITTALS

- A. Proposed Mix Design and Gradation of Materials.
- B. Shop Drawings.
- C. Product data:
 - 1. Asphalt.
 - 2. Asphalt aggregate
 - 3. Pavement reinforcing fabric.
- D. Quality Control Submittals:
 - 1. Test Results.
 - 2. Certificate of Compliance.
 - 3. Certificate of Competence.
- E. Equipment List.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Asphalt Pavement Delivery:
 - 1. Transport the mixture from the mixing plant to the point of use in vehicles having tight bodies previously cleaned of all foreign materials.
 - 2. Treat bodies as necessary to prevent material from sticking to the bodies.

3. Cover each load with canvas or other suitable material of sufficient size and thickness to protect the asphalt mixture from the weather.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Asphalt Concrete:
 - Place asphalt concrete only when surface is dry, when atmospheric temperature in the shade is 40 degrees F and rising, or above 50 degrees F if falling.
 - b. Do not place asphalt concrete when weather is foggy or rainy nor when base on which material is to be placed is in wet or frozen conditions or when, in the opinion of the Engineer, weather conditions will prevent proper handling, finishing, compaction of the mixtures.
 - 2. Prime Coat:
 - a. Do not apply prime coat when atmospheric temperature is below 60 degrees F.
 - b. Apply prime coat only when base course is dry or contains moisture not in excess of that which will permit uniform distribution and desired penetration.

PART 2 PRODUCTS

2.01 ASPHALT PAVEMENT MATERIALS

- A. Asphalts:
 - 1. Asphalt Binder: Steam-refined paving asphalt, Grade AR-4000, conforming to Section 92-1.02 "Grades" of the Caltrans Standard Specifications.
 - 2. Prime Coat and Tack Coat: Grade SC-70, conforming to Section 93-1.01 of the Caltrans Standard Specifications.
 - 3. Fog Seal: Asphaltic Emulsion, Grade SS-1h, conforming to Section 94-1.01 of the Caltrans Standard Specifications.
- B. Asphalt Aggregate:
 - 1. Aggregate for asphalt concrete shall conform to Section 39-2.02 of the Caltrans Standard Specifications for Type B grading, 1/2-inch maximum, medium.
 - 2. Aggregate for asphalt concrete base shall conform to Section 39-2.02 of the Caltrans Standard Specifications for Type B grading.
- C. Asphalt pavement shall be produced in a batch mixing plant, a continuous pugmill mixing plant, or drier-drum mixing plant.
 - 1. Storage shall conform to section 39-3.01 and Section 39-3.05 of the Caltrans Standard Specifications.
 - 2. Drying shall conform to Section 39-3.02 of the Caltrans Standard Specifications.

- 3. Proportioning shall conform to Section 39-3.03 of the Caltrans Standard Specifications.
- 4. Mixing shall conform to Section 39-3.04 of the Caltrans Standard Specifications.

2.02 ASPHALT CONCRETE

- A. Asphalt prime coat shall be Grade SC 250 conforming to Section 39 of the State Specifications.
- B. Asphalt concrete shall be Type A. ³/₄-inch maximum, coarse graded aggregate material, conforming to Section 39 of the State Specifications.
- C. Asphalt concrete level material shall be Type A, 3/8-inch maximum, medium graded aggregate, conforming to Section 39 of the State Specifications.

2.03 SLURRY SEAL

- A. Slurry seal, Type II, shall be applied in conformance with the provisions in Section 37-2, and all applicable referenced sections of the Caltrans Standard Specifications, at the following locations:
 - 1. In all streets and private property easement in which excavation is performed by the Contractor, slurry seal shall be applied from gutter lip to gutter lip. The slurry seal shall extend 5 feet beyond any excavation in the direction parallel to the gutters.

2.04 AGGREGATE BASE COURSE

- A. Aggregate Base Course shall conform to Section 32 11 23, Aggregate Base Course.
- B. Aggregate Base Course shall be placed at the following locations:
 - 1. All asphalt pavement.
- C. Compacted thickness of Aggregate Base Course shall be as indicated on the Plans.

2.05 EQUIPMENT

- A. Spreading and Compacting Equipment:
 - 1. Spreading equipment shall conform to Section 39-5.01 and all applicable referenced sections, of the Caltrans Standard Specifications.
 - a. Only in areas inaccessible to the machine, by approval of the Engineer, will hand spreading be permitted.
 - 2. Compaction equipment shall conform to Section 39-5.02 and all applicable referenced sections, of the Caltrans Standard Specifications.

2.06 SOURCE QUALITY CONTROL

A. The Engineer will perform sampling and tests of materials in accordance with California Test Method Number 304 and California Test Method Number 362 or 379, as applicable. Samples will be taken from materials as delivered to the site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify surfaces and site conditions are ready to receive Work. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning application means acceptance of existing conditions.

3.02 PREPARATION

- A. Protection:
 - 1. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials.
 - 2. Building and other surfaces shall be covered with paper or other protection, when required.
 - 3. Contractor shall be responsible for any damage caused by Contractor's employees. All damage caused by the Contractor's operations shall be repaired to the satisfaction of the Engineer at no additional cost to City.
- B. Subgrade Preparation:
 - 1. Immediately prior to applying prime coat or tack coat, or immediately prior to placing the asphalt pavement when prime coat or tack coat is not required, the subgrade to receive asphalt pavement shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be cleaned to remove any loose or extraneous material.
 - 2. If the asphalt pavement is to be placed on an existing base or pavement which was not constructed as part of the contract, the Contractor shall clean the surface by sweeping, flushing or other means to remove all loose particles of paving, all dirt and all other extraneous material immediately before applying the prime coat or tack coat. If the asphalt pavement is to be placed against a vertical gutter face or other vertical surface, the Contractor shall roughen and clean vertical surface as required for proper bonding of asphalt immediately before applying prime coat or tack coat.
- C. Removal and Preparation of Existing Pavement:
 - 1. Cut existing asphalt pavement to be removed with wheel cutter or other device capable of making a neat, reasonably straight and smooth cut without damaging the adjacent pavement to remain.
 - 2. Cut and trim existing pavement after placement of specified base course material and just prior to placement of new asphaltic concrete pavement. Trimmed edges shall be coated with prime or tack coat as specified immediately prior to installing new abutting asphalt pavement.
 - 3. All removed aggregate base material and asphaltic concrete pavement and any excess new material shall be removed from the project site and legally disposed of by the Contractor.

3.03 PRIME COAT AND TACK COAT

- A. Prime Coat:
 - 1. A prime coat of liquid asphalt shall be applied on all surfaces of base course material to be paved.
 - 2. Prime coat shall be applied at a rate of 0.25 gallons per square yard, and shall conform to Section 93-1.03 of the Caltrans Standard Specifications for the distributor application of the grade of liquid asphalt being used.
- B. Tack Coat:
 - 1. A tack coat of asphaltic emulsion shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, or as otherwise specified herein.
 - 2. Tack coat shall be applied in one application at a rate of 0.1 gallons per square yard of surface covered.

3.04 ASPHALT PAVEMENT

- A. Placing materials in a windrow, then picking it up and placing it in the asphalt paver with loading equipment will not be permitted.
- B. Unless lower temperatures are directed by the Engineer, asphalt concrete shall be spread, and the first coverage of initial or breakdown compaction shall be performed when the temperature of the mixture is not less than 250 degrees F, and all breakdown compaction shall be completed before the temperature of the mixture drops below 205 degrees F.
- C. Asphalt pavement shall be spread and compacted in the number of layers and of the thicknesses indicated in the following table:
 - 1. A thickness tolerance of ± 0.1 inches is allowed for asphalt concrete.
 - 2. A total thickness tolerance of ± 0.2 inches is allowed for asphalt concrete base.

Total				Next Lower Layer		All Other Lower		
Thickness		Top Layer Thickness		Thickness		Layer Thicknesses		
Indicated on	Number							
Plans ⁽¹⁾	of Lifts	Min	Max	Min	Max	Min	Max	
< 2¾"	1							
3"	2	1¼"	11⁄2"	1¼"	1½"			
3¼" - 4¾"	2	1 ³ ⁄4"	21⁄4"	1¾"	3"			
> 5"	(2)	13⁄4"	21⁄4"	1 ³ ⁄4"	3"	1 ³ ⁄4"	4¾"	
(1) When pavement reinforcing fabric is shown to be placed between layers of asphalt pavement, the thickness of asphalt pavement above the pavement reinforcing fabric								

- pavement, the thickness of asphalt pavement above the pavement reinforcing fabric shall be considered to be the "Total Thickness Indicated on the Plans" for the purpose of spreading and compacting the asphalt pavement above the pavement reinforcing fabric.
- (2) At least two layers shall be placed if the total thickness is less than 5". At least three layers shall be placed if the total thickness is more than 5", and less than 10½". At least four layers shall be placed if the total thickness is greater than 10½".

- D. A layer shall not be placed over another layer which exceeds 3 inches in compacted thickness until the temperature of the layer which exceeds 3 inches in compacted thickness is less than 160 degrees F at mid depth.
 - 1. If the temperature of any layer drops below 140 degrees F, or if directed by the Engineer, apply tack coat before placing next layer.
 - 2. For any pavement thickness exceeding 3 inches, the section shall be placed in equal lifts, not to exceed 3 inches per lift.
- E. Unless otherwise indicated on the Plans, asphalt mixtures shall not be handled, spread or windrowed in a manner that will stain the finished surface of any pavement or other improvements.
- F. The completed mixture shall be deposited on the prepared subgrade at a uniform quantity per linear foot, as necessary to provide the required compacted thickness without resorting to spotting, picking-up or otherwise shifting the mixture.
- G. Spreading:
 - 1. All layers of asphalt pavement shall be spread with an asphalt paver and shall conform to Section 39-6.02 and all applicable referenced sections of the Caltrans Standard Specifications.
 - 2. At locations where the asphalt pavement is to be placed over areas inaccessible to spreading and rolling equipment, all layers of asphalt pavement shall be distributed directly out of the back of the dump truck and spread by hand.
 - a. Asphalt pavement spread by hand shall be compacted thoroughly to the required lines, grades and cross-sections by means of pneumatic tampers, or by other methods that will produce the same degree of compaction as pneumatic tampers.
- H. Compaction:
 - 1. Compaction of asphalt pavement shall conform to Section 39-6.03 and all applicable referenced sections of the Caltrans Standard Specifications.
 - 2. Minimum required density for each layer of asphalt pavement shall be 95 percent of that obtained in the laboratory according to ASTM Test Method D-1561.
- I. Segregation shall be avoided and the surfacing shall be free of pockets of coarse or fine material. Asphalt pavement containing hardened lumps shall not be used.
 - 1. In areas inaccessible to paving and compacting equipment where spreading is done by hand, minimize the amount of segregation.
- J. Location of longitudinal joints in the top layer will be determined by the Engineer and shall not adversely affect the quality of the finished product.
- K. At all locations, or as directed by the Engineer, the asphalt concrete shall be square and at least 1 inch thick when conforming to existing surfacing. Tapering or feathering is not allowed.
- L. The Contractor shall control the quality of work and shall provide adequate testing to assure compliance with these Specifications.

- 1. The type and size of the samples shall be suitable to determine conformance with stability, density, thickness and other specified requirements. Use an approved power saw or core drill for cutting samples. Furnish all tools, labor, and materials for cutting samples, testing, and replacing the pavement where samples were removed. Take a minimum of 1 sample for every 4000 square feet of asphalt pavement placed.
- M. All asphalt pavement shall match the grades indicated on the Plans and shall be completely free from unintended hollows and high spots.
 - After completion of paving Work, all paving shall be flooded with water. Any
 ponding that results in standing water greater than 3/4 inches in depth shall be
 ringed with chalk. Such hollows shall be corrected by removing and replacing the
 asphalt concrete. The asphalt concrete patch shall be square and at least 1 inch
 thick when conforming to existing surfacing. Tapering or feathering is not
 allowed.
- N. Contractor shall perform in-place density and compaction tests of the completed pavement in accordance with California Test Method Number 375, to determine compliance with the specified requirements. Submit test results to Engineer for approval.
- O. Cracks, settling of surface, improper drainage, improper compaction, and sloppy connection to previously laid surfaces will be construed as improper workmanship and will not be accepted.
- P. Where asphalt pavement is used to construct the Bay Trail, the horizontal tolerance of the edge of pavement against a DG shoulder shall be ½ half inch ±.

3.05 MAINTENANCE OF PAVEMENT

A. Upon completion of final rolling, traffic shall not be permitted on the finished pavement for at least 6 hours, or until the asphalt pavement has cooled sufficiently to withstand traffic without being deformed.

3.06 WORKMANSHIP AND WARRANTY

A. Contractor shall provide written warranty against defects in materials or workmanship for a period of not less than one calendar year upon completion of Work.

END OF SECTION

SECTION 32 15 40 STABILIZED DG (GRANITECRETE) PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of stabilized decomposed granite (DG) paving, known as GraniteCrete (the supplier) paving as shown on the Plans and as specified in this Section.
- B. Related Work includes but is not limited to:
 - 1. Earthwork
 - 2. Aggregate Paving
 - 3. Asphaltic Concrete Paving

1.03 STANDARDS & DEFINITIONS

- A. Unless otherwise shown or specified, all methods shall conform to the appropriate current sections of:
 - 1. "Greenbook" Standard Specifications for Public Works Construction, latest edition.
 - 2. Standard Specifications: California Department of Transportation Standard Specifications, latest active edition.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including:
 - 1. C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - D1140 Test Methods for Determining the Amount of Material Finer than 75μm (No. 200) Sieve in Soils by Washing
 - 3. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 4. D2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate
- C. Relative compaction: is defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density determined in accordance with ASTM D1557, expressed as a percentage.

1.04 QUALITY ASSURANCE

- A. Installer qualifications: provide evidence to indicate successful installations of 25,000 square feet or more, with an additional 6,000 square feet per year in providing decomposed granite surfacing containing GraniteCrete admixture. GraniteCrete Certified Installers can be found on the company website.
 - 1. For assistance, contact GraniteCrete at (800) 670-0849

- 2. The installation instructions in this Specification are meant as a guide. For more details refer to www.granitecrete.com/installation/
- B. Single Source: Supply decomposed granite from a single source for the entire quantity required. All materials to comply with suppliers' specifications.
- C. Layout Review: Stake and layout all paving areas for review by the Owner's Representative prior to excavation.
- D. Inspection: Notify the Owners Representative 24 hours prior to placement of any paving to inspect sub-grade and forms if applicable.
- E. Tolerances: Install the paving to the minimum thickness shown. Tolerances for subgrade and finished grade shall be as specified by the Standard Specifications, and no combination of high and low tolerances will be permitted.

1.05 SUBMITTALS

- A. GraniteCrete supplier's product data sheet and installation instructions indicating that product complies with specifications for crushed aggregate blended with GraniteCrete admixture
- B. Qualifications: as noted under Quality Assurance
- C. GraniteCrete sieve analysis
- D. Sample: A one-quart sample of crushed aggregate with admixture in suppliers standard color[s] specified.

1.06 MOCK-UPS

- A. Construct a mockup of 20 sq.ft minimum of GraniteCrete including base course and edging if applicable, at a location approved by Owners Representative. Intent of the mockup is to demonstrate surface finish, texture, color and standard of workmanship.
- B. Provide up to one additional mock-up panel if the original mock-up(s) is/are not approved, at no additional cost to the Owner.
- C. Keep approved mock-ups to serve as a demonstration for all finishes. Remove mock-ups at the completion of the paving Work and restore surfaces below.
- D. Remove and replace all paving Work installed that does not conform to the approved mock-ups at the direction of the Owners Representative at no additional cost to the Owner.
- E. Approved mock-up may remain as first in place construction at the discretion of the Owners Representative.

1.07 DELIVERY STORAGE AND HANDLING

A. Deliver all GraniteCrete Admixture materials in original, unopened packaging. Protect materials / aggregate from contamination with foreign matter. Store under waterproof cover and protect from dampness.

1.08 TESTS

- A. General: All test results for aggregate base are to be documented and submit all tests for aggregate base to the Owner's Representative.
 - 1. Cost of all tests to be borne by the Contractor.
 - 2. If at any time the aggregate base does not meet the Specifications, restore the aggregate base, at no additional cost to the Owner, to the required grade, cross-section and density.
- B. Porous Aggregate Base Tests:
 - Test porous aggregate base during installation at 800-ton increments of shipping for sieve conformance. Submit results to the Owner's Representative prior to completion of the stone base installation.
 - a. Permeability rate: no less than 14" per hour per ASTM 2434 (constant head), or ASTM F2898.
 - 2. For any porous aggregate base designed to conduct rainfall to the sub-soils and/or under-drain system, test the installed base for in-situ infiltration rate, per ASTM F2898.
 - a. Base to be tested by a registered Geotechnical Engineer or other qualified independent testing professional.
 - b. Submit results to the Owner's Representative prior to installation of decomposed granite paving.

PART 2 - PRODUCTS

2.01 AGGREGATE BASE

- A. Aggregate Base: See Specification Aggregate Paving
- B. Delivery Moisture Content: Aggregate base is to contain 90% to 110% of the optimum moisture content to ensure that fines do not migrate in transit or during placement and to facilitate proper compaction. Ensure that aggregate leaving the source plant meets this requirement. Apply water to the aggregate base on site to attain and maintain this minimum moisture content.

2.02 GRANITECRETE

A. Crushed aggregate blended with GraniteCrete Admixture, supplied by GraniteCrete Inc., Monterey CA, (800) 670-0849 <u>www.granitecrete.com</u>

2.03 CRUSHED AGGREGATE

A. Suppliers: Vineyard Rock Products, Hollister, CA (831) 637-6443, or approved equal.

B. Sieve: 3/8" maximum gradation, produced from naturally friable rock/granite with enough fines to produce a smooth walking surface. Materials should be free from clay lumps, organic matter and deleterious material. Blends of coarse sand and rock dust are not acceptable. Gradation in accordance with ASTM C136:

Sieve Size	Percent Passing by weight			
3/8" (9.5 mm)	100%			
#4 (4.75 mm)	90%			
#8 (2.36 mm)	76%			
#16 (1.18 mm)	55%			
#30 (600 um)	38%			
#50 (300 um)	24%			
#100 (150 um)	15%			
#200 (75 um)	9%			

Sieve 200 - Non-expansive Clay Fines - not to exceed 13% (Sand equivalent from Russell Enz)

- C. Test Method Criteria
 - 1. LA Abrasion (Calif. Test 211) Not to exceed 40
 - 2. Durability Index (Calif. Test 229) Not less than 40
- D. Color: to be selected by the Owner's Representative from suppliers' standard colors.
- E. Crushed aggregate to consist of 100% fractured stone on all sides with no rounded particles. Soft stone materials (i.e. sandstone, limestone and shale materials) are not suitable. Provide a certificate from the aggregate supplier that all supplied material will be clean of this type of stone.
- F. In addition, if stone stability to water and vehicles is in question, Owner has the right to perform additional testing to ensure material shall adhere to requirements of Caltrans Section 68, as well as additional applicable ASTM tests. All testing fees to be paid for by the Contractor.

2.04 ADMIXTURE (BINDER)

- A. Binder: GraniteCrete admixture is an all-natural product and does not contain oils, polymers, resins, or enzymes. Substitutions not permitted.
- B. Follow manufacturer's recommendations for binder to GraniteCrete ratio. For bidpurposes only, estimate quantity of binder as follows:
 - 1. Vehicular areas 15 lbs per ton

2.05 WATER

A. Water: free from contaminants that would discolor or be deleterious to crushed aggregate blended with GraniteCrete Admixture.

PART 3 - EXECUTION

3.01 GENERAL

- A. Examine grading and subsoil conditions.
 - 1. Do not install Work specified in this section prior to acceptance of earthwork and grading, and aggregate base if applicable.
 - 2. Do not install GraniteCrete surfacing when sub-base or base is wet at saturated field capacity, during rainy conditions or below 40 degrees F and falling.
- B. Excavation: Excavate to depth required so edges of GraniteCrete surfacing will match adjacent grades and have a maximum cross slope as shown on the Plans.
- C. Sub-grade: See Civil Plans and Specifications
- D. Aggregate Base: See Civil Plans and Specifications
- E. Finished Surface: The finish grades of the paving shall conform to the lines, grades, and slopes on the Plans. Edges of paving shall be flush with adjacent headers, concrete, or other paving. When Work is complete, the surface must be smooth, compacted as specified, and uniform.
- F. Protect adjacent Work from damage due to GraniteCrete installation.

3.02 GRANITECRETE SURFACING INSTALLATION - GENERAL

- A. Installation Depth (Lift): install GraniteCrete as a 4-inch lift, compacted dimension.
- B. Mixing Ratios:
 - 1. Commercial/light vehicular applications (3 bag mixture) Mix the DG with GraniteCrete Admixture in the ratio of eleven (11) units of DG to one-and-a-half (1.5) units of GraniteCrete, measured by volume.
 - 2. Depending on the mixing equipment available, it may be necessary to prepare GraniteCrete surfacing in batches, it is important to maintain the specified ratio.
- C. Compaction: All applications 88%-92% relative compaction per ASTM D1557
- D. Confirm compliance with the specified tolerances prior to scheduling an inspection by the Owner's Representative.
 - 1. Verify planarity and elevation by a licensed surveyor
 - 2. Verify compaction, gradation, & permeability by a Geotechnical Engineer

3.03 GRANITECRETE SURFACING INSTALLATION - WET

A. Supplier recommends this method for installations over 10,000 square feet and may require the use of a volumetric concrete truck.

- B. Thoroughly mix the GraniteCrete Admixture and DG together to the specified ratio. Moisten with water until the GraniteCrete mixture begins to marble or clump together Check for proper moisture content - clench a fist around the mixture when the mixture just stays together and the color just starts to transfer to the hand, GraniteCrete is ready to install.
- C. Moisten compacted aggregate base on entire installation area. Transport the prepared GraniteCrete surfacing mixture to the installation site and place to the full specified depth.
- D. Initial compaction can be performed by walking on the edges and corners. Rake or grade area with the flat side of a landscape or asphalt rake (do not use tang side) until the GraniteCrete surfacing is one inch above finish grade.
- E. Once initial compaction is achieved, hand tamp using a 10" hand tamp around benches, sign posts, corners, boulders. Ensure tight compaction at all edges.
- F. Make several passes with a 36" lawn roller filled with water, or for larger installations, a 36" walk-behind or riding-roller in static position. Hand tamp out any imperfections with a 6" wooden masonry float. Do not use vibratory plate compactors for pedestrian installations.
- G. Ensure that the compaction implements are clean at all times. Fill in any divots with fresh, loose material, removing any larger stone, and hand tamp with the wooden floats to match existing finish.
- H. When laying GraniteCrete in batches, use the cold joint method described below to ensure a blemish-free installation.
- I. Lightly sweep finish surface with a medium bristled broom. Then make several more passes with the lawn roller until the desired surface texture is achieved. With larger installations, a roller in static position can be used, making sure to keep drum clean at all times. Remove spoils off the surface.
- J. Do not allow the GraniteCrete surfacing to dry during installation. Mist lightly with a hose end spray head as necessary or cover with a plastic tarp.
- K. Completed, finished surface is to be of consistent quality and free of deleterious materials such as organic materials, nails, stones, and loose material. Surface shall not have depressions or humps greater than 1/4-inch in ten feet. Cold joints, if any, should be inconspicuous.

3.04 JOINTS

- A. Control Joints: Saw cut/trowel control joints every 5-ft in narrower paths, every 12-ft in wider paths, and at all engineered stress areas.
- B. Cold Joints General: Cold joints can be used at the end of the workday using two methods.
- C. Cold Joints Method One:

- 1. Step 1: Between pours, stop at an area that makes the joint location look intentional. Take a chalk snap line just back from loose GraniteCrete mixture into the compacted area and create a chalk line. Use either a masonry blade or a square-nose shovel and cut a straight line across the installation.
- 2. Step 2: Place newly prepared GraniteCrete mixture into area, being careful not to overlap existing compacted material. With a concrete trowel or similar tool, tamp the new material at a tapered, 45-degree angle 1" above the finished grade and compact. If necessary, feather in with a medium-bristled broom.
- D. Cold Joints Method Two:
 - 1. Place a 2x4 or 2x6 piece of wood across the installation, stake it, and finish compacting the material. Leave the board in place overnight. The next day, carefully lift the wood up and away from the installed GraniteCrete surfacing. Continue the installation process as per step 2 under Method One.

3.05 CURING & PROTECTION

- A. Curing: dampen with water newly-installed and compacted GraniteCrete surfacing. Using a shower head/spray hose attachment, moisten the entire area and avoid puddling. Moisten all GraniteCrete surfacing a second time the following 1 to 5 days, as practical. Slow curing of GraniteCrete is important to avoid cracking. Cover finished surface, when practical, to achieve maximum curing period.
- B. Protection: Do not allow foot traffic on GraniteCrete surfacing for 24-hours after installation. Do not allow vehicular traffic on GraniteCrete surfacing for 5-7 days after installation. Do not allow heavy construction equipment on the installed surfacing at any time.
- C. Newly installed GraniteCrete paving surfaces are fully cured in 28 days. At that time clean the entire surface with a blower or by sweeping to eliminate loose surface materials. Minor cracking may take place. However, over time, the aggregate fines will fill in the minor cracks and they should disappear.
- D. Protect GraniteCrete surfacing from damage until project completion. Repair damaged areas to match specified requirements.

3.06 CLEAN UP

A. Waste Removal: remove all waste as a result of GraniteCrete paving construction from the site and dispose of legally. Remove all excess GraniteCrete mixture from adjacent planting and other hard surfaces.

END OF SECTION

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SECTION 32 16 00 CONCRETE CURBS, GUTTERS, AND SIDEWALKS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Concrete curbs, gutters, sidewalks, driveways, and access ramps shown on the Plans, and replacement of similar Work or work intentionally or inadvertently demolished or damaged during construction.
- B. Related Sections:
 - 1. Section 03 30 00 Cast-In-Place Concrete.
 - 2. Section 32 11 23 Aggregate Base Course.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements: Construct various types of concrete curb, gutter, sidewalk, driveways, and alley intersections to dimensions and details indicated on the Plans.

1.03 SUBMITTALS

- A. Product Data: Submit data completely describing products.
- B. Samples: Submit samples when requested.

1.04 PROJECT CONDITIONS

- A. Environmental Requirements.
- B. Existing Conditions.
- C. Field Measurements.

1.05 SEQUENCING AND SCHEDULING

A. Sequence and schedule work in coordination with other trades.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Concrete: Class "E" 3,600 psi at 28 days. Portland cement concrete shall conform to the provisions of Section 03 30 00.
- B. Curb Finishing Mortar: 1 part portland cement to 2 parts sand.

- C. Form Release Material: Light oil or other releasing agent of concrete type that does not discolor concrete or interfere with the application of finishing mortar to curb tops and faces.
- D. Joint Materials:
 - 1. Expansion: Comply with requirements as specified in Section 03 11 00.
 - 2. Construction: Steel dividers or plastic inserts.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify field conditions, including subgrade condition and interferences, before beginning construction.

3.02 PREPARATION

- A. Surface Preparation:
 - 1. Subgrade:
 - a. Construct and compact true to grades and lines indicated on the Plans and requirements as specified in this section.
 - b. Remove soft or unsuitable material to depth of not less than 6 inches below subgrade elevation and replace with satisfactory material.
 - 2. Forms And Subgrade: Water immediately in advance of placing concrete.

3.03 INSTALLATION

- A. Special Techniques:
 - 1. Contractor's Option:
 - a. Construct concrete curbs and gutters by conventional use of forms, or by means of curb and gutter machine when acceptable to the Engineer.
 - b. When use of machines designed specifically for work of this Section are accepted by the Engineer, results must be equal to or better than those produced by use of forms.
 - c. Applicable requirements of construction that apply to use of forms also apply to use of machines.
 - d. Discontinue use of machines when results are not satisfactory to the Engineer.
- B. Forms:
 - 1. Carefully set to line and grade and securely stake in position forms conforming to dimensions of items to be constructed.
 - 2. Thoroughly clean prior to each use and coat with form releasing material.

- C. Expansion and Contraction Joints:
 - 1. Expansion Joints:
 - a. Construct vertically, and at right angles to centerline of street and match joints in adjacent pavement or sidewalks.
 - b. Constructed at radius points, driveways, alley entrances, and at adjoining structures.
 - c. Fill joints with expansion joint filler material.
 - 2. Contraction Joints:
 - a. Constructed not more than 15 feet apart.
 - Make joints of construction joint material, scoring or saw cutting to depth of not less than 1-1/2 inches and matching joints in adjacent pavement or sidewalk.
- D. Concrete:
 - 1. Placing:
 - a. Thoroughly spade concrete away from forms so that no rock pockets exist next to forms and so that no coarse aggregate will show when forms are removed.
 - 2. Compacting:
 - a. Compact by mechanical vibrators accepted by the Engineer.
 - b. Continue tamping or vibrating until mortar flushes to surface and coarse aggregate is below concrete surface.
 - 3. Form Removal:
 - a. Front Form Faces: Do not remove before concrete has taken initial set and has sufficient strength to carry its own weight.
 - b. Gutter and Rear Forms: Do not remove until concrete has hardened sufficiently to prevent damage to edges. Take special care to prevent damage.
 - 4. Finishing and Curing:
 - a. As soon as curb face forms are stripped, apply finishing mortar to the top and face of curb and trowel to a smooth, even finish. Finish with fine haired broom in direction of work.
 - b. Where curb is installed without integral gutter, extend finish 2 inches below grade.
 - c. Edge concrete at expansion joints to 1/4-inch radius.
 - d. Flow lines of gutters shall be troweled smooth 4 inches out from curb face for integral curb and gutter and 4 inches on both sides of flowline 4 gutters without curbs.
- E. Backfilling:
 - 1. Unless otherwise specified, backfill behind curbs, gutters, or sidewalks with Class 2 aggregate base to lines and grades indicated on the Plans.

3.04 FIELD QUALITY CONTROL

- A. Tests:
 - 1. Curbs and Gutters:
 - a. Test face, top, back, and flow line with 10-foot straightedge or curve template longitudinally along surface.
 - b. Correct deviations in excess of 1/4 inch.
 - 2. Gutters:
 - a. Frequency of Testing: When required by the Engineer, where gutters have slope of 0.8 foot per hundred feet or less, or where unusual or special conditions cast doubt on capability of gutters to drain.
 - b. Test Method: Establish flow in length of gutter to be tested by supplying water from hydrant, tank truck, or other source.
 - c. Required Results:
 - 1) 1 hour after supply of water is shut off, inspect gutter for evidence of ponding or improper shape.
 - 2) In event water is found ponded in gutter to depth greater than ½-inch, or on adjacent asphalt pavement, correct defect or defects in manner acceptable to the Engineer without additional cost to the Contract.

3.05 ADJUSTING

- A. Repair portions of concrete damaged while stripping forms or, when damage is severe, replace such work at no additional cost to the Contract. Evidence of repairs shall not be noticeable in the finished product.
- B. Remove and replace sections of work deficient in depth or not conforming to requirements indicated on the Plans and specified in the Specifications at no additional cost to the Contract. Removal and replacement shall be the complete section between two joints.

END OF SECTION

SECTION 32 17 23 PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Pavement marking requirements for striping text and graphics, including those destroyed or damaged during construction.

1.02 SUBMITTALS

- A. Product Data.
- B. Manufacturer's Instructions.

1.03 QUALITY ASSURANCE

- A. Applicator Qualifications: Minimum 5 years' experience of applying traffic markings with satisfactory performance record.
- B. Regulatory Requirements: Comply with applicable requirements of governmental agencies having jurisdiction, including airborne emissions and industrial waste disposal requirements.

1.04 **PROJECT CONDITIONS**

- A. Apply Pavement Marking Paint When:
 - 1. Pavement is clean and thoroughly dry.
 - 2. Ambient temperature is above 40 degrees Fahrenheit.
 - 3. Precipitation is not expected within 12 hours of completion of application.
- B. Replace all pavement markings damaged or destroyed as a result of construction activity to original or better condition.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Pavement Marking Paint: One of the following manufacturers or equal:
 - 1. Dunn-Edwards Corporation, Los Angeles, CA.
 - 2. Glidden Company, Cleveland, OH.
 - 3. Sherwin Williams Company, Cleveland, OH.

2.02 MATERIALS

A. Pavement Marking Paint, Latex Based: One of the following or equal:

- 1. Dunn-Edwards: No. W 801, Vin-L-Stripe, epoxy-modified acrylic-latex based paint.
- 2. Glidden: 63240 Series, UltraHide Latex Traffic Paint.
- 3. Sherwin Williams: Set fast acrylic water borne traffic marking paint.
- B. Pavement Marking Paint, Alkyd Based: One of the following or equal:
 - 1. Glidden: 63220 Series, UltraHide Traffic Paint.
 - 2. Sherwin Williams: ProMar Alkyd Traffic Marking Paint.
- C. Masonry Conditioner: One of the following or equal:
 - 1. Sherwin Williams: B46WZ1000, Masonry Conditioner.
- D. Colors:
 - 1. Text: White.
 - 2. Parking Dividers: White.
 - 3. No Parking Zone Markings: Yellow.
 - 4. No Parking Curb: Red.
 - 5. Handicap Zone Markings: Blue and white.
 - 6. Directional Arrows: White.
 - 7. Driving Lane Dividers: White.

PART 3 EXECUTION

3.01 **PREPARATION**

- A. Remove dirt, oil, grease, and other materials which may affect paint adhesion.
- B. Apply masonry conditioner on weathered or sandblasted surfaces, brick, or stucco.

3.02 APPLICATION

- A. Apply paint at package consistency whenever possible. Thin paint as little as possible.
- B. Apply paint with specifically designed and manufactured equipment for pavement marking. Provide:
 - 1. Uniform straight edges without overspray.
 - 2. Four inch wide lines, unless indicated otherwise.
 - 3. Hatching in handicap parking areas.
- C. Provide striping between parking stalls as indicated on the Plans or to replace existing markings in-kind.
 - 1. Identify parking spaces with text as so indicated.

- a. Compact Spaces: COMPACT.
- b. Carpool Spaces: CARPOOL.
- c. Motorcycle Spaces: MOTORCYCLE.
- d. Visitor Spaces: VISITOR.
- D. Apply paint to obtain thickness recommended by paint manufacturer.
- E. Paint traffic control markings, including striping, directional arrows, cross walks and lettering, and handicap striping and symbols as indicated on the Plans and in accordance with the City's standards. Use stencils for arrows, lettering, and symbols.
- F. Apply 700 square inch international handicap symbol on pavement surface where indicated on the Plans.
 - 1. On asphalt surfaces, paint blue symbol on white square.
 - 2. On concrete surfaces, paint white symbol on blue square.

END OF SECTION

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SECTION 32 17 33 DECORATIVE PAVEMENT OVERLAYS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of preformed thermoplastic pavement marking materials, referred to in this Specification as Decorative Pavement Overlays as shown on the Plans and as specified in this Section.
- B. Related Work includes but is not limited to:
 - 1. Asphalt Concrete Paving
 - 2. Site Concrete

1.03 STANDARDS AND DEFINITIONS

- A. Applicable ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including but not limited to:
 - 1. D92 Test Method for Flash and Fire Points by Cleveland Open Cup Tester
 - 2. D2047 Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
 - 3. D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
 - 4. D4796 Test Method for Bond Strength of Thermoplastic Pavement Marking Materials
 - 5. D4960 Test Method for Evaluation of Color for Thermoplastic Traffic Marking Materials
 - 6. D5420 Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)
 - 7. E303 Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
 - 8. E1710 Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

1.04 QUALITY ASSURANCE

- A. Manufacturer: ISO 9001:2008 certified for design, development and manufacturing of preformed thermoplastic material.
- B. Manufacturer Certified Applicator Requirement: Material to be supplied and applied only by an applicator certified by the material manufacturer. Certified Applicator to follow the material manufacturer's current published application procedures.

- C. Certified Applicators:
 - 1. Asphalt Impressions, Sacramento, CA (916) 383-0441

1.05 SUBMITTALS

- A. Certification:
 - 1. Manufacturers current ISO certification.
 - 2. Proof of applicators current certification from the manufacturer and valid through the period of installation on this project for the specific type of Work as shown on the Plans.
- B. Applicator Agreement: copy of the current Applicator Agreement as provided to the proposed applicator issued by Ennis-Flint.
- C. References: at least three project references, completed in the last five years, of Decorative Pavement Overlay installations similar in nature to that shown on the Plans. Include the name and contact details of the Owner.
- D. Warranty: sample product warranty from Ennis-Flint. At the completion of the project, Applicator will be required to provide a dated warranty specific to this project to the Owner.
- E. Documentation:
 - 1. Confirmation of the thermoplastic color(s).
 - 2. List of major equipment to be used. If the Plans indicate stamped asphalt pavement, then this list shall include asphalt heating equipment, compactor(s) and wire rope stamping templates.
- F. Samples: minimum of two (2) sample chips of each specific color and texture specified on the Plans.

1.06 MOCK-UPS

- A. Site Reviews: Prepare a mock-up of Decorative Pavement Overlay, minimum 4-ft x 4-ft (4 panels).
 - 1. Mock-up shall be viewed for color and finish requirements.
 - 2. Provide up to two additional mock-up panels if the original mock-up is not approved.
 - 3. Approved mock-up shall be kept at the job site to serve as a demonstration for all finishes. Mock-up shall be removed at the completion of the Decorative Pavement Overlay Work.
 - 4. Remove and replace all Decorative Pavement Overlay Work installed that does not conform to the approved mock-up, to the satisfaction of the Owners Representative and at no additional cost to the Owner.

1.07 DELIVERY, STORAGE AND HANDLING

A. Delivery: preformed thermoplastic material to be packaged with a plastic sheet between each layer of material and delivered in cardboard cartons wrapped in protective plastic film to protect the material from rain or premature aging.

Packaging to use cardboard stiffeners where necessary to prevent damage in transit. Packages to be labeled for ease of identification.

B. Storage: The material may be stored for 24 months, if stored indoors and protected from the elements.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCT / SUPPLIER

- A. The product supplier shall be one of the following or equal:
 - 1. Ennis-Flint Greensboro, NC (336) 436-9415
 - 2. Asphalt Impressions, Sacramento, CA (916) 631-1365
 - 3. Cook Engineering, Rancho Cordova, CA (916) 631-1365
 - 4. Apply-A-Line, Inc, Anderson, CA (530) 365-4000
- B. Material: Ester modified rosin in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements.
 - 1. Material must be able to be applied in temperatures down to 45°F without any special storage, preheating or treatment of the material before application.
 - 2. Material to consist of interconnected individual pieces of preformed thermoplastic pavement marking material, which through a variety of colors and patterns, make up the desired design. Individual pieces in each material segment to be factory assembled and interconnected with a compatible material so that in the field it is not necessary to assemble the individual pieces within a material segment.
 - 3. Material must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures.
 - 4. Material thickness: per selected system described elsewhere in this Specification.
- C. Pigments and anti-skid/anti-slip elements must be uniformly distributed throughout the material.
 - 1. Pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.
- D. Heating indicators: The top surface of the material shall have regularly spaced indents. These indents shall act as a visual cue during application that the material has reached a molten state allowing for satisfactory adhesion and proper embedment of anti-skid/anti-slip elements, and a post-application visual cue that the application procedures have been followed.
- E. Performance / properties:
 - 1. Skid Resistance: minimum skid resistance value of 60 BPN when tested according to ASTM E303.
 - 2. Slip Resistance: minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.
 - 3. Environmental Resistance: The material must be impervious to oil or gasoline, and resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions, as well as to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids, etc.

2.02 DECORATIVE PAVEMENT OVERLAY SYSTEM

- A. Traffic Patterns 125 mil, colored thermoplastic overlay with integral pattern for asphalt / concrete. Pigments and anti-skid/anti-slip elements are uniformly distributed throughout the material. Contains a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements and where the top surface contains antiskid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 8 (Mohs scale).
 - 1. Type #1: Dimensions as shown on the Plans. Manufacturer's premium colors Light Grey, Light Blue, Sky Blue, Blue, Teal.
 - Type #2: Band with 8-inch high street name lettering as shown on the Plans. Two bands at each location. Street names are unique at each location. Manufacturer's standard colors – Field Grey lettering on White background.

2.03 APPLICATION EQUIPMENT

- A. Heating Equipment: The System manufacturer will provide:
 - 1. Reciprocating infrared heating equipment designed specifically to elevate the temperature of the preformed thermoplastic material and asphalt pavement without adversely affecting it. The primary heating unit will employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, allowing the applicator to monitor the temperature of the preformed thermoplastic at all times during the pavement heating process.
 - 2. Mobile infrared heater if required and designed specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters. This secondary heater also allows the applicator to monitor the temperature of the preformed thermoplastic at all times during the heating process.
 - 3. Hand-held propane heat torch if required and to heat isolated areas of the preformed thermoplastic.
- B. Sealer Dispensing Gun: Provided by the system manufacturer and used to dispense the required two-part epoxy sealer onto the substrate.

2.04 OTHER MATERIALS

A. Sealer: supplied by the material manufacturer in cartridges along with sealer application supplies and application instructions.

PART 3 - EXECUTION

3.01 JOB CONDITIONS

- A. Weather Conditions: Install Decorative Pavement Overlays only when the weather is not rainy.
- B. Pre-conditions: Inspect the existing or new asphalt paving base for defects, and verify that it has been properly prepared and is stable and adequate for the Decorative Pavement Overlay application. Inform the Owner's Representative if otherwise and do not start Work prior to rectification of defects.

1. Defects in existing asphalt paving include cracks, ruts or potholes. The paving should not demonstrate any flushing, raveling

3.02 BASE PREPARATION

- A. Substrate Condition: The System must only be applied to a stable, high quality asphalt pavement substrate over a stable base that is free of defects, as per the System manufacturer's published Substrate Guide. The asphalt pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.
- B. Surface Preparation: Remove all loose material on the asphalt surface by mechanical booming, or blowing clean using a backpack blower or compressed air. Remove any difficult to remove dirt using a Pressure Washer. Prior to applying the coatings, the asphalt surface shall be completely dry.
- C. Pavement marking: removal: removed pavement markings by sandblasting, waterblasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface.
 - 1. Verify with the Owner's Representative if the removal of the markings is satisfactory for the application of the Decorative Pavement Overlays. Do not proceed with the Work until this approval is granted.

3.03 APPLICATION

- A. General: Install materials at ambient and road temperatures down to 45°F without any preheating of the pavement to a specific temperature.
- B. Sealer: apply two-part epoxy sealer specified and supplied by the material manufacturer along with application instructions to the substrate prior to material application to ensure proper adhesion, and to provide bond reinforcement for the material. A thermometer is not be required during the sealer application process.
- C. Traffic Patterns: Material to be applied by using an infrared heater supplied by the material manufacturer.
 - 1. A hand-held propane heat-torch supplied by the material manufacturer may be used in isolated areas.
 - 2. The use of a compactor or similar equipment is not necessary during or after the application of the material.
- D. Coverage: Material must cover the entire application area and be flush across the surface. Once applied, no part of the pavement surface should be visible in the application area.
- E. Cooling: Allow material to cool thoroughly before being opened to vehicle or pedestrian traffic. Consult the manufacturer's published application procedures for complete information.

3.04 PROTECTION & CLEAN UP

A. Protection: Take all steps necessary not to discolor or damage existing improvements. If damage occurs, repair immediately and if repair cannot be made to the satisfaction of the Owner's Representative, remove and replace at no additional expense to the Owner.

END OF SECTION

SECTION 32 31 13 CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes furnishing labor, tools, and equipment to install new chain link fencing, including posts, minor concrete, clips, tension wire, top rail, caps, clamps, tapwire, steel truss rods, braces, etc. as shown on the Plans.
- B. Chain link fence shall be black vinyl coated unless noted otherwise on the Plans. Black vinyl coating shall include black vinyl posts, black vinyl caps, black vinyl clamps, black vinyl tapwire, and black vinyl braces.
- C. All chain link fence shall be six feet tall unless noted otherwise on the Plans.
- D. Related Sections:
 - 1. Section 03 30 00 Cast in Place Concrete.
 - 2. Section 31 00 00 Earthwork.

1.02 REFERENCES

- A. State of California Department of Transportation Standard Specifications, latest edition (Caltrans Standard Specifications).
 - 1. Section 80 Fences.
- B. Caltrans Standard Plans.
 - 1. Detail A85, except as modified in the Plans or herein.
- C. American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM A36 Standard Specification for Carbon Structural Steel.
 - 2. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - ASTM A392 Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - 4. ASTM A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 - 5. ASTM F626 Standard Specification for Fence Fittings.
 - 6. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC), Polyolefin and Other Polymer-Coated Steel Chain Link Fence Fabric.
 - 7. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) for Fence Structures.

1.03 SYSTEM DESCRIPTION

- A. This Work shall consist of furnishing and installing chain link fences and gates as specified and as indicated on the Plans.
- B. In general, chain link fences and gates shall conform to Section 80 "Fences" and all applicable referenced sections of the Caltrans Standard Specifications.
 - 1. Where conflicts exist, this Specification shall govern.

1.04 SUBMITTALS

- A. Contractor shall submit manufacturer's details or drawings for Engineer's approval before installation.
- B. Submit a 3-foot long sample of fencing for Engineer's approval before installation.

PART 2 PRODUCTS

2.01 FENCE

- A. Fence materials, including and not limited to posts, caps, tapwire, top rail, steel truss rods, and braces shall conform to Section 80 of the State Standard Specifications.
- B. Chain link fence shall conform to Section 80, "Fences," of the State Standard Specifications and State Standard Plan Detail A85, except as modified in the Plans or herein.
- C. Black Class A vinyl coating shall be fusion bonded and comply with AASHTO M181 for Type IV fabric.
- D. Concrete shall have a minimum compressive strength of 3,000 psi and shall conform to Section 03 30 00 of these Specifications.
- E. Chain link fabric shall be 9 gauge for uncoated (Type A1) and coated (Type A2) fencing fabric.

2.02 GATES

- A. Chain link gate materials, including and not limited to posts, caps, tapwire, truss rods, and braces shall conform to Section 80 of the State Standard Specifications and as shown in the Plans.
- B. Chain Link gates shall conform to Section 80, "Fences," of the State Standard Specifications.
- C. Gates, posts, bars, tension bars, and appurtenances shall be black vinyl coated unless noted otherwise on the Plans.
 - 1. Black vinyl coating shall be fusion bonded.

- D. Each gate section shall:
 - 1. Swing freely both ways with a lock mechanism.
 - 2. Have adequate attachments, fittings, and fasteners as specified in Section 80 of the State Specification.
- E. Gate latches with a plunger and plunger cap are prohibited.
- F. Locking chain and locks for each gate will be furnished by the City.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify surfaces and site conditions are ready to receive Work. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation.

3.02 **PREPARATION**

- A. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials.
- B. Contractor shall be responsible for any damage caused by Contractor's employees. All damage caused by the Contractor's operations shall be repaired to the satisfaction of the Engineer at no additional cost to City.

3.03 PLACEMENT

- A. Unless otherwise shown on the Plans, all fence posts shall be set in concrete poured into a hole without backfill.
- B. Where chain link fences meet adjoining fences or structures, the maximum allowable gap shall be 4 inches.
 - 1. Custom or special configurations may be necessary, such as short fence "wing panels" to close the gap to an acceptable width.
 - 2. Wing panels shall have fence tubes on all edges so that the fence fabric cannot be bent and pushed out of shape.
- C. Contractor shall lay out fence alignment in the field. If the proposed location of the fence (posts, fabric, etc.) would damage existing trees including roots, Contractor shall propose modifications to the fence alignment to protect existing trees from damage.
 - 1. Propose modifications to Engineer for approval prior to installing any fence alignment modifications.
- D. Install a brace rail and diagonal truss rod on fence runs longer than 1,000 feet if there are no corner posts within 1,000 feet.

E. Mark and stake gates by locating gate posts and swing arc in the field for Engineer's approval before installation.

3.04 WORKMANSHIP AND WARRANTY

A. Contractor shall provide written warranty against defects in materials or workmanship for a period of not less than one calendar year upon completion of Work.

END OF SECTION

SECTION 32 34 13 DESIGN-BUILD BRIDGES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Design, furnish, and install the pedestrian and vehicular bridges, complete, as shown on the Plans Including:
 - 1. Prefabricated steel bowstring truss pedestrian bridge, including steel superstructure, concrete abutments, and foundations, near Control Line 1 Sta. 86+68.
 - 2. Precast concrete bridge, including concrete superstructure, substructure, and foundations, near Control Line A-40 Sta. 1+35.
 - 3. Precast concrete bridge, including concrete superstructure, substructure and foundations, near Control Line 46 Sta. 0+55.
- B. This section contains requirements for fully engineered clear span bridges and shall be the minimum standards for design and construction.
- C. Clear span length and width of the bridges shall be as shown on the Plans.
- D. Abutment and foundation design shall be based on the parameters provided in these Specifications and the referenced Geotechnical Reports.
- E. Related Sections:
 - 1. Section 01 30 30 Shop Drawings, Product Data, and Samples.
 - 2. Section 01 57 00 Environmental Controls.
 - 3. Section 01 57 23 Storm Water Pollution Prevention.
 - 4. Section 01 73 24 Seismic Design and Anchorage.
 - 5. Section 01 73 25 Wind Design and Anchorage.
 - 6. Section 03 20 00 Concrete Reinforcing.
 - 7. Section 31 00 00 Earthwork.
 - 8. Section 31 23 16 Structural Excavation.
 - 9. Section 31 23 19 Dewatering.
 - 10. Section 31 23 33 Structural Fill.

1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO) / State of California Department of Transportation (Caltrans):
 - 1. AASHTO-CA BDS-8 AASHTO LRFD Bridge Design Specifications, 2017 (8th Edition) with California Amendments, preface dated April 2019.

- 2. AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges, December 2009, AASHTO with 2015 Interim Revisions.
- 3. AASHT0 M154 Standard Specification for Air-Entraining Admixtures for Concrete.
- B. American Institute of Steel Construction (AISC):
 - 1. AISC Steel Construction Manual, 15th Edition.
 - 2. AISC 303 Code of Standard Practice for Steel Buildings and Bridges.
 - 3. AISC 348 Specifications for Structural Joints Using High-Strength Bolts.
- C. ASTM International (ASTM):
 - 1. ASTM A242 High-Strength Low-Alloy Structural Steel.
 - 2. ASTM A307 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 3. ASTM A588 High-Strength Low-Alloy Structural Steel, up to 50 ksi Minimum Yield Point, with Atmospheric Corrosion Resistance.
 - 4. ASTM A606 Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - ASTM A847 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance
 - 6. ASTM C33 Standard Specification for Concrete Aggregates
 - 7. ASTM F1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105ksi Yield Strength
 - ASTM F3125 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- D. American Welding Society (AWS):
 - 1. AWS D1.1/D1.1M, Structural Welding Code Steel.
- E. State of California Department of Transportation (Caltrans):
 - 1. Caltrans Seismic Design Criteria (SDC) 2.0, dated April 2019.
- F. The Society for Protective Coatings (SSPC):
 - 1. SSPC SP6, Commercial Blast Cleaning.

1.03 SUBMITTALS

- A. Submit complete Shop and Fabrication Drawings to Engineer for review.
- B. Submit manufacturer's certification of compliance with referenced standards.
C. Submit a Bridge Delivery Plan a minimum of two weeks prior to the delivery and unloading of the fabricated bridge elements. This plan shall detail the proposed delivery route to the site, a site plan for staging of equipment at the site for unloading and erection, coordination with and actions required by the Manufacturer and any special safety or handling measures to be taken on the day of delivery.

1.04 QUALITY ASSURANCE

A. Bridge designs shall be signed and sealed by a Registered California Professional Engineer, Civil or Structural.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery requirements with Manufacturers.
- B. Comply with Manufacturers' requirements for unloading, lifting, and placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
 - 1. Contech Engineering Solutions; 1-800-338-1122.
 - 2. Big 'R' Manufacturing; 1-800-234-0734.
 - 3. Excel Bridges; 1-800-548-0054.
 - 4. Bridge America; 1-320-763-5600.
 - 5. Approved equals.

2.02 DESIGN REQUIREMENTS

- A. Prefabricated steel bowstring truss pedestrian bridge:
 - 1. The bridge design shall be in accordance with and will satisfy all design requirements of the "LRFD Guide Specifications for the Design of Pedestrian Bridges", December 2009, AASHTO with 2015 Interim Revisions by AASHTO.
 - 2. Welded tubular structure design shall be in accordance with the AWS D1.1/D1.1M.
 - 3. The bridge shall be designed for a 90 psf uniform pedestrian live loading on the full deck area, in accordance with Table 1607A.1, Note "r", "Article 3.1" of the "LRFD Guide Specifications for the Design of Pedestrian Bridges".
 - 4. Seismic design shall be in accordance with Caltrans SDC 2.0, dated April 2019, with October 2019 Interim Revisions by Caltrans, and the site-specific response spectra to be determined by the Contractor's geotechnical engineer.
 - 5. Abutment and foundation design shall be the responsibility of the Contractor in coordination with the Contractor's geotechnical engineer. Design shall be in accordance with and shall satisfy all design requirements of AASHTO-CA BDS-8.

- 6. Steel trusses and pedestrian railing for the bridge shall consist of tubular members, diagonal bracing, tubular handrail, timber rub rail, steel angle, steel toe plates and steel safety rails on both sides. Safety rails shall have a clear spacing sufficient to prevent passage of a 4" sphere between rails. The top chord of the bridge may serve as the top element of the side railing, the top of which is to be a minimum of 3'-6" above finish deck surface. All safety rails shall be attached to the interior side of the structure posts. A full length steel toe plate and timber rub rail shall be provided on each side of the structure, on the interior side of the steel trusses.
- 7. The bridge deck shall consist of 3x wood decking, Select Structural Fir (Fb=1,400 psi min.) with an A.C.Q. preservative treatment to 0.4 pcf retention or to refusal, or M.C.A. treatment to 0.6 pcf retention or to refusal.
- 8. A small unobtrusive plaque shall be attached at each end of the structure indicating fabricator, fabricator contact information, fabricator tracking number, and bridge design live loads.
- 9. The bridge shall be shop-fabricated as far as practicable. The Contractor shall field verify all controlling dimensions and existing conditions and coordinate with the manufacturer prior to fabrication. One field bolted splice will be permitted on the bridge.
- 10. The minimum concrete cover for reinforcement shall in accordance with and shall satisfy all design requirements of AASHTO-CA BDS-8. The exposure condition shall be considered as marine. Except for concrete located permanently three feet below the mean lower low water (MLLW) elevation, the minimum concrete cover for reinforcement shall conform to the requirements for concrete within the splash zone and exposed to chloride concentrations greater than 10,000 ppm.
- B. Precast concrete bridges:
 - 1. The bridge design shall be in accordance with and shall satisfy all design requirements of AASHTO-CA BDS-8.
 - 2. The bridge shall be designed for a 90 psf uniform pedestrian live loading on the full deck area.
 - 3. The bridge shall be designed for vehicle design loads as follows:
 - a. Precast concrete bridge near Control Line A-40 Sta. 1+35 shall be designed for one 75,000 pound Fire Engine load.
 - b. Precast concrete bridge near Control Line 46 Sta. 0+55 shall be designed for one 20,000 pound vehicle (H10 truck) load.
 - 4. Seismic design shall be in accordance with Caltrans SDC 2.0, dated April 2019, with October 2019 Interim Revisions by Caltrans, and the site--specific response spectra to be determined by the Contractor's geotechnical engineer.
 - 5. Abutment and foundation design shall be the responsibility of the Contractor in coordination with the Contractor's geotechnical engineer.
 - 6. The bridge shall be shop-fabricated as far as practicable. The Contractor shall field verify all controlling dimensions and existing conditions and coordinate with the Manufacturer prior to fabrication.

- 7. The minimum concrete cover for reinforcement shall in accordance with and shall satisfy all design requirements of AASHTO-CA BDS-8. The exposure condition shall be considered as marine.
- 8. Except for concrete located permanently three feet below the mean lower low water (MLLW) elevation, the minimum concrete cover for reinforcement shall conform to the requirements for concrete within the splash zone and exposed to chloride concentrations greater than 10,000 ppm.
- C. Dimensions and Requirements:
 - 1. Lengths: As shown on Plans.
 - 2. Widths: Clear unobstructed inside width as shown on Plans.
 - 3. Railings: Install for full length of bridge.
 - 4. Bridge walking surface profiles shall be as shown on the Plans.
 - 5. Bridges shall be cambered to compensate for dead load deflection. The amount of dead load camber shall be determined by the manufacturers and approved by the Engineer.
 - 6. Abutments: Bridge to accommodate abutment elevations noted on the Plans.

2.03 MATERIALS

- A. Metal Fabrication: Material thickness and design of members shall be fully engineered for the length and style of each bridge requirement specified.
- B. Prefabricated steel bowstring truss pedestrian bridge shall conform to the following:
 - 1. The bridge and railing material shall be high strength, self-weathering, low alloy, atmospheric corrosion-resistant ASTM A847, cold formed, welded square and rectangular tubing using ASTM A588, ASTM A606 or ASTM A242 plate and structural shapes (Fy=50,000 psi).
 - 2. Shop welding shall utilize E80 series electrodes which have the same weathering characteristics as corrosion resistant steel. Welding shall be performed by certified welders per AWS "Standard Qualification Procedure" to perform type of work required. All welding shall be in conformance with the AWS Welding Code.
 - 3. The prefabricated steel truss shall not be painted.
- C. Precast concrete bridges shall conform to the following:
 - The concrete for the precast elements shall be air-entrained, composed of cementitious materials, fine and coarse aggregates, admixtures and water. Airentrained concrete shall contain 6 ± 2 percent air. The air-entraining admixture shall conform to AASHT0 M154. The minimum concrete compressive strength shall be as shown on the shop drawings.
 - Cementitious Materials Comply with the requirements for cementitious materials specified in Section 03 30 00, except Type III portland cement may be used.
 - b. Coarse Aggregate Shall consist of stone having a maximum size of 1 inch. Aggregate shall meet requirements for ASTM C33.

- c. Water Reducing Admixture The manufacturer may submit, for approval by the Engineer, a water-reducing admixture for the purpose of increasing workability and reducing the water requirement for the concrete.
- d. Calcium Chloride The addition to the mix of calcium chloride or admixtures containing calcium chloride will not be permitted.
- e. The aggregates, cementitious materials, and water shall be proportioned and mixed in a batch mixer to produce a homogeneous concrete meeting the strength requirements of this specification.
- f. Concrete must contain at least 675 pounds of cementitious material per cubic yard.
- g. The cementitious material must be composed of one of the following, by weight, unless noted otherwise:
 - 1) 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement.
 - 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement.
 - 3) 12 percent silica fume, metakaolin, or ultra-fine fly ash, and 88 percent portland cement.
 - 4) 50 percent ground-granulated blast-furnace slag and 50 percent portland cement.
- h. The ratio of the quantity of free water to the quantity of cementitious material must not exceed 0.40.
- 2. Bar reinforcing steel shall conform to Section 03 20 00.
- D. Bolts and nuts shall be in accordance with referenced specifications for structural joints using ASTM F3125, Grade A325, Type 3 or Grade A490, Type 3 bolts. Anchor bolts shall be ASTM A307 or ASTM F1554.
- E. Cast-in-place concrete shall conform to the requirements in Section 03 30 00.
- F. Bar reinforcing steel shall conform to the requirements in Section 03 20 00.

2.04 FABRICATION

- A. Workmanship, fabrication, and shop connections for steel shall be in accordance with AWS and AISC specifications.
- B. Welding must be performed by certified welders per AWS "Standard Qualification Procedure" to perform type of work required. All welding must be in conformance with the AWS Welding Code.
- C. Welding electrodes for self-weathering, corrosion-resistant steel shall have the same weathering characteristics as corrosion resistant steel.
- D. All boldly exposed members shall have mill scale removed according to SSPC SP6.

E. Precast element dimension and reinforcement details shall be as prescribed in the plan and shop drawings provided by the manufacturers.

PART 3 EXECUTION

3.01 INSTALLATION

- A. The prefabricated steel bridge shall be placed on the bridge foundations in conformance with the Plans, manufacturer shop drawings and these special provisions.
 - 1. Extreme care shall be exercised in handling, moving and erecting operations to avoid twisting, racking or other distortion that would result in damage to the bridges.
 - 2. Bridge lift points shall be at the points specified by the manufacturer and approved by the Engineer.
 - 3. Install decking per manufacturer's recommendations. Wood decking shall be "rattle proof" and installed to the greatest extent possible to prevent warping.
 - 4. Confirm that concrete abutments and foundations have obtained sufficient strength before placement of steel structures.
- B. The precast bridge systems shall be placed on the bridge foundations in conformance with the Plans, manufacturer shop drawings and these special provisions.
 - 1. Extreme care shall be exercised in handling, moving and erecting operations to avoid twisting, racking or other distortion that would result in damage to the bridge.
 - 2. Bridge lift points shall be at the points specified by the manufacturer and approved by the Engineer.
 - 3. Confirm that concrete foundations have obtained sufficient strength before placement of steel structure.

END OF SECTION

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SECTION 32 84 00 IRRIGATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of a complete and operational automatic Landscape Irrigation system as shown on the Plans and as specified in this Section. The Work includes:
 - 1. Trenching, excavation, backfill including base and backfill materials.
 - 2. Valve wiring associated with the system.
 - 3. Maintenance of the system during the maintenance period.
 - 4. Electrical wiring/conduit Work associated with the controller.
- B. Related Work includes but is not limited to:
 - 1. Irrigation Control System
 - 2. Planting
 - 3. Landscape Maintenance

1.03 STANDARDS & DEFINITIONS

- A. Unless otherwise shown or specified, all materials and methods shall conform to the applicable current sections of:
 - 1. National Sanitation Foundation (NSF) Standard 61 Drinking Water System Components
 - 2. California Code of Regulations (CCR) Title 24 Part 5 California Plumbing Code (CPC)
 - 3. California Code of Regulations (CCR) Title 24 Part 3 California Electrical Code (CEC)
 - 4. State of California, Department of Transportation (CALTRANS) Standard Specifications (DTSS), except for measurement and payment requirements.
 - 5. South Coast Air Quality Management District's (SCAQMD) Laboratory Methods of Analysis for Enforcement Samples Method 316A for VOC content of PVC, CPVC, and ABS pipe cements, and adhesives.
- B. ASTM International Standards (latest revisions) as they apply to this Work and related test methods, including:
 - 1. D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
 - 2. D1784 Specification for Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC) Compounds
 - 3. D1785 Specification for Polyvinyl Chloride Plastic Pipe, Schedules 40, 80, and 120
 - 4. D2241 Specification for Polyvinyl Chloride Pressure-Rated Pipe (SDR)

- 5. D2287 Specification for Non-rigid Vinyl Chloride Polymer, Copolymer Molding, &Extrusion Compounds
- 6. D2464 Specification for Threaded Polyvinyl Chloride Plastic Pipe Fittings, Schedule 80
- 7. D2466 Specification for Polyvinyl Chloride Plastic Pipe Fittings, Schedule 40
- 8. D2467 Specification for Polyvinyl Chloride Plastic Pipe Fittings, Schedule 80
- 9. D2564 Specification for Solvent Cements for Polyvinyl Chloride Plastic Piping Systems
- 10. D2609 Specification for Plastic Insert Fittings for Polyethylene Plastic Pipe
- 11. D2672 Specification for Joints for IPS PVC Pipe Using Solvent Cement
- 12. D2737 Specification for Polyethylene (PE) Plastic Tubing
- 13. D2855 Standard Practice for Making Solvent-Cemented Joints with Polyvinyl Chloride Pipe and Fittings
- 14. D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials
- 15. F656 Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
- 16. F690 Standard Practice for Underground Installation of Thermoplastic Pressure Piping Irrigation Systems
- 17. F1498 Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings
- C. All materials and methods shall conform to the applicable standards of the following organizations:
 - 1. American Society of Irrigation Consultants (ASIC) Design Guidelines for Earth Grounding Electronic Equipment in Irrigation Systems
 - 2. American Society of Mechanical Engineers (ASME) Standards
 - 3. American Welding Society (AWS) Specifications
 - 4. Copper Development Association: Copper Tube Handbook.
 - 5. Manufacturers Standardization Society (MSS) Standards
 - 6. National Electrical Manufacturers Association (NEMA) Standards
 - 7. Underwriters Laboratories (UL) Standards
- D. Relative compaction: is defined as the in-place dry density of the compacted soil divided by the laboratory compacted maximum dry density determined in accordance with ASTM D1557, expressed as a percentage.
- E. Slope: as defined for installation of sub-surface drip irrigation, emitters low-flow bubblers, and tree bubblers on the uphill side of a plant or tree is any gradient in excess of 5%.

1.04 QUALITY ASSURANCE

- A. Materials: All materials shall be new and of the best quality available unless otherwise specified. Manufacturer shall be clearly marked on all material, containers, or certificates of contents for inspection.
- B. Codes: Install and test irrigation system in accordance with applicable codes and manufacturer's specifications.
- C. Guarantee: Guarantee irrigation system for one year from date of acceptance.

1.05 SUBMITTALS

- A. General:
 - 1. Product data: all specified irrigation equipment, including any proposed substitutions.
- B. Drawings: Irrigation As-built Drawing(s) and Valve Stationing Plan(s).
- C. Close-out Documentation: As specified herein.

1.06 REVIEWS

- A. Request at least two (2) days in advance the following reviews prior to progressing with the Work:
 - 1. <u>Site Preparation Review</u> Removal of and adjustments to existing valve boxes and valves and sprinkler heads and drip lines / emitters. Adjustments as needed to make final grade. Applicable to irrigation conform areas only.
 - 2. <u>Preliminary Review</u> Main-line layout, trenching, pressure-test, flushing of main-line.
 - 3. <u>Intermediate Review</u> Irrigation coverage, controller location. Requirements for irrigation coverage inspection are specified herein.
 - 4. <u>Substantial Completion Review</u> valve box inspection, and overall operation of the irrigation system.
 - 5. <u>Final Review</u> (at the completion of Maintenance Period) all punch-list items identified at Substantial Completion Review, Close-out Documentation
 - 6. See Specification Sections Soil Preparation, Planting, and Landscape Maintenance for other items to be inspected during these reviews.
 - 7. Each review will be conducted only after all items pertaining to that review as noted above and in related Sections have been completed.

1.07 DELIVERY, STORAGE AND HANDLING

- A. General: Exercise care in loading, unloading, storage, and handling of pipe, fittings, and irrigation equipment.
- B. Remove any pipe / fittings that have been cracked, dented, or otherwise damaged from the site. If installed, replace pipe / fittings with undamaged pipe / fittings as directed by the Owner's Representative at no additional cost to the Owner.

1.08 TESTING

A. A licensed testing agency is to test the backflow preventer prior to substantial completion. Submit test results certificate to Owner as part of Substantial Completion review for Landscape Maintenance Period authorization.

PART 2 - PRODUCTS

2.01 PLASTIC PIPE AND FITTINGS

- A. Unless otherwise noted:
 - 1. Lateral lines: Schedule-40 PVC solvent weld joints.

- 2. Mainline up to 2" diameter: Schedule-40 PVC, solvent weld joints.
- 3. Mainline 2-1/2" 3" diameter: Class 315 PVC
- 4. Mainline above ground only: UVR Sch40 Brown solvent weld joints.
- 5. Lateral line threaded / solvent weld fittings: Schedule 40 PVC.
- 6. Mainline threaded / solvent weld fittings: Schedule 80 PVC.
- 7. Risers and nipples: Schedule 80 PVC, molded thread. Machine threaded nipples will not be permitted.

2.02 CEMENTS, SEALANTS, AND PRIMERS

- A. Unless otherwise noted:
 - 1. Pipe Thread Sealant: low VOC, slow-drying, soft-setting multi-purpose sealant, Weld-On All Seal by IPS Corporation or approved equal. Do not use Teflon / PTFE tape.
 - 2. PVC cement: low VOC, high strength, heavy bodied, medium setting, solvent weld cement, ASTM D2564, Weld-On 711 by IPS Corporation or approved equal. Do not use fast setting cements.
 - 3. Primer: low VOC, industrial strength primer, ASTM F656, Weld-On P-70 by IPS Corporation or approved equal.
 - 4. Paint: Krylon Fusion spray paint for plastics, for PVC pipe only where approved by the Owner's Representative to be installed above grade.
 - 5. PVC Flex-hose glue: low VOC, medium bodied, fast setting solvent cement, ASTM D2564, Weld-on 795 Flex-PVC cement or approved equal.
 - 6. Ensure that cans of solvents and primers have labels intact and stamped with the date of manufacture. Do not use cans dated over 1-year old. Do not thin solvents and primers.

2.03 RED BRASS PIPE AND FITTINGS

- A. Pipe sizes less than 4": ASTM B43 Specification for Seamless Red Brass Pipe, Standard Sizes.
- B. Fittings: ANSI / ASME B16.15 Cast Bronze Threaded Fittings, Class 250.

2.04 DRIP IRRIGATION

- A. Approved manufacturers of drip irrigation and associated products:
 - 1. Hunter, San Marcos, CA (760) 591-7383 <u>www.hunterindustries.com</u>
 - 2. NDS, Woodland Hills, CA (877) 412-7467 <u>www.ndspro.com</u>
 - 3. Netafim, Fresno CA (888)638-2346 www.netafimusa.com
 - 4. Rainbird, Azusa CA (800)458-3005 <u>www.rainbird.com</u>
 - 5. Salco Products, Ontario CA (855)725-2648 www.salcodrip.com
 - 6. Toro, Riverside CA (877)345-8676 <u>www.toro.com</u>
- B. Supply system:
 - 1. Valve Assembly: solenoid valve, filter, and pressure regulator: as specified on the Plans.
 - 2. Laterals, supply / exhaust headers: as specified under Plastic Pipe and Fittings in this Specification, size per the Plans.

- C. General Drip Accessories:
 - 1. Fittings as provided by the drip irrigation pipe manufacturer or approved equal.
 - Staples / stakes: 11-gauge x 6-inch galvanized steel irrigation round-head staples / stakes by An-Wil Bag Co., GPR, Southeastern Wire Fabricators or equal.
 - 3. Flush port / valve by manufacturer or approved equal where shown on the Plans.
 - 4. In-line check valve by manufacturer or approved equal on all sloped areas. Spacing per manufacturer's recommendation. Swing-type for water flowing uphill; spring-type for water flowing downhill.
- D. Sub-surface:
 - 1. Dripline: as shown on the Plans.
 - 2. Use manufacturer's blank tubing to transport water across locations where irrigation is not required and as shown on the Plans.
- E. Sub-Surface Drip Accessories:
 - 1. Manual flushing valve: as shown on the Plans.
 - 2. Pressure gauge by manufacturer or approved equal where shown on the Plans. *FOR*

2.05 SLEEVING

A. Sleeves: As shown on the Plans.

2.06 VALVE BOXES

- A. General: Pre-cast plastic with bolt-down covers free of all cracks, chips or structural defects.
 - 1. Size: valve boxes as required by equipment plus adequate clearance to operate valves unless otherwise noted. Ensure that for drip irrigation valves, the box is sized large enough so that the filter mounted sideways or pointing down as shown on the Plans can be easily removed for cleaning.
 - 2. Rodent screen: welded wire mesh, hot-dip galvanized, size as shown on the Plans.
 - 3. Color: unless otherwise noted on the Plans: Green for turf areas. Black for shrub / groundcover / mulch areas.
- B. Models / Types:
 - 1. Shrub / groundcover / mulch areas: Carson, Rainbird PVB Series, NDS Standard Series (Commercial) or approved equal.
 - 2. Turf areas: ribbed / reinforced lids capable of withstanding the loads of rideon lawn mowers. Carson TrussT Line, Rainbird VB Series, NDS Pro Plus Series or approved equal.
 - 3. Vehicular paving: concrete with traffic rated lids.
- C. Valve Identification (ID) Tags: Christy's Irrigation Standard size ID Tags by T.Christy Enterprises, Anaheim CA, (800)258-4583, or approved equal. Blue background for potable water, purple background for reclaimed/recycled water. If single controller, use the alphanumeric sequence starting with A1. For multiple

controllers, use separate sequences starting with A1, B1, C1 to match controller identification shown on the Plans.

2.07 IRRIGATION EQUIPMENT

- A. General: Supply and install irrigation equipment as shown on the Plans, or approved equal.
- B. Backflow Preventer: lead-free as certified under NSF / ANSI Standard 61 by NSF International.
 - 1. Enclosure: Guardshack or equal, size to fit backflow device plus 6" clearance at the top and sides.
 - 2. Enclosure Pad: Encpad or equal, size to fit backflow enclosure.
 - 3. Blanket: Weatherguard / Frostguard or equal, size to fit backflow preventer, R-value appropriate for location
- C. Controller: See Specification Section Irrigation Control System
- D. Drip Irrigation Valve Pressure Regulators: in-line regulators as shown on the Plans. Pressure regulating dials are not permitted unless otherwise noted.

PART 3 - EXECUTION

3.01 GENERAL

- A. Acceptance of Work: Complete site grading to specified tolerances before trenching. Verify the existing conditions on site and the removal and or reinstallation required making the grades.
- B. Existing Utilities: Verify location of all on site utilities prior to trenching. Notify Owner's Representative by telephone and in writing of any conflicts prior to installation. Restore damaged utilities as directed by the Owner's Representative at no additional cost to the Owner.
- C. Coordination: Coordinate trenching as required with trenching contractor as well as with any other trades affected by irrigation installation. Coordinate installation of pipe and other irrigation equipment with other existing and proposed utilities and planting locations.
- D. Grading: Install all irrigation features to their finished elevation and at depths indicated.
- E. Finish Grade: Unless otherwise noted, set all heads at and perpendicular to, finish grade.
- F. As-Built Conditions: regularly update a print of the system and any changes made to the system throughout the project. See Valve Stationing requirements elsewhere in this Specification.

- G. Unusual Conditions: Immediately notify the Owner's Representative in the event that any unusual soil conditions are encountered during irrigation trenching operations. Excavate unsuitable material encountered below the natural grade and dispose of as directed by the Owner's Representative. Unsuitable material is defined in Section 19 Earthwork Clause 1.01B of the CALTRANS Standard Specifications.
- H. Hazardous Materials: In the event existing asbestos pipe is encountered and needs to be modified and/or removed, comply with the requirements of Federal (OSHA) regulations, and California Code of Regulations Title 8 (Cal/OSHA).

3.02 INSTALLATION – TRENCHING & PIPE

- A. Point of Connection: below grade. Connect to water meter and plumb backflow device and remaining irrigation system.
- B. Excavation:
 - 1. Depth excavate trenches for mainline, sleeves, and laterals to the depth required for laying pipe or conduit, plus depth of bedding if required as noted below.
 - 2. For pipes 4" dia. and less level bottom of trenches for a smooth flat grade and excavate bell holes where necessary to ensure that pipe rests for entire length on solid ground. Should rock or other unsuitable material be encountered, excavate to 6" below bottom of pipe and replace with well tamped and compacted approved backfill material or sand before laying pipe.
 - 3. Width excavate trenches wide enough to provide adequate working space to align and lay pipe or to construct the trench, make up and inspect joints, and allow placing and compaction of bedding material. Maximum trench width at the top of the pipe is the pipe outside diameter plus 12- inches on each side of the pipe.
 - 4. Maintain excavations free of water while installing pipe and until backfilled.
- C. Bedding: Install bedding upwards from the bottom of the trench to the extent shown on the Plans.
 - 1. Bedding material: compacted approved sub-soil or sand as defined herein.
 - 2. In planting areas, sand bedding may be jetted or ponded into place. Compact to equal that of the adjacent prepared sub-grade as specified herein. Mechanical compaction may be necessary to achieve this required density. If the bedding is jetted or ponded, the operation should be closely supervised, and provisions should be made for the removal of excess water.
- D. Backfill: Cover no joints until system has been pressure tested and approved by the Owner's Representative.
 - 1. Backfill material: selected on-site excavated/sub-soil material, imported sandy soils, subject to prior approval by the Owner's Representative. Backfill with potentially damaging rocks and debris is not permitted.
 - 2. When piping has been installed, tested, inspected, and approved, backfill excavations in layers not exceeding 8". Moisten and machine tamp as required.
 - 3. <u>In planting areas</u>, install on-site near surface soils in the top 6" of the trenches compacted to maximum 85% relative compaction. For trenches in

existing planting areas maintain near surface soils as uniform as possible with existing upper stratum soils.

- 4. <u>In paving areas</u>, install fill in maximum 8-inch lifts (compacted layers) and compact by mechanical means only. Condition fill conditioned, at time of compaction, to 1% to 3% above the optimum moisture content of the soil and compact each lift to minimum 95% relative compaction.
- 5. For trenches in existing areas, restore the ground or paving to original condition.
- 6. After backfilling, remove from the premises all surplus earth resulting from this Work and dispose of same, to the satisfaction of the Owner's Representative.
- E. Pipe: pipes shown parallel on the Plan may be installed in a common trench. Where required, snake pipe from side to side when trench exceeds 30 feet in length.
 - 1. Install pipes in planting areas including those shown schematically adjacent or parallel to such areas.
 - 2. Install all changes in depth of pipe using 45-degree fittings.
 - 3. Use Teflon tape on all threaded connections.
- F. Check Valve: On sloped sites, install in-line check-valves in sloped main / lateral / supply lines as required to prevent low sprinkler head / drip emitter drainage. This may be omitted only on those circuits where all sprinkler heads or tree bubblers have built-in check valves and where the head pressure does not exceed the holding capacity of these check valves.
 - 1. For sub-surface irrigation, install one in-line check-valve valve on supply / exhaust headers for every 4-1/2-ft of elevation change within a circuit or as recommended by the Manufacturer.
- G. Sleeves: install sleeves for all wiring and irrigation lines to be placed (with ends clearly marked above grade) under driveways and walks prior to their construction.
 - 1. Install sleeves minimum 24" under paving.
 - 2. Extend sleeves a minimum of 12-inches into planting areas.
 - 3. Install all wiring in a separate sleeve.
 - 4. Install temporary PVC caps to prevent intrusion of earth/debris prior to installation of pipes / wire.
 - 5. For longer lengths of sleeve (> 15'-20') with multiple pipes, consider installing pipes along with sleeve and connecting later.
 - 6. Install removable non-decaying plugs, expanding insulation foam, grout, or equal, at ends of sleeves and conduits to prevent entrance of earth and roots.
- H. Fabrication: Install all manifolds in a neat and orderly manner, for ease in maintenance operations. Install manifolds to allow valve boxes to be parallel to each other and to adjacent walls, walks, and curbs.
- I. Flushing of System: After installation of pipelines and risers, but before installation of sprinkler heads, tree bubblers, and/or drip irrigation emitters, thoroughly flush the system to remove any foreign material in the pipes.
 - 1. Flush the system in the presence of the Owner's Representative.

- 2. For flushing mainline and sprinkler portions of the system utilize full water main pressure.
- 3. For flushing downstream of drip irrigation valves via flush ports use drip system design pressure.
- 4. After flushing, backfill and settle soil. Rake smooth to match surrounding grade.
- 5. Flush out the existing mainline by operating one of the existing quick couplers downstream of the new valve installation, prior to operating any portion of the system again.
- 6. Flush out all drip systems by operating flush valves at the ends of circuits as needed. Drain excess water out to gutters or drains, not within the planting bed.

3.03 INSTALLATION – EQUIPMENT

- A. General: Install irrigation equipment as shown on the Plans
- B. Valve Boxes: Install valve boxes so that the top of box is ½" above finish grade in turf areas and 1-½" above finish grade in mulch areas. Install valve box assembly in ground cover / shrub and not in hard paved areas. Install in lawn area only if groundcover does not exist adjacent to lawn.
 - 1. Label valve box lids with the valve station number using a weather resistant method. Plastic valve box lids may be labeled using a branding tool / branding iron.
 - 2. Attach a Valve ID tag, with the valve station number clearly marked with weatherproof method, to the inside of each remote control valve, and attached by means of a weatherproof tie.
- C. Sprinklers:
 - 1. Install sprinkler heads at a spacing not to exceed that shown on the Plans, unless verified in advance with the Owner's Representative.
 - 2. Install sprinkler bodies and swing joints down at lateral depth with hole in swing joint cap as shown in the details to allow for un-impeded soil preparation of entire area. See "Heading Up" clause in this Specification.
 - 3. Coverage Adjustments: Adjust all heads for arc, radius, riser height, and distribution for uniform and optimum coverage, and eliminate overspray onto paved surfaces and structures. Such adjustments are to include nozzle changes without additional cost to the Owner.
- D. Heading Up (Natural Turf Fields):
 - 1. During heading up operations, do not allow trucks on the roto-tilled areas, only carts and vehicles with turf-tires.
 - 2. After soil preparation and finish grading, operate the system to locate risers or swing joints where applicable. Make field measurements to assist in location.
 - 3. Dig out swing joints for head installation. Install heads and backfill with dry soil.
 - 4. Turn on installed heads zone by zone. Flood holes and allow to settle 24 hours and refill any settled areas.
 - 5. Use laser box scraper to bring areas around heads back to final grade.

3.04 DRIP IRRIGATION – GENERAL

- A. Install all drip line and equipment as indicated on Plans. Follow equipment Manufacturers Instructions.
- B. Bury all supply and distribution pipes to the depths shown on the Plans.
- C. Staples: Install steel staples on drip line as follows:
 - 1. 2' on center in sand, 3' on center in loam, 4' on center in clay, unless otherwise shown on the Plans.
 - 2. Two (2) staples on each change of direction (tee, elbow, or cross).

3.05 DRIP IRRIGATION (SUB-SURFACE) INSTALLATION

- A. General:
 - 1. The system requires proprietary fittings and specific installation methods. Request the manufacturer for a training session if not familiar with the system requirements.
 - 2. Request the manufacturer's representative for an on-site review of system installation.
- B. Accessories and fittings:
 - 1. Manual Flush Valve: Install at exhaust header. At dual end-feed circuits, install valve at each end feed unless otherwise noted.
 - 2. Pressure Gauge: Install one pressure gauge per remote control valve circuit in box along with manual flush valve. If multiple smaller sub-circuits attached to one valve, then install at the furthest end from the supply.
 - 3. Clamp fittings with Oetiker clamps if operating pressure exceeds specific drip line fitting requirements.
- C. Pipe: See the Plans for chart sizing of supply and exhaust headers. Exhaust header(s) are to be same size as supply header for that circuit.
 - 1. Use Teflon tape on all threaded connections.

3.06 VALVE STATIONING

- A. As-built Drawing: Provide the Owner's Representative as-built mark-ups of the most current irrigation drawings, to reflect changes to the irrigation system layout, including:
 - 1. Point of connection, isolation valves, filter, pressure regulator, master valve & flow sensor as applicable.
 - 2. Remote control valve locations and renumbering if applicable.
 - 3. Isolation valve, quick couplers, and stub-out locations as applicable.
 - 4. Valve boxes for intermediate control wire splices.
 - 5. Main-line and lateral lines.
 - 6. Drip irrigation supply pipes. These are shown only in typical schematic form on the Plans. Do not draw in drip irrigation distribution pipes.
 - 7. Dimensionally locate all the above irrigation equipment with at least two measurements from surface features such as pavements, fences and buildings. Dimensionally locate each direction of main line with one offset

measurement from a surface feature. Lateral lines and drip irrigation supply pipes do not require measurements but are required to be drawn accurately.

- 8. Record all final changes before trenches are backfilled.
- 9. Include 'AS-BUILT DRAWINGS' with Contractor name and date, preferably in the title block area of the drawing, otherwise on an area of the drawing that does not have information below it.
- B. Valve-stationing Plan (New Systems): Clearly label and sequence stations according to the assigned valve identification numbers shown on the Record Drawings and color code the corresponding valve zones. Use a separate color for each valve zone.
 - 1. Valve Stationing Maps shall be electronically and neatly prepared in color using software capable of annotating PDF documents. Hand colored markups will not be accepted. Provide the Owner an unlocked copy of the PDF for future use.
 - 2. In case valve sequencing needs to be changed for ease in maintenance operations, verify changes in advance with the Owner's Representative.
 - 3. Provide (2) 11"x17" laminated copies for reference purposes inside the controller, and for the Owner's record.
 - 4. Include a non-laminated 3rd copy of the Valve-stationing Plan in the Post
 - 5. Submit completed valve-stationing plan to the Owner's Representative before final payment request.

3.07 PRESSURE TEST

- A. Pressure Test:
 - 1. Notify the Owner's Representative a minimum of two (2) working days prior to pressure test.
 - 2. Furnish all equipment and temporary connections required for tests at no additional cost to the Owner.
 - 3. Exercise caution in filling the system to prevent excessive surge pressure and water hammer.
 - 4. Test pipe subject to continuous water pressure (pressure lines) at 125 lbs. of hydrostatic pressure for two hours with a maximum 5 PSI drop.
 - 5. Repair any leaks, if necessary, and re-test.
 - 6. Have the Owner's Representative visually inspect the pressure gauge at the start and end of the test period, without which the test will not be approved.
- B. Closing in Un-inspected Work: Pay all costs necessitated by requiring opening, restoration and correction of all Work closed in or concealed before inspection, testing as required and approval by Owner's Representative. Notify Owner's Representative 48 hours in advance of required testing.

3.08 IRRIGATION COVERAGE

- A. Inspection of irrigation coverage shall take place during the Intermediate Review, as specified herein.
 - 1. In the presence of the Owner's Representative, perform a coverage and operation test to determine if the system is fully operational.
 - 2. If it is determined that adjustments in the irrigation equipment and the respacing of heads and/or relocation of emitters / low-flow bubblers will provide

more complete coverage, then make such adjustments prior to planting. Adjustments may also include changes in nozzle or emitter / low-flow bubbler sizes, and degrees of nozzle arc as necessary.

3. Make changes and obtain complete and adequate coverage in all irrigated areas at no additional cost to the Owner.

3.09 HARDWARE

A. See Specification Section Landscape Maintenance for items to be handed over to the Owner at the in-service meeting.

3.10 CLOSE-OUT DOCUMENTATION

- A. Submit prior to Final Review, the following documents:
 - 1. Sheet containing:
 - a. Contractor's name, address, and phone number.
 - b. Controller manufacturer's service address, and phone number
 - c. Controller assembly manufacturer's name, address, and phone number
 - d. Controller registration / activation, with Owner's information, on manufacturer's weather data service, including length of contract purchased for weather data.
 - 2. Copies of the following documents:
 - a. Valve-stationing Plan
 - b. Existing soils test reports see Specification Section Soil Preparation.
 - 3. Warranties and Certificates. Warranty documents or accompanying letters on company letterhead are to include project name and location and effective start date for warranties.
 - a. Irrigation Controller Warranty
 - b. Irrigation Controller Assembly Warranty.
 - c. Backflow Prevention Device testing certificate.
 - 4. In-service Meeting discussions & decisions. See Specification Section Landscape Maintenance.
 - 5. For new projects, include all the documents in a 3-ring binder.
- B. The Final Review will not be considered complete until the Close-out Documentation has been reviewed and approved by the Owner's Representative.

END OF SECTION

SECTION 32 84 16 IRRIGATION CONTROL SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the installation of a complete and operational Landscape Irrigation Controller as shown on the Plans and as specified in this Section. The work includes:
 - 1. Trenching, excavation, backfill including base and backfill materials.
 - 2. Electrical and wiring/conduit work associated with the system.
 - 3. Maintenance of the system during the maintenance period.
 - 4. Registration of controller and activation of Manufacturer's weather data service
- B. Related work includes but is not limited to:
 - 1. Earthwork
 - 2. Site Concrete (Irrigation Controller pad)
 - 3. Irrigation
 - 4. Landscape Maintenance
 - 5. Electrical as shown on the Electrical Drawings

1.03 STANDARDS

- A. Unless otherwise shown or specified, all materials and methods shall conform to the applicable current sections / specifications of:
 - 1. California Electrical Code (CEC)
 - 2. Underwriters Laboratories (UL)
 - 3. American Society for Testing and Materials (ASTM) applicable sections
 - 4. American Society of Irrigation Consultants (ASIC) Guideline 100 for Earth Grounding Electronic Equipment in Irrigation Systems
 - 5. The State of California, Department of Transportation (CALTRANS) Standard Specifications (DTSS), except for measurement and payment requirements.

1.04 QUALITY ASSURANCE

- A. All materials shall be new and of the best quality available unless otherwise specified. Manufacturer shall be clearly marked on all material, containers, or certificates of contents for inspection.
- B. Install and test irrigation control system and electrical power to controller in accordance with local codes and manufacturer's specifications.
- C. Guarantee: guarantee irrigation control system for one year from date of acceptance by Owner's Representative.

1.05 SUBMITTALS

- A. General:
 - 1. Product data: all specified irrigation control system equipment, including any proposed substitutions.
 - 2. Controller manufacturer's recommended grounding details.
- B. Certification: Prior to the Substantial Completion Review submit to the Owner's Representative a written statement that the controller has been grounded adequately from the controller manufacturer's representative or other qualified testing professional.
- C. Verification: see clause on Verification and Training elsewhere in this Specification. Statements from the installing contractor will not be accepted as verification.

1.06 REVIEWS

A. As noted in the Specification Section Irrigation.

1.07 DELIVERY, STORAGE AND HANDLING

A. General: Exercise care in loading, unloading, storage, and handling of irrigation control system equipment.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Controller: ET-based automatic controller, number of stations and configuration as shown on the Drawings, capable of adjusting watering parameters automatically based upon current local reference evapotranspiration data, or as provided by a remote or localized weather-based information system.
 - 1. Cabinet: weather-proof, lockable controller cabinet, capable of wall-mounting, pedestal-mounting, or mounting inside an enclosure.
 - 2. Flow sensing and control capabilities (line breakage, auto shut down, high flow alarm, and individual station (valve) operation shut down)
- B. Decoder Controllers:
 - 1. System is to include built in diagnostics that will test for individual station operation, decoder pass/fail and electrical shorts in the two-wire path.
 - 2. System should be capable of activating multiple stations simultaneously.
 - 3. System is to be capable of at least 2 independent two-wire paths.

2.02 CONTROLLER

- A. Manufacturer / model of ET-based Decoder (2-wire) controller:
 - 1. CS3000 by Calsense, Carlsbad, CA (800)-572-8608, <u>www.calsense.com</u>.
 - a. Reference Quote 00002364 dated 4/8/2020

2.03 CONTROLLER ASSEMBLY

- A. Controller assembly:
 - 1. Controller enclosure, pedestal-mounted heavy-duty stainless steel, vandalresistant, weather-proof, NEMA Type 3R rated, UL listed, capable of fully enclosing the unit. Top entry.
 - 2. Transient protection board and surge arrestor if recommended by and supplied by the manufacturer.
 - 3. Master valve terminal for the Master Valve.
 - 4. Remote control unit, as approved by the controller manufacturer.
 - 5. Remote control radio receiver board or universal receiver as applicable for the remote control unit.
 - 6. Antenna: externally mounted vandal-proof antenna.
 - 7. Line Surge Protector
- B. Controller Sensors & Interfaces:
 - 1. Flow sensor communications board / terminal for the flow sensor.
 - 2. Master Valve decoder if required. Some controllers are capable of direct connect or via decoder.
 - 3. Flow sensor decoder if required. Some controllers are capable of direct connect or via decoder.

2.04 CONDUCTORS

- A. Control Wire: Type UF, 600V, copper, common ground white, UL listed for irrigation control use.
 - 1. Minimum wire gauge #14, use gauge appropriate to distance to account for voltage loss.
 - 2. PVC (polyvinyl chloride) or PE (polyethylene) insulation.
 - 3. Seal splices and connections as recommended by the decoder system manufacturer.
- B. Controller Power: See Electrical Drawings
- C. Decoder Wire: Minimum 14 AWG, Type UF, UL-listed for 600V, solid-core, color-coded 2-conductor cable as supplied or recommended by the decoder system manufacturer.
 - 1. Colored outer jackets as recommended by the controller manufacturer.
 - 2. Do not use non color-coded wire. Do not re-use wire from an existing system.
 - 3. Seal splices and connections as recommended by the decoder system manufacturer.

2.05 CONDUIT

- A. Conduits: rigid nonmetallic type, conforming to UL 651, rated 90 degrees C, and NSF certified. Schedule 40 PVC plastic for underground installations with glue-on PVC couplings and factory made elbows and sweeps. Carlon Plus 80 or approved equal.
 - 1. Size: minimum 1" diameter or size for the conductors, whichever is greater.
 - 2. Install conduits minimum 18" depth in planting areas, minimum 24" depth under paving.
 - 3. Make couplings and connectors watertight in all runs. Utilize solvent cement of type approved by conduit manufacturer.

- 4. Join conduits with approved conduit couplings with ends butted in all such cases.
- 5. Provide adapters and locknuts where conduit is attached to metal boxes and panels.
- 6. Bends: free from dents or flattening, made with standard conduit elbows or conduit bent to not less than same radius.
- B. Conduits for Controller Power: See Electrical Drawings

2.06 MASTER VALVE & FLOW SENSOR

- A. Master Valve: as shown on the Drawings. If not indicated on the Drawings, then a Superior 3300 normally open master valve, size to match main-line.
- B. Flow Sensor: purchase a fully compatible flow sensor from the Controller manufacturer or its authorized distributor. Do not purchase this item from an independent source, the operation of the flow sensor must be covered under warranty by the entity that supplies the controller. Factory set any controller software parameters that need to be set to ensure compatibility.

2.07 DECODER EQUIPMENT

- A. Decoders (Field Decoders / Line Decoders): Epoxy sealed water-proof programmable decoders with integrated surge suppression as supplied or approved by the irrigation controller system manufacturer.
 - 1. One decoder per solenoid unless otherwise noted on the Drawings.
 - 2. Flow sensor decoder if flow sensor shown on the Drawings.
 - 3. Weather sensor decoder if weather sensor shown on the Drawings.
 - 4. Preprogram the decoders by the controller manufacturer where such a facility is available. This is the preferred option. If not available, then field program the decoders.
 - 5. Hand over the hand-held programmer to the Owner at Final Completion. Include the operation of the programmer in the in-service meeting.
- B. Surge Protector: sealed water-proof surge protection device as supplied or approved by the decoder system manufacturer. Spacing per manufacturer.
- C. Decoder Cable Fuse Device: 270DCSD by Paige Irrigation, Union, NJ 07083 (800)327-2443, or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Schematic: System features are shown schematically for graphic clarity.
- B. Existing Utilities: Verify location of all on site utilities prior to trenching. Notify Owner's Representative by telephone and in writing of any conflicts prior to installation. Restore damaged utilities as directed by the Owner's Representative at no additional cost to the Owner.

C. Coordination: Coordinate trenching as required with trenching contractor as well as with any other trades affected by irrigation controller installation.

3.02 CONTROLLER

- A. General: Based on existing soil types, soil imports, and final ground conditions, additional grounding equipment may require to be installed at no extra cost to the Owner.
 - 1. Submit manufacturers grounding equipment details recommended for the Project.
- B. Installation: controller cabinet on to wall, or cabinet / pedestal on to concrete base per the Drawings.
- C. Power: Install power to controller following all applicable electrical codes. Install GFCI outlet and 9-volt battery.
- D. Grounding: Determine from the Controller manufacturer, the grounding equipment recommended for the specific project soil and weather conditions. The guidelines below are provided for information only.
 - 1. Ground each controller individually, unless otherwise noted by the Controller manufacturer.
 - 2. Grounding rods: copper-clad steel type
 - 3. Grounding plates: solid-copper type.
 - 4. A typical installation requires the installation of a 5/8" dia. x 8' long UL listed grounding rod embedded in the soil, outside the footprint of the controller concrete pad, per Controller manufacturer's instructions.
 - 5. For sandy, dry, and/or loose soils, a grounding plate set in appropriate earth contact material may be required per Controller manufacturer's instructions.
 - 6. For rocky soils, one or two grounding plates may be required per Controller manufacturer's recommendations.
 - 7. For areas known to be prone to lightning, a transient protection board and surge protector may be required inside the controller(s) per Controller manufacturer's instructions.
 - 8. Demonstrate, at Final Completion that the Controller has been adequately grounded for the specific project soil and weather conditions and provide a written statement to this effect from the Controller Manufacturers representative or other independent qualified testing professional
- E. Master Valve & Flow Sensor Testing: After installation of system engage a qualified independent testing agency to learn the station flows, set the flow parameters for each station, and test the operation of the Master Valve and Flow Sensor.
 - 1. Pre-approved flow testing and verification agency: Watersavers Technical Services, a service of Watersavers Irrigation Inc., (415) 256-1711 www.watersaversinc.com.
 - 2. The agency may choose one or more methods to test the master valve operation:
 - a. Prior to testing set the high-flow on the flow sensor to the maximum design GPM shown on the Drawings. In case of a smart controller, run the controller through full cycles so that it learns the flows of individual stations.
 - b. Test the main-line by removing a quick coupler valve.

- c. Test an individual station by turning it on and removing a sprinkler head or nozzle.
- 3. For stand-alone controllers without central / web connectivity, assign one station to quick couplers, ensuring that the programmed flows can accommodate quick coupler use without shutting the master valve down.
- 4. For controllers with central / web connectivity, test for leak alerts during quick coupler use.
- 5. If the Owner's Representative requires, program the controller with an over-ride time period for quick coupler use.
- 6. Pay for all programming and testing fees from the testing agency.

3.03 CONTROL WIRE

- A. General: Install control wire in pipe trenches wherever practical. Install wire below or level with the bottom of adjacent pipes. Install wire inside conduits as specified in this section where pipes are not available.
 - 1. Bundle wire and tape to pipe every 10 feet. Size conduits or sleeve required based on control wires as specified herein.
 - 2. Enclose wiring above finish grade in steel conduit.
 - 3. Use a different color for control wires and the common wire.
 - 4. One solenoid valve per station unless otherwise indicated on the Drawings or with prior approval of the Owner's Representative.
 - 5. Test all wiring for continuity, open circuits and unintentional grounding prior to connecting.
- B. Splices: seal with direct bury connectors as specified in this section.
 - 1. Install wire splices in valve boxes, locations as approved by the Owner's Representative. Install traffic rated boxes in vehicular areas.
- C. Additional wire:
 - 1. Pull control wire for unused stations as noted on the Drawings.
 - 2. Pull control wire and common to each stub-out as shown on the Drawings. Minimum one control wire and common if not indicated on the Drawings.
 - 3. Provide 24" excess wiring in each valve box / pull box and in the nearest project valve box at 100-ft intervals on wire runs of greater than 100-ft. Neatly coil in valve box or pull box.

3.04 DECODER WIRE

- A. General: Follow decoder system manufacturer's instructions including wiring diagrams for decoder wiring.
 - 1. Maximum total two-wire run from controller to the furthest decoder: as specified by the decoder system manufacturer. Note that the maximum distance decreases based on the number of simultaneously open valves.
 - 2. Use separate two-wire paths for different directions from the controller. Use outer jackets of different colors to identify different paths.
 - 3. Do not inter-connect two-wire paths within a controller system. Do not connect two-wire paths across controller systems. Do not loop the two-wire system. Maintain the proper polarity throughout the two-wire system.

- 4. Splice two-wire runs as required to branch the system. Keep the branches off the main two-wire path as short as possible. For long branches, install decoder cable fuse devices as required to isolate the branches during troubleshooting.
- 5. At all splices and connections, leave 5' of wire slack. Coil wire neatly and place out of the way.
- 6. Do not run decoder wires next to power cables. Cross high-voltage cables at right angles.
- 7. Use decoder wire from the controller to the decoders. Use control wire from the decoders to the solenoid valves. Maximum distance of control wire from decoder to solenoid is 100 ft. For lengths over 20 ft, twist the control wires to aid in surge suppression.
- 8. Pull additional decoder wire to each stub-out as shown on the Drawings

3.05 DECODERS

- A. General:
 - 1. Decoder may be located in the valve box along with the solenoid.
 - 2. If connecting two solenoids to one decoder output, wire the solenoids in parallel.
- B. Grounding:
 - 1. Install line surge protectors at intervals as specified by the controller manufacturer.
 - 2. Install earth grounding within maximum distance specified by the controller manufacturer.
 - 3. Install earth grounding at the last decoder in a two-wire run. If a two-wire run is spliced into different directions, then ground each last decoder.
 - 4. Install the grounding wire and earth ground hardware at right angles from the two-wire path.
 - 5. Decoders are to be grounded to ground rods or plates with less than 10 ohms resistance as specified by the decoder system manufacturer. Measure the ground with a ground resistance meter prior to grounding.
 - 6. Grounding rods: copper-clad steel type.
 - 7. Grounding plates: solid-copper type.
 - 8. For sandy, dry, and/or loose soils, a grounding plate set in appropriate earth contact material may be required per decoder system manufacturer's instructions.
- C. Programming:
 - 1. Program the decoders according to the decoder system manufacturer's instructions.
 - 2. Program and label each decoder prior to installation in the two-wire path.
 - 3. Each decoder needs a unique station number for each output. Do not create duplicate station addresses for decoders.
 - 4. Multi-station decoders will have sequential station addresses.

3.06 WEATHER DATA SERVICE

A. General: Prior to the In-Service Meeting, register the controller and activate the Manufacturer's weather data service. Obtain Owner's information to correctly input registration data. Include a copy of the registration / activation document along with the

Close-out Documentation, see Specification Section Irrigation. Also include as separate documentation if not a part of the registration document:

- 1. Annual cost of the weather data service.
- 2. Length of subscription included in the cost of the controller. This may be 1-year or multiple years depending on the Manufacturer.

3.07 CLOSE-OUT DOCUMENTATION

A. Contact See Specification Section Irrigation for controller supplier information, warranty and grounding verification.

3.08 VERIFICATION & TRAINING

- A. Provide the Owner as part of Close-out Documentation the following written statements of verification of correct installation and operation by the respective equipment manufacturer's authorized representative or a qualified independent testing agency:
 - 1. Programming of K/Offset values for the flow sensor.
 - 2. Programming of station run-times, including site profile worksheets if applicable.
 - 3. Grounding installation.
 - 4. Master Valve operation.
 - 5. Flow Sensor operation including learned flow testing to learn each station flow valves, and testing of high and low flow alerts.
 - 6. Decoder system operation.
- B. Contact the Manufacturer's authorized representative for a Training Session(s) on system operation with the Owner's maintenance personnel.
- C. Pre-approved programming / testing and verification / training agency: Watersavers Technical Services, a service of Watersavers Irrigation Inc., (415) 256-1711 www.watersaversinc.com.
- D. Statements of Verification and Training Session(s) shall be at no additional cost to the Owner.

END OF SECTION

SECTION 32 91 13 SOIL PREPARATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for Soil Preparation of planting areas as shown on the Drawings and as specified in this Section. The work includes installation of soil amendments, finish grading and plant pit backfill.
- B. Related work includes but is not limited to:
 - 1. Earthwork
 - 2. Planting
 - 3. Mitigation Planting
 - 4. Hydroseeding

1.03 QUALITY ASSURANCE

- A. Finish Grade: is defined as the finished top surface of the soil after all grading and soil preparation activities, and prior to installation of hydroseed, sod, or mulch.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods, including:
 - 1. C602 Specification for Agricultural Liming Materials
 - 2. D5268 Specification for Topsoil Used for Landscaping Purposes
- C. Fertilizers: Comply with the requirements of the Fertilizing Materials Inspection Program of the California Department of Food and Agriculture.

1.04 SUBMITTALS

- A. Product Data: to be approved by the Owners Representative before the material is delivered to the site.
 - 1. Amendments, fertilizers and chemicals.
- B. Samples: to be approved by the Owners Representative before the material is delivered to the site.
 - 1. 1-quart bag of soil amendments
- C. Testing General: Provide samples, as specified herein, to an agricultural soil testing laboratory approved by the Owners Representative, referred to herein as the Testing Lab, unless delivered to the site in original, unopened containers, each bearing the manufacturer guaranteed analysis.
 - 1. Pre-approved Testing Labs include:

- a. Waypoint Analytical 4741 E Hunter Ave Suite A, Anaheim, CA 92807, (714)282-8777
- b. Wallace Laboratories LLC, 365 Coral Circle, El Segundo, CA 90245, (310) 615-0116
- c. Soil Control Lab, 42 Hangar Way, Watsonville CA 95076, (831) 724-5422
- 2. The Owners Representative reserves the right to reject the analysis from an alternate soil testing lab without prior approval.
- 3. Do not deliver any soil or amendment material to the site without approval of test results by the Owner's Representative.
- 4. Use the same Testing Lab for all tests specified herein.
- 5. Pay for all testing fees from the Testing Lab for all tests specified herein.
- D. Testing Amendments: Provide, along with a sample, latest analysis of amendments / compost / bulk organic materials by the Testing Lab for verification of conformance to this specification, and specific recommendations as to exact quantities to be used in planting.
 - 1. Analysis is to conform to physical and chemical properties specified herein.
 - 2. Analysis is to assume tilling of the amendments into the soil as described elsewhere in this Specification
 - 3. Analysis is to be carried out / reported no more than three months prior to the date of amendment installation, not the start of the project.
- E. Testing Imported Topsoil: Provide, along with sample, latest analysis of soil proposed to be imported by the Testing Lab for testing as to specific fertilizers and/or soil amendments to be used in planting.
 - 1. Submit certificate or sample of any proposed bulk organic materials simultaneously for testing with soil samples for optimum amendment recommendations.
 - 2. Analysis is to be carried out / reported no more than three months prior to the date of imported soil installation, not the start of the project.
 - 3. Should the final soil mixture be a combination of existing soil and imported topsoil, provide additional lab recommendations on method of mixing and exact fertilizers and soil amendments to be used in planting for the mixture. Reference both the amendment test report and existing soils test report by number.
- F. Testing Existing Soil:
 - 1. Prior to finish grading operations or at least four weeks before proposed planting operations, take a sample of planting area soil, from 0"-12" deep, as described below, or as directed by the Owners Representative.
 - a. Composite Sample-1: Area north of Mariner's Point Golf Course
 - b. Composite Sample-2: Graded slope south of Mariner's Point Golf Course (hydroseed)
 - c. Composite Sample-3: Access Area Planting at E 3rd Ave
 - d. Composite Sample-4: Graded slope south of Bridgeview Park (hydroseed)
 - e. Composite Sample-5: Graded slope along Beach Park Boulevard northern portion
 - f. Composite Sample-6: Graded slope along Beach Park Boulevard southern portion

- g. Composite Sample-7: Graded slopes, both sides of trail, at J-site
- 2. Mix the samples from each group of (3) three locations to provide a composite sample for each area, combined volume of each composite sample to be not less than 2 quarts.
- 3. Forward the composite soil samples to the Testing Lab for testing and recommendations as to exact fertilizers and soil amendments to be used in planting, Waypoint Analytical A05-2 complete analysis or approved equal.
- 4. Inform the Testing Lab as to the proposed planting types e.g. turf, groundcovers, trees, native grasses; lab report is to note this in the report summary.
 - a. If each composite sample is for a different type of planting area, each lab report is to note the specific type of planting in the summary.
 - b. For native grass areas being established by hydroseed, report should reference the fertilizer and inoculant proposed in the hydroseed slurry.
- 5. Provide the Testing Lab the imported topsoil report and the amendment report, as approved by the Owner's Representative.
- 6. Amendment and fertilizer recommendations by the Testing Lab shall be specific to the proposed amendments and topsoil to be used and include the amendment lab test / sample ID number and testing date as reference. <u>Generic recommendations will be rejected and will require specific recommendations to be re-obtained from the Testing Lab.</u>
 - a. Reference the amendment test report by number.
 - b. For soil preparation that includes imported topsoil, reference the imported topsoil test report by number.
- 7. Each composite soil report shall include an estimated infiltration rate for the tested soils.
- 8. Provide a sketch on the site plan of the locations from which samples were taken.
- G. Submit delivery tags for all amendments and fertilizers delivered to the Site for the Project, if required by the Owners Representative.
 - 1. Fertilizer delivery tags should clearly indicate the product and NPK designation.
 - 2. Amendment delivery tags should clearly indicate the lab test number corresponding to the approved amendment test report.

1.05 REVIEWS

- A. Specifically request at least (2) two days in advance the following review prior to progressing with the work:
 - 1. <u>Intermediate Review</u> completion of site grading, topsoil placement amendment depths, finish grade.
 - 2. See Specification Sections Irrigation and Planting for other items to be inspected during this review.
 - 3. The review shall be conducted only after all items pertaining to the review as noted above and in related Sections have been completed.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizers and manufactured amendments to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis.

Materials in broken containers or which become caked or contaminated making them unsuitable for use will not be accepted and are to be removed from the site.

PART 2 - PRODUCTS

2.01 EXISTING SOIL

- A. Topsoil: There is no existing topsoil at the site.
- B. Sub-soil: The engineered fill on the site after completion of rough grading operations.

2.02 IMPORTED TOPSOIL

A. Imported Topsoil: USDA classification of fraction passing a 2.0 mm sieve: loose, friable sandy loam, free of harmful insects, all weed growth, clods over 1 cubic inch and/or clods that will not be pulverized during operations, and free of rocks over 1 cubic inch.

Β.	

Class	Particle Size Range	Maximum %	Minimum %
Rock	1/2 - 1 inch	10% by volume, v	vith none > 1 inch
Gravel	2 – 13 mm	20%	0%
Coarse Sand	0.5 – 2.0 mm	15%	0%
Silt plus Clay	<0.05 mm	50%	15%
Organic Matter		15%	0%
Chemistry		Suitability Considerations	
Salinity: Saturation Extract Conductivity		Less than 4.0 dS/m (mmhos/cm) @ 25° C	
(ECe)			
Sodium: Sodium Adsorption Ration (SAR)		Less than 6.0	
Boron: Saturation Extract Concentration Less than 1.0 ppm		1.0 ppm	
Reaction: pH of Saturation Paste		5.5 - 7.0	
Fertility Considerations: Soil to contain sufficient quantities of available nitrogen, phospho-			
rus, potassium, calcium and magnesium to support normal plant growth. In the event of			
nutrient inadequacies, make provisions to add required materials prior to planting			

2.03 FERTILIZER

- A. Soil amendment fertilizer: commercial fertilizer, 16-6-8 (N-P-K) uniform pellet. For bidding purposes only: the exact fertilizer type and quantity is to be determined by Testing Lab analysis.
- B. Plant fertilizer: commercial fertilizer packets / tablets, two-year controlled-release 20-10-05 (N-P-K). Best Tabs by Simplot Professional Products, Agriform by The Scotts Company, or equal.

2.04 SOIL AMENDMENTS

- A. Amendment: nitrogen stabilized organic amendment / compost produced only from landscape / yard trimmings, grass clippings, food scraps or agricultural residues.
 - 1. Compost to be supplied by a producer who participates in the U.S. Composting Council's Standard Testing Assurance (STA) program.

- Compost is to have a dark brown color, does not exhibit a sour or putrid smell, does not contain recognizable grass or leaves, and is not hot upon delivery or rewetting.
- 3. Compost gradation:

Sieve Size	Percent Passing
3/8 inch (9.5 mm)	100%
1/4 inch (6.25 mm)	At least 95%
#8 (2.36 mm)	At least 60%
#16 (1.18 mm)	20% - 70%
#32 (500 um)	0% - 30%

- B. Amendment / Compost Chemistry Suitability Considerations
 - 1. Nitrogen (dry weight basis): 0.4 to 0.6%
 - 2. Iron (minimum): 0.08%
 - 3. Organic content: above 17%
 - 4. Carbon-Nitrogen Ratio: below 25
 - 5. pH: below 8.0
 - 6. Salinity (ECe): a value such that when combined with the existing site soil at a use rate determined by the Testing Lab Analysis, the salinity of the amended soil shall not exceed 4.0 dS/m (mmhos/cm).
- C. Biochar: As supplied by Pacific Biochar, Santa Rosa, CA (808) 936-3484 pacificbiochar.com

2.05 SOIL ADDITIVES

- A. Gypsum (if required by existing soils test): agricultural grade, OMRI listed.
 - 1. Cal-Sul Pelletized Gypsum by North Pacific, Portland OR
 - 2. Ultra Fine AG Gypsum by Western Mining & Minerals
 - 3. Approved equal.
- B. Sulfur (if required by existing soils test): granular degradable sulfur product, Tiger 90CR Organic 0-0-0-90 Sulfur by TigerSul.com, or approved equal.

2.06 CHEMICALS

- A. The following brand names of various chemicals to be used in this Section are provided for ease of specifying; equals or brands with similar chemicals that will match or improve performance may be used at the Contractor's discretion. Verify use of any chemicals with Owner's Representative prior to application:
 - 1. Pre-emergent herbicides (granular form only) Treflan, Ronstar, or prior approved equal.
 - 2. Post-emergent herbicides for hydroseeded areas Speedzone or prior approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Limits and Grades: Prior to commencing soil preparation operations, request a review by the Owners Representative to verify rough / mass grading work completed to date and verify specified limits of soil preparation work to commence. See schedule of soil preparation below:
- B. Finish grade all non-hardscape areas to round the top and toe of all slopes, providing natural contouring to integrate newly graded areas with the existing natural topography.
- C. Finish grade all non-hardscape areas to smoothly integrate newly graded areas with the existing grades.
- D. Protect concrete from any sulfate-based amendments that may be specified from soils analysis to avoid staining. Replace any concrete damaged from amendment placement at the no additional cost to the Owner.
- E. Schedule of Soil Preparation:

Planting Type	Cultivation	Imported	Additives (gyp-	Amendment	Fertilizers
	Depth	ropsoli	sum, sunur)		
Turf, Shrubs &	10-inches	6-inches	Yes*	Compost*	Yes*
Gloundcovers					
Ice-plant	3-inches	None	Yes*	None	None
Hydroseed	3-inches	None	Yes*	Biochar	None

*As required by the composite soils report

3.02 CULTIVATION

A. Cross-rip or cultivate sub-grade to a depth specified in the Schedule of Soil Preparation. Add water if necessary and continue ripping or cultivation until the entire specified depth is loose and friable. Settle the soil with water as needed and regrade high/low areas in accordance with paragraph "Finish Grading" this Section.

3.03 IMPORTED TOPSOIL PLACEMENT

- A. Install imported topsoil as necessary to produce final finish grade requirement as shown on the Drawings, minimum depth as noted in the Schedule of Soil Preparation.
 - 1. Proposed landscape areas including areas to be graded or that have been disturbed by construction that are to be planted with shrubs and groundcovers as shown on the Drawings require topsoil across the entire planting areas. Amended excavated subsoil cannot be used as topsoil for these areas.
- B. Place 2-inches of topsoil uniformly over sub-grade and thoroughly cultivate before placing remaining topsoil. Place topsoil and bring to a smooth, even grade.

3.04 AMENDMENT / ADDITIVE PLACEMENT

- A. The requirements below are for bidding purposes only, adjustments to the bidding formula shall be determined by the Testing Lab analysis.
- B. Upon completion of cross-ripping apply the amendments and/or additives, including the hydroseeded areas as follows: Uniformly spread and incorporated the materials to obtain a homogeneously blended soil, to half the specified cultivation depth.

Turf / Shrubs / Groundcovers – amount / 1000 Square Feet		
6 cubic yards	Nitrogen Stabilized Organic Amendment	
12 lbs.	Commercial Fertilizer	

 All Planting Areas – amount / 1000 Square Feet

 50 lbs.
 Gypsum

Hydroseed Areas – amount / 1000 Square FeetX lbs.Biochar

- C. Plant pits: Use soil which has been amended in the above manner as the backfill mix around the sides of the root balls. See Specification Section Planting for plant pit requirements.
- D. Watering: Apply water to areas to be drip irrigated to thoroughly mix in amendments and fertilizers immediately after amending soil, and a minimum of 24-hours prior to planting, unless rain is forecast for that period.
 - 1. Water may be manually applied by spray attachments or impact sprinklers on stands.
 - 2. Connect hose pipes to quick couplers or hose bibs. If neither is available or the main line has not been pressurized, use a portable lawn sprinkler pump connected to a water tank.
 - 3. The cost of watering to mix in amendments is at no additional cost to the Owner.

3.05 FINISH GRADING

- A. Finish grade all areas, including those indicated to be planted on the Drawings, and remove all rocks and clods over 1 cubic inch. Remove all rocks and clods in turf areas. Finish grade all planting areas smoothly and uniformly. Repair all erosion damage during the construction period.
- B. Unless otherwise shown on the Drawings, all soil finish grades after watering and / or natural settlement shall be 1-inch below finish surface of walks, pavements, and curbs.

3.06 CHEMICALS

A. Herbicides and pesticides: Verify compatibility, dosage and other application procedures with the manufacturer. All chemicals shall be applied by a pest control operator licensed in the State of California.

- B. Planting areas: Treat all planting and non-naturalized areas for weed control with pre-emergent herbicide, as recommended by the manufacturer. See Specification Section Landscape Maintenance for related work.
- C. Hydroseed areas: After cross-ripping / loosening the soil as specified, and after weed germination from first rains or water applied for establishment spray hydroseed areas with post-emergent herbicides. Spray weeds prior to going to seed and that are at least 2" tall, over a minimum of two weeks. Upon weed kill, apply hydroseeding per Specification Section Hydroseeding.
- Include copies of documentation of pesticide and herbicide applications, countersigned by the Owner's Representative, as part of Close-out Documentation – see Specification Section Landscape Maintenance.

3.07 PLANT FERTILIZER

A. Apply additional fertilizer to all container stock, in the form of commercial fertilizer packets / tablets at the rate of:

Container size	Fertilizer Packets / Tab-
	lets
4-inch pot	one (1)
1-gallon plant	two (2)
5-gallon plant	four (4)

- 1. Space the packets / tablets evenly around the ball halfway up backfill touching side of root ball.
- 2. The additional fertilizer requirement is independent of the Testing Lab analysis.

3.08 CLEAN UP

A. After completion of all soil preparation operations, remove all trash, excess soil and other debris. Sweep and wash clean all walks, walls, and pavement. Leave the entire area in a neat, orderly condition.

END OF SECTION

SECTION 32 92 13 HYDROSEEDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for hydroseeding areas as shown on the Plans, as designated by the Owner's Representative, and as specified in this Section.
- B. Related work includes but is not limited to:
 - 1. Soil Preparation
 - 2. Mitigation Planting
 - 3. Mitigation Planting Maintenance

1.03 QUALITY ASSURANCE

- A. Cellulose Fiber: certified to indicate that laboratory and field testing of the product has been accomplished and meets all requirements specified herein based on testing. Weight specifications from the supplier for this material shall refer only to air dry weight of the fiber material.
- B. Seed: delivered in original sealed packages bearing supplier's certificate lab analysis for purity, germination, weed seed content, and inert material. Seed bags to include manufacturer's tags in conformance with Federal Seed Act (FSA) and applicable state laws. Wet, moldy, or otherwise damaged seed will be rejected by the Owner's Representative.
- C. Seed Suppliers:
 - 1. Pacific Coast Seed 533 Hawthorne Place Livermore, CA 94550 (925) 373-4417 www.pcseed.com
- D. Fertilizers and manufactured amendments are to be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Materials which become caked or contaminated making them unsuitable for use will not be accepted.
 - 1. Fertilizers shall comply with the requirements of the Fertilizing Materials Inspection Program of the California Department of Food and Agriculture.
- E. Hydraulic equipment used for the application of the fertilizer, seed and slurry of prepared wood pulp is subject to approval by the Owner's Representative.

F. Hydroseeding Contractor: Per the Plans, all the hydroseeding is considered part of mitigation planting operations. See Specification Section Mitigation Planting for contractor qualifications.

1.04 SUBMITTALS

- A. Documents:
 - 1. Hydroseeding Schedule
 - 2. Description of hydraulic equipment proposed to be used.
 - 3. Seed labels for each native plant species in the hydroseed mix
- B. Samples:
 - 1. Fiber: 4 oz sample if <u>not</u> a pre-approved product as noted. For pre-approved products submit only product data sheet.
 - 2. Tackifier / binder: 4 oz sample if <u>not</u> a pre-approved product as noted. For preapproved products submit only product data sheet.

1.05 REVIEWS

A. See Specification Section Planting

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Hydroseed Area Seed Mixes
 - 1. Native Plant Species Mix-1 as shown on the Plans.
 - 2. Native Plant Species Mix-2 as shown on the Plans.
- B. Fiber: 100% virgin natural wood fiber mulch, free from synthetic paper or plastic materials, and thermally refined.
 - 1. Fiber must disperse into a uniform slurry when mixed with water.
 - 2. Colored with a non-toxic, water-soluble green dye to provide a proper visual gauge for metering of material over ground surfaces.
 - 3. Manufactured in such a manner that after addition and agitation in slurry tanks with fertilizer, seed, water and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry; and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed; and which after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil.
 - 4. Materials that inhibit germination or growth will not be permitted in the mixture.
 - 5. Pre-approved thermally refined wood products: Rainier Fiber by Rainer Veneer, Conwed Fibers 1000 by Profile Products, Terra-Wood by Profile Products or approved equal.
- C. Fertilizer:
 - 1. Biosol Forte 7-2-1 (N-P-K) as manufactured by Rocky Mountain Bio Products www. rockymtnbioproducts.com, and distributed by Pacific Coast Seed, Inc. Tracy, CA (925) 373-4417 and S&S Seeds, Carpinteria, CA (805) 684-0436.
- D. Tackifier/Binder: 100% psyllium fiber drived from the outer coating of the plantago seed. Available in powder form and packed in clearly marked bags stating the contents of each package. The tackifier will require no curing time, shall remain soft and rewettable, and shall not inhibit seed germination. All ingredients shall be biodegradable. Pre-approved products:
 - 1. Ecology Control M-Binder by S&S Seeds, Inc, Carpinteria, CA (805)684-0436
 - 2. Plantago Binder by Northstar Impex Corpn. Moreno Valley CA (951)486-0441.
 - 3. Approved equal.
- E. Mycorrhizal Inoculant: AM 120 Standard by Reforestation Technologies International (RTI), Gilroy CA, (408) 848-9604, and distributed by Pacific Coast Seed, Inc. Tracy, CA (925) 373-4417 and S&S Seeds, Carpinteria, CA (805) 684-0436.
- F. Equipment: Use hydraulic equipment with a built-in agitation system and operating capacity sufficient to agitate, suspend and mix homogeneously the slurry mixture.
 - 1. Slurry distribution lines are to be large enough to prevent stoppage.
 - 2. Discharge line is to be equipped with a set of hydraulic spray nozzles capable of providing a continuous non-fluctuation discharge and delivery of the slurry in the prescribed quantities uniformly, without misses, waste, or erosion.
 - 3. Slurry tank with a minimum capacity of 500 gallons and mounted on a traveling unit which may be either self-propelled or drawn with a separate unit which will place the slurry tank and spray nozzle within sufficient proximity to the areas to be seeded so as to provide uniform distribution.
 - 4. If using equipment with smaller tank capacity then demonstrate to the Owners Representative that it has the necessary agitation system and sufficient pump capacity to spray the slurry in a uniform coat.

PART 3 - EXECUTION

3.01 GENERAL

- A. Carry out hydroseeding during a windless period using approved equipment and materials.
- B. At areas with mitigation planting, hydroseeding is to take place prior to that planting activity. See Specification section Mitigation Planting.
- C. Preparation of Surfaces: At the time of hydroseeding the surfaces shall be even and free of deleterious material and weeds and cultivated per Specification Section Soil Preparation. Ensure that soil is moist to a depth of at least 1/2".
- D. At non-irrigated areas, apply hydroseeding only after the first rainfall of the season and do not apply during the months of April to September unless approved by the Owner's Representative.

3.02 MIXING

A. With agitation system operation at part speed, add water to the tank, and establish good circulation. Add materials in such a manner that they are uniformly blended into the mixture. Add the seed first; then fiber. Do not add the fiber until the tank is at least

one-third filled with water. Agitate the mixture at full speed when the tank is two-thirds to three-fourths full.

- 1. Do not allow seed to remain in the seeder longer than one hour. Seed kept longer will be rejected by the Owners Representative, disposed of off-site, replaced at no additional cost to the Owner.
- 2. A dispersing agent may be added, provided that documented evidence if furnished that the additive is not harmful to the mixture.
- B. Mixing / Application Rates per Acre:

Hydroseed Area (Two-Stage Application)	
First Application	
Fiber	500 lbs.
Seed	As specified above
Fertilizer: Biosol Forte	2000 lbs
Mycorrhizal Inoculant	60 lbs or per seed supplier rec- ommendations
Water	As needed for application
Second Application (within 2 hours of completion of first application)	
Fiber	1500 lbs.
Tackifier / Binder	Per manufacturer's recommen- dations
Water	As needed for application

3.03 APPLICATION

- A. Apply the hydroseed slurry within one hour of mixing, with a sweeping and arched technique with no slumping or shadowing to ensure uniform coverage and to ensure that material is spread evenly at the required rate as noted above.
- B. Apply the hydroseed in two-stages as specified under Mixing in this Specification.
- C. Wherever possible, locate equipment outside of the hydroseeded areas to minimize compaction. Do not allow hydroseeding equipment on to bioretention areas. Take preventive measures to avoid damage to adjacent vegetation.

3.04 CLEAN-UP AND REPAIR

- A. Remove all trash, seed containers, and ancillary material in and adjacent to the hydroseeded areas on completion of hydroseeding and leave the work area in a neat and orderly manner.
- B. Following application and clean-up minimize all activity on the hydroseeded areas.
- C. Re-apply hydroseed according to this Specification, and at no additional cost to the Owner, to any bare spots prior to final acceptance by the Owners Representative.

END OF SECTION

SECTION 32 93 03 PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the provision and installation of plant materials as shown on the Plans and as specified in this Section. This Section excludes restoration planting.
- B. Related work includes but is not limited to:
 - 1. Soil Preparation
 - 2. Irrigation
 - 3. Hydroseeding
 - 4. Landscape Maintenance

1.03 QUALITY ASSURANCE

- A. Quality: Minimum quality of all plant material shall unless otherwise indicated conform to:
 - 1. ANSI Z60.1-2004 American Standard for Nursery Stock, Sponsored by the American Nursery and Landscape Association (ANLA)
 - 2. Prevailing published specifications of the California Association of Nurserymen.
 - 3. Additional standards as indicated on the Plans and as specified herein.
- B. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods, including:
 - 1. D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers— Tension
- C. Fertilizers: Comply with the requirements of the Fertilizing Materials Inspection Program of the California Department of Food and Agriculture.
- D. Guarantee: Any plant material, within twelve (12) months following the final acceptance of the project, determined by the Owners Representative to be defective, restricted, declining or otherwise deficient due to abnormal root growth, shall be replaced to the equal condition of the adjacent plants, at the time of replacement.

1.04 SUBMITTALS

- A. Product Data: to be approved by the Owners Representative before the material is delivered to the site.
 - 1. Summary list certifying species / size of plant material ordered, the nursery supplier(s), along with nursery photographs of species.

- 2. Note any plant material not available at that time, or proposed substitutions to be reviewed.
- 3. All associated planting products specified herein and shown on the Plans.
- B. Samples: to be approved by the Owners Representative before the material is delivered to the site.
 - 1. 1-quart bag sample of each mulch type specified.
- C. Sod soils analysis: by an agricultural soil testing laboratory approved by the Owners Representative, referred to herein as the "Testing Lab".
 - 1. Pre-approved Testing Labs include:
 - a. Waypoint Analytical (formerly Soil & Plant Laboratory) 4741 E Hunter Ave Suite A, Anaheim, CA 92807, (714)282-8777
 - b. Wallace Laboratories LLC, 365 Coral Circle, El Segundo, CA 90245, (310) 615-0116
 - c. Soil Control Lab, 42 Hangar Way, Watsonville CA 95076, (831) 724-5422
 - 2. 2. The Owners Representative reserves the right to reject the analysis from an alternate soil testing lab without prior approval.
 - 3. 3. Analysis shall not be more than three months old at the time of delivery of the sod to the site.
 - 4. 4. Do not deliver any sod to the site without approval by the Owners Representative.
 - 5. 5. Soil texture analysis is to note percent of gravel, sand, silt, and clay, and indicate USDA soil classification. Soil agricultural suitability analysis is to indicate pH, salinity (ECe), and sodium absorption ration (SAR).
 - 6. 6. The Owners Representative reserves the right to take a separate sample of the sod soil on-site and send to the Testing Lab for analysis
 - 7. 7. Remove and replace sod not matching the approved soils analysis with approved sod at no additional expense to the Owner.

1.05 REVIEWS

- A. Specifically request at least (2) two days in advance the following review prior to progressing with the work:
 - 1. <u>Intermediate Review</u> plant material approval and layout/locations. See Specification Sections Landscape Irrigation and Soil Preparation for other items to be inspected during this review.
- B. Specifically request at least (5) five days in advance the following reviews prior to progressing with the work:
 - 1. <u>Substantial Completion Review</u> (to initiate Maintenance Period) all planting areas including turf, and hydroseed areas. See Specification Section Landscape Maintenance.
 - 2. <u>Final Review</u> (at the completion of Maintenance Period) all planting areas including turf and hydroseed areas, including all punch-list items identified at Substantial Completion Review. See Specification Section Landscape Maintenance.
- C. Each review will be conducted only after all items pertaining to that review as noted above and in related Sections have been completed.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver fertilizers and manufactured amendments to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Materials in broken containers or which become caked or contaminated making them unsuitable for use will not be accepted and are to be removed from the site.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Nomenclature and Labels: Plant botanical names conform to "Standardized Plant Names," second edition, and secondly, "A Checklist of Woody Ornamental Plants of California, "Manual 32, University of California. Deliver all plants of each clone, species, and cultivar to the site labeled with their full botanical name. Label every plant species with no less than one label for every ten plants of a species.
- B. Quantities: The quantities shown on the plant list and in labels are for the use of the Owners Representative use and are not to be construed as the complete and accurate limits of the Contract. Furnish and install all plants shown schematically on the Drawings.
- C. Root Systems: All container-grown stock shall be grown in its container for at least six months prior to its planting. Allow a minimum of two (2) and maximum of five (5)% of the quantity of plants of each species for removal and inspection.
- D. Health: Foliage, roots and stems of all plants shall be of vigorous health and normal habit of growth for its species. All plants shall be free of all disease, insect stages, burns or disfiguring characteristics.
- E. Untrue Species: All plant material, within 12-months following the final acceptance of the Project, determined by the Owner to be untrue to the species, clone, and/or variety specified, shall be replaced to the equal condition of adjacent plants at the time of replacement.

2.02 TREES

A. All trees shall have straight trunks of uniform taper, larger at the bottom. Trunks shall be free of damaged bark, with all minor abrasions and cuts showing healing tissue. Remove sucker basal growth and lateral growth and treated surface to eliminate resprouting. Allow normal lower side branching to remain. Trees unable to stand upright without support shall be rejected.

2.03 FERTILIZER

- A. 15-15-15 (N-P-K) Commercial Fertilizer, uniform pellet.
 - 1. The requirements above are for bidding purposes only, exact fertilizer types per Testing Lab analysis.

2.04 MULCH

- A. General: Mulch is to contain less than 1% foreign matter including soil, weeds, seeds, etc. by dry weight.
 - 1. Pneumatically applied mulch will not be permitted.
- B. Mulch: recycled wood, 2"-4" minus, partly shredded arbor mulch.
 - 1. Pre-approved product: Wonder Mulch, by Vision Recycling, CA
 - 2. Color: natural
 - 3. Approved Equal.

2.05 TURF SOD

- A. Sod: grown from high quality seed in soil treated with appropriate State and Federal agency approved pesticides, fungicides, and herbicides and regularly inspected by the State in accordance with "State of California Regulations for Nursery Inspection".
 - 1. Grown in fields with a sandy loam soil containing a minimum of 65% sand. Clay or clay loam soils are not be acceptable.
 - 2. Well-developed root structure sufficiently mature so that it will hold together when held by one end of the roll.
 - 3. Yellowing, brown, diseased, dried, or pest infested sod will be rejected.
 - 4. Soil thickness: 1/4 inch to 5/8 inch thick excluding top growth and thatch.
 - 5. Size of rolls or slabs: consistent to the supplier's standard length and width and is not to vary by more than 2% in either dimension.
 - 6. See submittal requirements for sod soil as specified herein.
- B. 90% dwarf fescue and 10% bluegrass mix. Pre-approved suppliers:
 - 1. Bolero Plus Sod, by Delta Bluegrass Company, Stockton, CA (800)637-8873, www.deltabluegrass.com
 - 2. Approved equal.

2.06 EROSION CONTROL FABRIC

- A. General: Erosion control blankets, 100% seed free, and consisting of wood or coconut fibers manufactured into a, interlocking matrix of uniform thickness, and providing up to 36 months of functional life.
 - 1. Blankets are to be free of synthetic monofilament reinforcing grids.
- B. Coir yarn fabric: Biodegradable hand-woven open mesh fabric of heavy and high strength coir yarn, with approximately 60% open area. Nedia KoirMat 400 by Nedia Enterprises Inc. (888) 725-6999 or approved equal.
- C. Staples: galvanized steel "U "shaped 8 inch or longer.

2.07 WATER

- A. Water for irrigation to be paid for by the Contractor.
- B. The Owner will provide water source locations as close as may be feasible to the planting sites. Hoses or other methods of transportation of water to planting sites are the sole responsibility of the Contractor.

C. Water to be of a quality that will promote germination and growth of seeds and plants. Water to not contain weed seeds nor shall it be obtained from sources containing more salts than found locally.

PART 3 - EXECUTION

3.01 GENERAL

- A. Plant Material Approvals: Before planting operations commence, review all plant material with the Owners Representative. Remove defective plants from the site and substitute acceptable material in its place. The review does not accept defective plants which may be installed.
- B. Layout: Lay out only those plants to be planted in any single day. Review locations of all plants prior to planting. Plants installed without this review may have be relocated and replanted as directed by the Owners Representative.
- C. Protection of Plants: Maintain all plant material in a healthy growing condition prior to and during planting operation. Contractor shall be responsible for vandalism, theft, and damage to plant material until commencement of the maintenance period.
- D. Pruning: Do not prune without specific authorization of the Owners Representative. Replace plants pruned without authorization if directed by the Owners Representative.

3.02 PLANTING

- A. Rest the rootball only on undisturbed soil, or in the case of fill areas, on compacted, unamended sub-grade. See Specification Section Soil Preparation for backfill mix requirements. Loosen / scarify the sides and bottoms of plant rootball and pits to prevent glazing or compaction.
 - 1. Plant pit sizes: as shown on the Drawings.
- B. Watering basins: construct watering basins with bottoms draining away from plant stems to the edge of basins.
 - 1. Flat areas with sprinkler irrigation and all areas with sub-surface drip irrigation construct basins only if required to hand water plants during establishment period. See Specification Section Landscape Maintenance for removal of basins.
 - 2. Sloped areas with sprinkler irrigation construct basins and do not remove at the end of landscape maintenance, unless directed to do so by the Owner's Representative.
- C. Foliage: trim foliage and lower branches if necessary, so that watering basin is clearly visible. Bubblers/emitters if installed should be clearly visible for maintenance.

3.03 CHEMICALS

A. Pesticide: Verify compatibility, dosage and other application procedures with the manufacturer. All pesticides shall be applied by a pest control operator licensed in the State of California.

B. Include copies of documentation of pesticide applications, countersigned by the Owner, as part of Close-out Documentation – see Specification Section Landscape Maintenance.

3.04 FERTILIZER

- A. Shrubs and groundcovers Apply Commercial Fertilizer at 5 pounds per 1,000 square feet to planting areas 30 days after planting. Schedule re-application at 45-day intervals until completion of Landscape Maintenance.
 - 1. The requirements above are for bidding purposes only, exact application rates per Testing Lab analysis.
 - 2. Hand-water as necessary to dissolve fertilizer into the ground below the mulch.
- B. Include copies of documentation of fertilizer applications, countersigned by the Owner as apart of Close-out Documentation see Specification Section Landscape Maintenance.

3.05 WATER

- A. Water to be of a quality that will promote germination and growth of seeds and plants. Water to not contain weed seeds nor shall it be obtained from sources containing more salts than found locally.
- B. During the course of planting, water for irrigation will be provided by Owner at locations as close as may be feasible to the planting sites. Hoses or other methods of transportation of water to planting sites are the sole responsibility of the Contractor.

3.06 MULCH

- A. Install mulch to a minimum depth after settling / natural compaction as specified below
 see the Drawings for areas to be covered and for tapering mulch down to the edge of adjacent hard surfaces.
 - 1. Wood Mulch three (3") inches
 - 2. In drip irrigation areas do not install mulch until inspection of irrigation by the Owner's Representative.

3.07 SOD INSTALLATION

- A. The installation specifications below prevail over the sod grower's installation specifications, unless otherwise noted.
- B. Grading / Soil Preparation: Finish grade to smooth, even surface, allowing for sod thickness at pavement and other structures to leave the sod flush to the finish grade of adjacent surfaces.
- C. Lightly roll the soil surface so that it is sufficiently firm to resist impressions over 1/4 inch deep. Water the top 6-8 inches of soil until this zone has an optimum moisture content for root growth.
- D. Fertilization: Follow Existing Soils Report recommendations for amendments and fertilization.

- E. Storage: Protect sod from wind and sun exposure during storage, with a maximum storage period of twenty-four hours.
- F. Installation: Lay sod in rows with staggered ends neatly and tightly butted on all edges. Remove harvesting netting upon installation. No overlap, gaps, ripples, or other uneven placement will be accepted. Lightly roll sod after installation to insure optimum contact with the soil. Cut and trim sod around structures with sharp tools and carefully fit the panels so the final appearance is a continuous bed of turf with no gaps at the edges.
- G. Establishment Watering / Mowing: Follow sod grower's specifications.

3.08 EROSION CONTROL FABRIC

A. Coir yarn fabric: Install down (not across) the slope unless approved otherwise by the Owners Representative. Overlap edges of the fabric rolls minimum 3" and staple securely with a common row of staples.

3.09 MAINTENANCE

A. See Specification Section Landscape Maintenance

3.10 CLEAN UP

A. After completion of all planting operations, remove all trash, excess soil and other debris. Sweep and wash clean all walks, walls, and pavement. Leave the entire area in a neat, orderly condition.

END OF SECTION

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SECTION 32 93 06 MITIGATION PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Plans and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to the Work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the undertaking of Mitigation Planting as shown on the Plans and as specified in this Section.
- B. Related Work includes but is not limited to:
 - 1. Soil Preparation
 - 2. Mitigation Planting Maintenance
 - 3. Hydroseeding

1.03 QUALITY ASSURANCE

- A. Biologist:
 - 1. The Owner will provide a Biologist (Owner's Representative) who will observe mitigation planting Work.
- B. Licensing:
 - 1. Mitigation planting subcontractor: C-27 Landscaping Contractor under CCR Title 16 Division 8, Article 3
 - 2. Qualified Applicator License (QAL) Department of Pesticide Regulation, State of California
- C. Experience: Mitigation planting subcontractor shall have completed a minimum of three (3) mitigation planting projects, similar in scope and scale, within the past five (5) years including site maintenance. These projects must have been located within the local counties that comprise the San Francisco Bay Area and Monterey Bay Area. See qualification submittals elsewhere in this Specification.
 - 1. For the intent of this requirement, a mitigation planting project is defined as a landscaping project using 100 percent site-specific, California native plants which are designed to function as natural habitat, and which includes a plant maintenance requirement.
 - 2. Provide evidence through the Qualifications Submittal noted in this Specification, that the mitigation planting subcontractor has performed the followings tasks:
 - a. Native plant installation using container stock.
 - b. Soil preparation m methods, both broadscale and at individual planting locations.

- c. Exotic plant species control and eradication including trees, shrubs, and herbs.
- d. Routine and alternative weed control methods for selective control of target plants, which co-exist with planted or volunteer natives. Involves the ability to identify native versus weed species.
- e. Native grass seeding by hydraulic methods.
- f. Monitoring of plant mortality percentages, health, and vigor.
- g. Installation and maintenance of temporary irrigation systems for mitigation plantings.
- D. Plant Material: All mitigation plants are to have been grown in nurseries which have been inspected by State of California Department of Agriculture and will be tagged with correct names as per Standard Plant Names.
- E. Fertilizers: Comply with the requirements of the Fertilizing Materials Inspection Program of the California Department of Food and Agriculture.
- F. Plans: For the purposes of clarity and legibility, the Plans are essentially diagrammatic. Exact locations of items are not indicated unless specifically dimensioned.
 - 1. Do not install the mitigation planting materials as shown on the Plans when it is obvious in the field that unknown obstructions, grade differences or discrepancies in dimensions exist. Bring such obstructions or differences shall be brought to the attention of the Owner's Representative.
 - 2. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.
 - 3. Final locations of trees and shrubs to be approved by Owner's Representative prior to planting.
- G. Phytophthora Protections:
 - 1. General: implement all appropriate measures to minimize the potential spread of Phytophthora spp. pathogens to the maximum extent practicable. For guidance on appropriate measures, reference internal subject matter experts in coordination with evolving guidelines and expertise of the Working Group for Phytophthoras in Native Habitats (www.calphytos.org).
 - 2. Site sanitation: clean the exterior and interior of all vehicles, construction equipment, and tools shall be free of debris, soil and mud, including mud on tires, treads, wheel wells and undercarriage. Keep work shoes clean by inspecting shoe soles and removing mud, debris, and soil off treads before moving to a new job site. Vehicles are to stay on established roads whenever possible.
 - 3. Nursery Stock: ensure that the following sanitation, planting and nursery guidelines, prepared by the Working Group for Phytophthoras in Native Habitats and that are available online are implemented to minimize the potential for spreading Phytophthora spp. pathogens, to the maximum extent practicable:
 - a. All container plants used for revegetation efforts, are to be acquired from nursery stock grown per the Guidelines to Minimize Phytophthora Pathogens in Mitigation Nurseries, dated September 2016.

- b. Follow appropriate holding facility and planting guidelines to ensure that clean nursery stock is installed into the site per the Guidelines to Minimize Phytophthora Contamination in Mitigation Projects, dated October 2016.
- H. Guarantee all mitigation planting to be in healthy, vigorous growing condition for a period of one year after planting and final acceptance. See Specification Section Mitigation Planting Maintenance.

1.04 SUBMITTALS

- A. Qualifications: For each project to be submitted by the mitigation planting subcontractor as relevant qualifying experience, provide the project name, county of project location, project acreage, project dollar value, project start and end dates, and the client's name and contact information.
- B. Product Data: to be approved by the Owners Representative before the material is delivered to the site.
 - 1. Summary list certifying species / size of plant material ordered, the nursery supplier(s), along with nursery photographs of species.
 - 2. Certificate / letter from the seed supplier indicating species / variety and source of seed that can be delivered to site for the specific planting season.
 - 3. Note any plant material not available at that time, or proposed substitutions to be reviewed.
 - 4. All associated planting products specified herein and shown on the Plans.
- C. Record Drawings: During the course of the installation, carefully record all changes made to the mitigation layout during installation.

1.05 REVIEWS

- A. Specifically request at least (2) two days in advance the following reviews by the Owner's Representative prior to progressing with the Work:
 - 1. Plant materials: Inspection and approval of all plant materials prior to installation.
 - 2. Layout: Inspection and approval of trees and shrubs after being located and prior to planting, or locations of marking flags color coded by plant species, at the discretion of the Owner's Representative.
 - 3. Substantial Completion Review to initiate Maintenance Period.

1.06 DELIVERY, STORAGE & HANDLING

- A. Protect plant material at all times during handling, shipping, storage and planting from extreme weather conditions, wind, drying roots and rootballs, and injury.
 - 1. Support root system of container plant material when lifting and moving to minimize injury to the root system.
 - 2. Handle and pack each plant in the approved manner for that species. Take all necessary precautions to ensure that the plants will arrive at the site of the Work in proper condition for successful growth.

B. Deliver fertilizers and manufactured amendments to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Materials in broken containers or which become caked or contaminated making them unsuitable for use will not be accepted and are to be removed from the site.

PART 2 - PRODUCTS

2.01 MITIGATION PLANTING CONTRACTORS

- A. Ecological Concerns, Inc., Santa Cruz, CA (831)459-0656 www.ecologicalconcerns.com
- B. Approved Equal

2.02 MITIGATION PLANT SUPPLIERS

- A. Central Coast Wilds, Santa Cruz, CA (831)459-0656 www.centralcoastwilds.com
- B. The Watershed Nursery, Point Richmond, CA (510) 234-2222 www.watershednursery.com
- C. Approved Equal

2.03 PLANT MATERIALS - GENERAL

- A. Plants: Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects and all forms of infestation.
 - 1. Cold storage plants are not acceptable.
- B. Nomenclature: Furnish all plants furnished true to type and name. Final determination of plant species or variety will be made by the Owner's Representative.
 - 1. No plant species to be substituted without approval of the Owner's Representative.
- C. Standards: Plant material is to conform to the requirements of USA Standard for Nursery Stock, published by the American Association of Nurserymen, Inc., except as otherwise supplemented and modified under this Specification Section.
- D. Plans: Plant material is to conform to the requirements noted on the Mitigation Planting Plan, or those portions of the Planting Plans identified as Mitigation Planting.
- E. Source: Plant material is to originate from seed and cuttings collected from the San Mateo North Shoreview Watershed or neighboring watersheds within Santa Clara or San Mateo Counties.
- F. Inspections: Notify the Owner's Representative two weeks in advance of the nurseries' delivery dates to schedule an inspection of the plant material on site prior to planting.

G. Plant material not meeting the specifications or showing damage from shipping, while in storage or during planting may be rejected by the Owner's Representative. Replace rejected plant material at no additional expense to the Owner.

2.04 CONTAINER PLANTS

A. Container size: as noted on the Plans. All container-grown stock shall be grown in its container for at least six months prior to its planting. Allow a minimum of two (2) and maximum of five (5)% of the quantity of plants of each species for removal and inspection.

2.05 WATER

- A. Water for irrigation shall be paid for by the Contractor.
- B. The Owner will provide water source locations as close as may be feasible to the planting sites. Hoses or other methods of transportation of water to planting sites are the sole responsibility of the Contractor.
- C. Water shall be of a quality that will promote germination and growth of seeds and plants. Water shall not contain weed seeds nor shall it be obtained from sources containing more salts than found locally.

2.06 EROSION CONTROL FABRIC

- A. Jute / coir yarn fabric: Biodegradable hand-woven open mesh fabric of heavy and high strength jute or coir yarn, with approximately 60% open area. Nedia KoirMat 400 by Nedia Enterprises Inc. (888) 725-6999 or approved equal.
- B. Staples: galvanized steel "U "shaped 8 inch or longer.

PART 3 - EXECUTION

3.01 GENERAL

- A. Existing Conditions: Examine proposed planting areas and conditions of installation. Do not start planting Work until unsatisfactory conditions are corrected, or during wet, muddy or frozen conditions.
- B. Existing Vegetation: Clear and grub all existing vegetation from the mitigation project area and dispose of legally or as directed by the Owner's Representative.
- C. Protection of Work: Provide adequate protection for all Work until completion and final acceptance. Take particular precautions to protect existing buildings, fencing, overhead and underground utilities, and all existing trees to remain.
- D. Soil preparation: See Specification Section Soil Preparation
- E. Sequencing and Scheduling:
 - 1. Coordinate all mitigation planting tasks with other phases of construction so as not to incur any scheduling or installation conflicts.

2. Hydroseeding activities if any must take place prior to planting operations.

3.02 INSTALLATION

- A. Container Planting:
 - 1. Rest the root ball only on undisturbed soil, or in the case of fill areas, on compacted, un-amended sub-grade. Use surrounding soil as backfill. Loosen / scarify the sides and bottoms of plant root ball and pits to prevent glazing or compaction.
 - 2. Plant pit sizes: as shown on the Plans.
 - 3. Watering basins: construct watering basins with bottoms draining away from plant stems to the edge of basins.
 - 4. Foliage: trim foliage and lower branches if necessary, so that watering basin is clearly visible. Bubblers/emitters if installed should be clearly visible for maintenance.

3.03 CLEAN-UP, REPAIR & REPLACEMENT

- A. Keep Project site reasonably free from accumulation of debris, topsoil, and other materials resulting from Work specified under this Specification Section.
 - 1. Remove topsoil, fertilizers, textural soil amendments, and soil mixes from adjacent Work, furniture, signage, utilities, and equipment. Sweep these clean on a daily basis.
 - 2. At completion of each area of Work, remove debris, equipment and surplus materials and thoroughly clean adjacent Work, furniture, signage, utilities, and equipment.
- B. Replace or repair all damaged, stained or disturbed items at no additional expense to the Owner prior to final acceptance. Determination of repair vs replacement will be made by the Owner's Representative.

3.04 FINAL ACCEPTANCE

- A. Final acceptance shall be given when all mitigation plantings have been planted as detailed and have demonstrated health and growth, or been replaced if necessary, as determined by the Owner's Representative.
- B. Upon acceptance, begin the plant maintenance per Specification Section 32 01 90.

END OF SECTION

SECTION 33 11 00 WATER MAINS AND IRRIGATION SERVICES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Basic piping materials and methods for water main relocation and irrigation service construction.
- B. Related Sections:
 - 1. Section 31 23 33 Trenching and Backfilling.
 - 2. Section 32 84 00 Irrigation.
 - 3. Section 32 84 16 Irrigation Control Systems.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D648 Test Method for Deflection Temperature of Plastics Under Flexural Load.
 - 2. D1248 Specification for Polyethylene Plastics Molding and Extrusion Materials.
 - 3. D1869 Specification for Rubber Rings for Asbestos-Cement Pipe.
 - 4. D3261 Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 - 5. D3350 Specification for Polyethylene Plastic Pipes and Fittings Materials.
 - 6. F714 Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- B. American Water Works Association (AWWA):
 - 1. AWWA C104 Cement-Mortar Lining for Ductile Iron Pipe and Fittings
 - 2. AWWA C110 Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch
 - 3. AWWA C111 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
 - 4. AWWA C115 Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
 - 5. AWWA C151 Ductile Iron Pipe, Centrifugally Cast
 - 6. AWWA C219 Bolted, Sleeve-Type Couplings for Plain-end Pipe
 - 7. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. for Water Transmission and Distribution

- 8. AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, ½ in. Through 3 in., for Water Service.
- C. Code of Federal Regulations:
 - 1. Title 49 Transportation.
- D. Plastics Pipe Institute (PPI).
- E. United States Department of Transportation:
 - 1. Materials Transportation Bureau.
- F. Uniform Plumbing Code.

1.03 SYSTEM DESCRIPTION

- A. Piping Drawings:
 - 1. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been indicated on the Plans. Sizes and locations are indicated on the Plans.
 - 2. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed.
 - a. Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Time.
- B. Performance Requirements:
 - 1. Restraining Piping:
 - a. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends.
 - 1) When piping is underground, use concrete thrust block or mechanical restraints.
 - 2) When piping is aboveground or under water, use mechanical or structural restraints.
 - 3) Determine thrust forces by multiplying the nominal cross sectional area of the piping by design test pressure of the piping.
 - b. Provide restraints with ample size to withstand thrust forces resulting from test pressures.
 - 1) During testing, provide suitable temporary restraints where piping does not require permanent restraints.
 - c. Place concrete thrust blocks against undisturbed soil, in accordance with the City Standard Details. Place concrete so piping joints, fittings, and other appurtenances are accessible for assembly and disassembly.
 - d. Provide underground mechanical restraints where specified in the Piping Schedule or shown on the Plans.

- 2. Connections to Existing Piping:
 - a. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings.
 - 1) Protect domestic water supplies from contamination.
 - a) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
 - b) Provide devices approved by City for domestic water supply system to prevent flow from other sources into the domestic supply system.
 - b. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
 - c. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.
- 3. Connections to In-service Piping:
 - a. Shutdown in-service piping in accordance with Section 01 14 00.
 - 1) Establish procedures and timing in a conference attended by Contractor and Engineer.
 - b. Where operation and maintenance of existing facilities require that a shutdown be made during hours other than normal working hours, perform the related work in coordination with the hours of actual shutdown.
 - c. Additional provisions regarding shutdown of existing facilities are specified in Section 01 14 00 Work Restrictions.
- 4. Connections at Dissimilar Metals:
 - a. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
 - b. Nonferrous metals include aluminum, copper, and copper alloys.
- C. Piping Alternatives:
 - 1. Provide piping in accordance with this Section, unless indicated on the Plans or specified otherwise.
 - 2. Alternative Pipe Ratings: Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price. Piping of different material may not be substituted in lieu of specified piping.
 - 3. Valves in Piping Sections: Capable of withstanding specified test pressures for piping sections and fabricated with ends to fit piping.
 - 4. For flanged joints, where one of the joining flanges is raised face type, provide a matching raised face type flange for the other joining flange.

1.04 SUBMITTALS

- A. Material List:
 - 1. Submit a complete material list prior to performing any work. The material list shall include the manufacturer, model number and description of all materials and equipment to be used.
 - 2. Equipment or materials installed or furnished without prior acceptance may be rejected and if so shall be removed from the site by the Contractor.
- B. Record Drawings:
 - 1. Provide Record Drawings in accordance with requirements of Section 01 77 00 and as follows.
 - 2. Dimension from two permanent points of reference, such as building corners, the location of the connection to the existing water line, and routing of the new water line.

1.05 QUALITY ASSURANCE

- A. Fusion Machine Technician Qualifications: Minimum 1 year of experience in the installation of similar PE piping systems from the same manufacturer.
- B. Plastic Pipe in Potable Water Applications: Provide pipe and tubing bearing NSF seal.
- C. Mark plastic pipe with nominal size, type, class, schedule or pressure rating, manufacturer and all markings required by applicable ASTM and AWWA standards.
- D. For purposes of clarity and legibility, the drawings are essentially diagrammatic to the extent that many offsets, bends, unions, special fittings, and exact locations of items are not indicated, unless specifically dimensioned
- E. Exact routing of piping, etc., shall be governed by structural conditions, obstructions. Contractor shall make use of data in the Contract Documents and actual Site conditions.
- F. The Contractor shall not willfully install an irrigation service as shown on the Plans when it is obvious in the field that unknown obstructions, grade differences or discrepancies in area dimensions exist. Such obstructions or differences shall be brought to the attention of the Engineer. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect piping materials from sunlight, scoring and distortion.

- B. Do not allow surface temperatures on pipe and fittings to exceed 120 degrees Fahrenheit.
- C. Store and handle pipe and fittings as recommended by manufacturer in published instructions.

PART 2 PRODUCTS

2.01 DUCTILE IRON PIPE

- A. Pipe sizes are nominal inside diameter unless otherwise noted. All sizes shall be as called out on the Plans and specified herein. All pipe and fittings delivered to the job Site shall be clearly marked to identify the material, class, thickness, and manufacturer. All material shall be new and free of blemishes.
- B. Ductile iron pipe and associated fittings shall be Class 150, cement-mortar lined and bitumatic coated.
- C. Restrained push-on joint pipe and fittings for the exposed portion of the water main relocation shall be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51.
 - 1. Push-on joints for such pipe shall be in accordance with ANSI/AWWA C111/A21.11 "Rubber-Gasket Joints for Ductile-Iron Pipe and Fittings."
 - 2. Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 "Thickness Design of Ductile-Iron Pressure Pipe," and shall be based on laying conditions shown on the Drawings and internal pressures as stated in the specifications.
 - Restrained joint fittings and the restraining components shall be Ductile Iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10 and/or C153/A21.53 with the exception of the manufacturer's proprietary design dimensions. Push-on joints for such fittings shall be in accordance with ANSI/AWWA C111/A21.11.
 - 4. Asphaltic outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/ A21.53 for fittings. Restrained push-on joints for pipe and fittings shall be designed for a water working pressure of 350 psi. Flanges shall be factory assembled.
 - a. Ductile iron pipe for buried service shall additionally be encased on polyethylene in conformance with AWWA C105.
 - b. Ductile iron pipe for buried service shall be cathodically protected as detailed on the Plans and as specified herein.
- D. All products shall bear the seal of a nationally recognized listing or certifying agency, with the following markings:
 - 1. Manufacturer's name

- 2. Nominal pipe size
- 3. Schedule or class
- 4. ASTM designation
- 5. Lot number and date of manufacture

2.02 DUCTILE IRON PIPE FITTINGS

- A. Material: Fittings for ductile iron pipe shall conform to AWWA C110.
- B. Joints: Fittings for ductile iron pipe shall be restrained mechanical joint or flanged and indicated on the Drawings.
- C. Flange Pattern: All flanged fittings shall be flanged to ANSI B16.1 Class 125 standard pattern.
- D. Coating: Fittings shall be coated in accordance with Section 09 96 00.
- E. Lining: Fittings shall be amine cured novalac epoxy lined per Section 22 05 80.

2.03 PVC PIPE

- A. Pipe sizes are nominal inside diameter unless otherwise noted. All sizes shall be as called out on the Plans and specified herein. All pipe and fittings delivered to the job Site shall be clearly marked to identify the material, class, thickness, and manufacturer. All material shall be new and free of blemishes.
- B. PVC pipe and associated fittings shall be Class 150.
- C. PVC pipe shall have bell ends with elastomeric gaskets.
- D. Restrained push-on joint pipe and fittings for the buried portion of the water main relocation shall utilize non-metallic couplings with locking splines.
 - 1. High strength, flexible thermoplastic splines shall be inserted into mating, precision machined grooves in the pipe and coupling to provide full 360-degree restraint with evenly distributed loading.
 - 2. Couplings shall be designed for use at or above the pressure class of the pipe with which they are utilized and shall incorporate twin elastomeric sealing gaskets meeting the requirements of ASTM F 477.
 - Joints shall be designed to meet the zero leakage test requirements of ASTM D 3139. Every pipe and coupling shall pass the AWWA C900 hydrostatic proof test requirements of 4 times the pressure class for 5 seconds.
 - 4. Restrained joint PVC pipe and couplings shall be Certa-Lok C900/RJ Restrained Joint PVC Pipe manufactured by CertainTeed Corporation or an approved equal.

- E. All products shall bear the seal of a nationally recognized listing or certifying agency, with the following markings:
 - 1. Manufacturer's name
 - 2. Nominal pipe size
 - 3. Schedule or class
 - 4. AWWA designation
 - 5. Lot number and date of manufacture

2.04 PVC PIPE FITTINGS

A. Fittings used with buried PVC pipe shall be PVC.

2.05 PIPE JOINTS

- A. Discharge pipe shall be joined by restrained mechanical, flanged or grooved joints as shown on the Plans, appropriate to field conditions or as directed.
- B. Flanged Joints: Provide full face gaskets per AWWA C111.
- C. Flanged Coupling Adapters: Flange coupling adapters shall be provided as shown on the Plans or as deemed necessary by the Contractor for pipe assembly.
- D. Gaskets, Bolts and Nuts: Gaskets shall be rated for wastewater service, made of synthetic rubber such as Buna-N not less than one-eighth (1/8) inch thick. All gaskets shall be the full width of the flange to which applied. Bolts and nuts shall be ASTM A316 stainless steel and shall have sound well-fitting threads. Bolts shall be provided with hexagonal chamfered heads and nuts. The underside of all bolt heads and nuts shall have true surfaces at right angles to the axis of the bolts. The lengths of the bolts shall be such that after joints are made up, the bolts shall protrude through the nuts, but in no case shall they protrude more than one-half (1/2) inch. Anti-galling compound shall be used in installation.

2.06 PIPE SUPPORT

- A. Support for piping crossing the pre-engineered vehicular bridge shall be provided as detailed on the Plans and specified herein.
- B. Sway Strut Assembly.
 - 1. Manufacturers: One of the following or equal:
 - a. Anvil, Figure 222.
 - b. Bergen-Paterson, Part 6100.
 - c. Eaton B-Line Systems, Figure B3140.
- C. Adjustable Clevis Hangar: ANSI/MSS SP 69 Type 1.

- 1. Manufacturers: One of the following or equal:
 - a. Anvil, Figure 260.
 - b. Bergen-Paterson, Part 6750.
 - c. Eaton B-Line Systems, Figure B3100.
 - d. Superstrut, C710.
- D. Pipe Clamps: ANSI/MSS SP 69 Type 4.
 - 1. Manufacturers: One of the following or equal:
 - a. Anvil, Figure 212.
 - b. Bergen-Paterson, Part 6100.
 - c. B-Line Systems, Figure B3140.
 - d. Superstrut, C725.
- E. Anchor Bolts, Flush Shells, Powder Actuated Fasteners, and Concrete Anchors: As specified in Section 05 12 00.
- F. Welded Support Brackets
 - 1. Manufacturers One of the following or equal:
 - a. Anvil, Figure 195
 - b. Anvil, Figure 199
- G. Pipe Hold Down Anchors
 - 1. Provide hold down anchors compatible with pipe sizes shown on the Plans.
 - 2. Manufacturers One of the following or equal:
 - a. Eaton B-Line Systems, B3256 Anchor Clamp
- H. U-Bolts
 - 1. Provide U-Bolts compatible with pipe sizes shown on the drawings
 - 2. Manufacturers One of the following or equal:
 - a. Anvil, Figure 137 or 137S
 - b. Eaton B-Line B3147A or B3147B
- I. Other Supports
 - 1. Fabricate other supports as shown on the Plans if needed or submit product data for approval.

2.07 FLEXIBLE EXPANSION JOINTS

A. As detailed on the Plans, furnish and install flexible expansion joints where the water main pipeline transitions from buried to bridge-supported.

- B. Flexible expansion joints shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53. Foundry certification of material shall be readily available upon request.
- C. Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 250 PSI. A minimum 2:1 safety factor, determined from the published pressure rating, shall apply.
- D. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of 25° and 8-inches minimum expansion. The flexible expansion fitting shall not expand or exert an axial imparting thrust under internal water pressure. The flexible expansion fitting shall not increase or decrease the internal water volume as the unit expands or contracts.
- E. All internal surfaces (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 shall meet ANSI/NSF-61.
- F. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.
- G. Polyethylene sleeves, meeting ANSI/AWWA C105/A21.5, shall be included for direct buried applications.
- H. Manufacturer's certification of compliance to the above standards and requirements shall be readily available upon request. The purchaser (or owner) shall reserve the right to inspect the manufacturer's facility for compliance. All flexible expansion joints shall be The Force Balanced FLEX-TEND as manufactured by EBAA Iron, Inc. Eastland, TX., U.S.A.

2.08 PIPE COATING

- A. Ductile iron pipe and fittings installed above ground shall have the specified coating system.
- B. Pipe coating shall be in conformance with manufacturers recommendations for surface preparation and primer.
 - 1. Pipe substrate shall be removed of asphaltic coating to National Association of Pipe Fabricators published surface preparation standards for ductile iron pipe and cast ductile iron fittings (NAPF 500-03).
 - 2. Apply one prime and one intermediate bonding coat using a polyamide epoxy such as Tnemec Series 20 Pota-Pox, or an approved equal, at a dry film thickness of 2 to 6 mils per coat. Color shall be compatible with the topcoat.
 - 3. Provide two coats of a UV-resistant acrylic polyurethane such as Tnemec Series 73U Endura-Shield, at a dry film thickness of 2 to 5 mils per coat.

2.09 IRRIGATION SERVICE PIPE AND FITTINGS

- A. Pipe for buried irrigation water service shall be AWWA C901 HDPE as shown and detailed on the Drawings.
- B. Provide compatible fittings as detailed and/or necessary.
- C. Provide compatible couplings to copper pipe as detailed and necessary.
- D. HDPE piping systems shall be installed in conformance with NSF 14 and 61 for potable water service.

2.10 VALVES AND FITTINGS

A. Provide valves and fittings, compatible with the piping system as detailed on the plans.

2.11 CONNECTION TO EXISTING MAIN

- A. Irrigation service shall be hot tapped to existing main, without shutting down utility.
- B. Provide saddle and tap as detailed on the Plans.
- C. Existing water mains may be asbestos-cement pipe.
 - 1. Use tapping materials and methods that do not release friable pipe fibers into the atmosphere.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Existing Conditions:
 - 1. Locate and expose existing structures, piping, conduits, and other facilities and obstructions that may affect construction of underground piping before starting excavation for new underground piping and appurtenances.
 - 2. Verify sizes, elevations, locations, and other relevant features of existing facilities and obstructions. Determine conflicts for the construction of the new underground piping and appurtenances.
 - 3. Make piping location and grade adjustments to resolve conflicts between new piping and existing facilities and obstructions.

3.02 WALL AND SLAB PENETRATIONS

A. Provide sleeves for piping penetrations through above ground concrete walls, floors, ceilings, roofs, pilasters, columns, piers, and beams unless specified or otherwise indicated on the Plans.

- B. For piping 1-inch in nominal diameter and larger, provide sleeves with minimum inside diameters of 1-inch plus outside diameter of piping. For piping smaller than 1-inch in nominal diameter, provide sleeve of minimum twice the outside diameter of piping.
 - 1. Arrange sleeves and adjacent joints so piping can be pulled out of sleeves and replaced without disturbing the structure.
 - 2. Cut ends of sleeves flush with surfaces of concrete, masonry, or plaster.
 - 3. Conceal ends of sleeves with escutcheons where piping runs through floors, walls, or ceilings of finished spaces within buildings.
 - 4. Seal spaces between pipes and sleeves with link-type seals when not otherwise specified or indicated on the Drawings.

3.03 BURIED PIPING

- A. Bury piping with minimum 3-foot cover, unless otherwise indicated on the Drawings or as needed to meet field conditions.
- B. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.
- C. Laying Piping:
 - 1. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.
 - 2. Place piping with top or bottom markings with markings in proper position.
 - 3. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
 - 4. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.
 - 5. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.

3.04 TESTING PRESSURE PIPING

- A. General:
 - 1. Test connections, hydrants, valves, blowoffs, and closure pieces associated with the piping system relocated or installed.
 - 2. Do not use installed valves for shutoff when the specified test pressure exceeds the valve's maximum allowable seat differential pressure. Provide blinds or other means to isolate test sections.

- 3. Do not include valves, equipment or piping specialties in test sections if test pressure exceeds the valve, equipment or piping specialty safe test pressure allowed by the item's manufacturer.
- 4. During the performance of the tests, test pressure shall not vary more than plus or minus 5 pounds per square inch gauge with respect to the specified test pressure.
- 5. Select the limits of testing to sections of piping. Select sections that have the same piping material and test pressure.
- 6. When Test Results Indicate Failure of Selected Sections, Limit Tests to Piping:
 - a. Between valves.
 - b. Between a valve and the end of the piping.
 - c. Less than 500 feet long.
- 7. Test piping for minimum 2 hours for visible leaks test and minimum 2 hours for the pressure test with maximum leakage allowance.
- B. Testing Procedures:
 - 1. Fill piping section under test slowly with potable water while venting air. Use of water from a body of water is prohibited. Temperature of test water shall be no higher than 73 degrees Fahrenheit. Use potable water.
 - 2. Before pressurizing for the tests, retain water in piping under slight pressure for a water absorption period of minimum 24 hours.
 - Raise pressure to the specified test pressure and inspect piping visually for leaks. Consider visible leakage testing complete when no visible leaks are observed.
- C. Pressure Test with Maximum Leakage Allowance:
 - 1. Leakage allowance is zero for piping systems using flanged, National Pipe Thread threaded and welded joints.
 - 2. Pressure test piping after completion of visible leaks test.
 - 3. For piping systems using joint designs other than flanged threaded or welded joints, accurately measure the makeup water necessary to maintain the pressure in the piping section under test during the pressure test period.
 - a. Consider the pressure test to be complete when makeup water added is less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - b. Successful completion of the pressure test with maximum leakage allowance shall have been achieved when the observed leakage during the test period is equal or less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - c. When leakage is allowed, calculate the allowable leakage by the following formula:

L = $S \times D \times P^{1/2} \times 133,200^{-1}$

wherein the terms shall mean:

- L = Allowable leakage in gallons per hour.
- S = Length of the test section in feet.
- D = Nominal diameter of the piping in inches.

P = Average observed test pressure in pounds per square inches, gauge, at the lowest point of the test section, corrected for elevation of the pressure gauge.

3.05 CLEANING

- A. Piping Cleaning:
 - 1. Upon completion of installation, clean piping interior of foreign matter and debris. Perform special cleaning when required by the Contract Documents.
- B. Cleaning Potable Water Piping:
 - 1. Flush and disinfect all potable water piping.

END OF SECTION

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SECTION 33 40 00 STORM DRAINS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. All labor, materials, equipment, facilities, transportation and services to complete the installation of storm drains and appurtenances as shown on the Plans and/or specified herein.
 - 2. Work to replace storm drains and appurtenances damaged during the course of Work.
- B. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 31 23 23 Trenching and Backfilling.
 - 3. Section 31 50 00 Excavation Support and Protection.
 - 4. Section 32 11 23 Aggregate Base Course.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. C76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 - 2. C150 Portland Cement.
 - 3. C443 Joints for Circular Concrete Sewer and Culvert Pipe, with Rubber Gaskets.
 - 4. C478 Precast Reinforced Concrete Manhole Structures.
 - 5. C858 Underground Precast Concrete Utility Structures.
- B. Foster City Standard Specifications and Plans.

1.03 QUALITY CONTROL

- A. All precast reinforced concrete pipe and appurtenance structures shall be manufactured in a plant especially designed for that purpose.
 - 1. Standard products may be used wherever feasible.
- B. Enough concrete test cylinders shall be taken by the precast concrete manufacturer to give a comprehensive knowledge of the concrete in each section of the work. All specimens shall be taken from the concrete as it is placed in the forms, and in accordance with ASTM C39. The cost of sampling and testing shall be borne by the manufacturer.

- C. Concrete pipe Work, being represented by specimens not attaining the minimum allowable comprehensive strength, shall be examined and tested at the expense of the Contractor to determine whether the Work is to be accepted or rejected by decision of the Engineer.
 - 1. Rejected Work shall be completely removed and reconstructed at the Contractor's expense to the approval of the Engineer.

1.04 SUBMITTALS

- A. Structural calculations, fabrication drawings, concrete mix designs, and reinforcement diagrams shall be submitted to the Engineer for review.
- B. Review by the Engineer does not relieve the precast concrete manufacturer of responsibility for the adequacy of design.

1.05 DESIGN

- A. The design of precast concrete structures is left to the manufacturers of these structures. Design parameters include sectional configuration, joints, wall thickness, and reinforcement. All design shall conform to the UBC and ACI Code.
- B. The following loading conditions shall be used to design concrete storm drain pipe and structures suitable for the dimensions and conditions shown on the Plans:
 - 1. Surface Live Load: HS-20.
 - 2. Unit Weight of Backfill:120 pcf.
 - 3. Lateral Soil Load (undrained condition): 90 psf per foot depth.
- C. Loading Conditions: Concrete pipe and structures shall be designed for:
 - 1. Full hydrostatic uplift (groundwater at surface) with no water on the inside of the pipe or structure.
 - 2. A fully surcharged pipe with hydraulic grades one foot above the ground surface with no groundwater outside the pipe.

PART 2 PRODUCTS

2.01 REINFORCED CONCRETE PIPE

- A. Reinforced concrete pipe shall meet or exceed the requirements of ASTM C76 for reinforced concrete pipe. Pipe shall be suitable for installation under the conditions shown on the Plans. Assumed backfill unit weight is 120 pounds per cubic foot.
- B. Portland cement used in the manufacture of reinforced concrete pipe shall be Type II (moderate sulfate resistance) in conformance with ASTM C150. Admixtures shall not be introduced to concrete mixes without specific approval by the Engineer.
- C. Pipe reinforcement and wall thickness shall not be less than that required under ASTM C76 for a D-load of 2000 pounds.

D. Reinforced concrete pipe shall be installed with double rubber gasket joints. Joint design, manufacture and testing shall conform to ASTM C443.

2.02 APPURTENANT STORM DRAIN STRUCTURES

- A. Where shown on the Plans, the Contractor may use reinforced concrete structures that are cast at an off-site location. In general, these structures include storm drain manholes and storm drain catch basins.
- B. Appurtenant precast concrete structures shall conform to the dimensions and notes shown on the Plan details.
- C. All precast concrete structures shall be manufactured in a plant especially designed for that purpose. Standard products may be used wherever feasible.

2.03 TRENCH DRAINS

- A. Surface drainage systems at trail and wall edges shall be a polymer concrete trench drain system.
 - 1. Trench drains shall be as manufactured by ACO Polymer Products or an approved equal.
- B. Channels shall be manufactured from polyester resin polymer concrete with an integrally cast-in stainless steel edge rail.
- C. Minimum properties of polymer concrete shall be:
 - 1. Compressive strength = 14,000 psi
 - 2. Flexural strength = 4,000 psi
 - 3. Tensile strength = 1,500 psi
 - 4. Water absorption = 0.07%
 - 5. Polymer concrete shall be frost proof, dilute acid and alkali resistant, and B117 salt spray test compliant.
- D. System shall be 4 inches nominal internal width, 5 inches plus or minus overall width, and have a built-in slope of 0.5 percent.
- E. Channel invert shall have a developed "V" shape.
- F. All channels shall be interlocking with male and female joints.
- G. Channel shall withstand loading as outlined in EN 1433.
- H. Stainless steel grate type shall be appropriate to meet the system load class and intended application with ADA-compliant pedestrian and bicycle traffic.
 - 1. Grates shall be secured using a boltless locking system.

2.04 WATERSTOPS

- A. Where cast-in-place concrete is poured against a precast concrete structure, a preformed rubber hydrophilic water stop with adhesive back shall be installed on the precast side of the joint prior to the pour.
- B. Water stop shall be Adeka Ultra Seal MC-2010M (Gates Unlimited, Santa Clara) or equivalent. Follow manufacturer's recommended installation procedures.

2.05 NON-SHRINK GROUT

- A. Grout used to seal pipe penetrations and support base plates shall be nonmetallic, non-corrosive, non-staining grouting compound containing silica sands, portland cement, shrinkage compensating agents and water reducing agents.
- B. Acceptable Products include Five Star Grout, Masterflow, and Upcon Nonshrink.

PART 3 EXECUTION

3.01 SHIPPING

- A. No storm drain pipe or structure shall be shipped to the Project Site until all submittals have been favorably reviewed by the Engineer and returned to the Contractor.
- B. Precast concrete shall be fully cured at the plant prior to shipment.

3.02 STORAGE OF PIPE

- A. Pipe may be stored on the project site at the Contractor's own risk.
- B. Precautions shall be taken to prevent damage to stored pipe.

3.03 PREPARATION FOR INSTALLATION

A. Storm drain pipe shall be installed as shown and detailed on the Plans. Bedding shall be placed prior to installation; any necessary support or stabilization shall be provided and remain in place until the pipe is securely anchored by trench backfill.

3.04 HANDLING

- A. Care shall be taken in handling, transporting and placing pipe, culvert and appurtenant structures to prevent damage to the pipe or structure. Temporary bracing may be required to prevent damage while transporting pipe or structures. No interior hooks or slings shall be used in lifting pipe. All handling operations shall be done with an exterior sling or with a suitable forklift.
- B. No damaged pipe or culvert will be accepted until and unless the damage has been repaired to the satisfaction of the Engineer. Damaged pipe, culvert and appurtenant structures will be replaced at the Engineer's discretion.

3.05 INSTALLATION

- A. Installation shall be in accordance with the pipe manufacturer's recommended installation guidelines.
- B. Joint sealers shall be used as specified herein for a water-tight installation.
- C. Precast concrete reinforced concrete box culvert structures shall be in place and plumb prior to pouring associated appurtenant structures. Dowel extensions shall be cast into the structures as a means of anchorage as detailed on the Plans.

3.06 DEFECTIVE CONCRETE AND REPAIRS

- A. Concrete shall be considered defective for the following reasons:
 - 1. Failure of finished concrete profiles to conform to the drawings within tolerance.
 - 2. Failure to meet the specified cylinder strength requirements.
 - 3. Concrete showing cracks, rock pockets, voids, spalls, or defects that adversely affect the structural adequacy of the concrete.
- B. Defective concrete that results from improper casting or curing shall be repaired or replaced at the plant prior to shipment; damaged concrete that results from transportation, handling, or storage after the piece leaves the plant shall be repaired or replaced at no expense to the City.
- C. Repairing and Patching: Immediately after removing forms, all concrete surfaces shall be inspected and any pour joints, voids, rock pockets, tie holes, except as specified, etc., shall be patched at once. Defective areas shall be chipped away to a depth of about one inch with the edges perpendicular to the surface.

3.07 BACKFILLING

A. Pipe, culvert or structures shall not be backfilled until the installation has been inspected and approved. Pipe backfilled prior to approval shall be uncovered and rebackfilled at the Contractor's expense.

END OF SECTION

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SECTION 33 46 16 PERFORATED PVC UNDERDRAINS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. All labor, materials, equipment, facilities, transportation and services to complete the installation of PVC underdrain piping, fittings, testing, and necessary appurtenances.
- B. Related Sections:
 - 1. Section 01 33 00 Submittal Procedures.
 - 2. Section 22 14 19 Piping and Fittings.
 - 3. Section 22 16 00 Plastic Piping.
 - 4. Section 22 17 00 Piping System Testing.
 - 5. Section 31 10 00 Site Preparation.
 - 6. Section 31 23 23 Trenching and Backfilling.
 - 7. Section 31 23 30 Cellular Concrete Fill.
 - 8. Section 32 11 23 Aggregate Base Course.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. D 638 Standard Test Method for Tensile Properties of Plastics
 - 2. D 790 Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials.
 - 3. D 792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - 4. D 1238 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
 - 5. D 1505 Standard Test Method for Density of Plastics by the Density-Gradient Technique.
 - 6. D 1693 Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
 - 7. D 1785 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - 8. D 2122 Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.

- 9. D 2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
- 10. D 2412 -Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
- 11. D 2444 Standard Test Method for Determination of Impact Resistance of Thermoplastic Pipe and Fittings by Means of a TUP (Falling Weight).
- 12. D 2466 Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- 13. D 2564 Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- 14. D 2855 Standard Practice for Making Solvent-cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

1.03 QUALITY CONTROL

- A. All PVC perforated storm drainpipe shall be manufactured in a plant especially designed for that purpose to be as uniform as commercially practicable in size, density, and other physical properties. Standard products may be used wherever feasible.
- B. Mark PVC pipe with nominal size, type, class, schedule or pressure rating, manufacturer and all markings required by applicable ASTM standards.
- C. For purposes of clarity and legibility, the drawings are essentially diagrammatic to the extent that many offsets, bends, unions, special fittings, and exact locations of items are not indicated, unless specifically dimensioned
- D. Exact routing of piping, etc., shall be governed by structural conditions, obstructions. Contractor shall make use of data in the Contract Documents and actual site conditions

1.04 SUBMITTALS

- A. Product information shall be submitted to the Engineer for review. Review by the Engineer does not relieve the manufacturer of perforated underdrain piping and appurtenances of responsibility for the adequacy of design.
- B. Material List:
 - 1. Submit a complete material list prior to performing any Work. The material list shall include the manufacturer, model number and description of all materials and equipment to be used.
 - 2. Equipment or materials installed or furnished without prior acceptance may be rejected and if so, shall be removed from the site by the Contractor.

PART 2 PRODUCTS

2.01 PERFORATED PVC DRAINPIPE

- A. Perforated PVC drainpipe shall be ASTM D1785/D2665 Schedule 40.
- B. Perforations shall conform to the following requirements, unless otherwise specified on the Plans:
 - 1. Perforations shall be either circular or slots
 - 2. Circular perforations shall be 1/4-inch $\pm 1/16$ -inch diameter holes arranged in rows parallel to the axis of the pipe.
 - 3. Perforations shall be evenly spaced along each row such that the center-tocenter distance between perforations is not less than eight times the perforation diameter.
 - 4. Perforations may appear at the ends of short and random lengths. The minimum perforation opening per foot of pipe shall be as shown in Table 1.

Nominal Pipe Size (in)	Minimum Number of Rows		Minimum opening/ft (in²)
4	2	2	0.22
6	4	2	0.44
8	4	2	0.44
10	4	2	0.44
12	6	2	0.66

Table 1: Perforations

- 5. Rows shall be arranged in two equal groups at equal distance from the bottom on each side of the vertical centerline of the pipe. The lower-most rows of perforations shall be separated by an arc of no less than 60 degrees and no more than 125 degrees. The uppermost rows of perforations shall be separated by an arc not to exceed 166 degrees.
- 6. The spacing of rows between these limits shall be uniform. The minimum number of rows shall be as shown in Table 1.
- 7. Slot perforations shall be symmetrically located in two rows, one on each side of the pipe centerline. Slot perforations shall be located within the lower quadrants of the pipe with slots no wider than 1/8-inch and spaced not to exceed 11 times the perforation width. Minimum perforation opening per lineal foot of pipe shall be as shown in Table 1.
- 8. On both the inside and outside of the pipe, perforations shall be free of cuttings or frayed edges and of any material that would reduce the effective opening.

2.02 FITTINGS

A. Fittings shall be provided as detailed in the Plans and/or as necessary.

- B. Fittings shall be manufactured entirely of PVC meeting ASTM D1784, be formed by a thermal-form process, and be of one-piece construction.
- C. Fittings shall be suitable for solvent weld joining to adjacent PVC pipe.
- D. Lubricants, Solvents, and Joint Compounds shall conform to Section 22 16 00 and be compatible with PVC pipe, conforming to the requirements of applicable ASTM specifications for pipe, fittings and joints.

2.03 OUTFALLS

A. PVC outfalls shall be provided as shown on the Plans and shall consist of a solid PVC drainpipe per ASTM D1785/D2665 Schedule 40.

PART 3 EXECUTION

3.01 STORAGE OF PIPE

- A. Pipe may be stored on the project site at the Contractor's own risk. Precautions shall be taken to prevent damage to stored pipe.
- B. Protect stored pipe from UV radiation.

3.02 PREPARATION FOR INSTALLATION

A. PVC underdrains shall be installed as shown and detailed on the Plans. Bedding shall be placed prior to installation; any necessary support or stabilization shall be provided and remain in place until the pipe is securely anchored by trench backfill.

3.03 HANDLING

- A. Care shall be taken in handling, transporting and placing pipe, culvert and appurtenant structures to prevent damage to the pipe or structure. Temporary bracing may be required to prevent damage while transporting pipe or structures. No interior hooks or slings shall be used in lifting pipe. All handling operations shall be done with an exterior sling or with a suitable forklift.
- B. No damaged pipe or culvert will be accepted until and unless the damage has been repaired to the satisfaction of the Engineer. Damaged pipe, culvert and appurtenant structures will be replaced at the Engineer's discretion.

3.04 INSTALLATION

- A. Pipe and Fittings
 - 1. Installation shall be in accordance with ASTM D2321 and the pipe manufacturer's recommended installation guidelines.
 - 2. Perforated pipes shall be installed at the bottom of drainage sections. If storage is required, two 90-degree bends provided at catch basin connections to achieve the required storage volume, or as shown in the Plans.

- 3. Joint sealers shall be used as specified herein for a water-tight installation for PVC pipe outfalls.
- B. Pipe backfilled prior to approval shall be uncovered and re-backfilled at the Contractor's expense.

END OF SECTION

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SECTION 35 31 16 STEEL SHEET PILING SEAWALLS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Materials and installation for steel sheet piling seawalls to the lines and grades as shown on the Plans and specified herein. Work includes trimming the sheet piling to the lines and grades shown on the Plans or as required.
 - 2. Pre-drilling to facilitate driving sheet pile to the designated elevations, as required.

B. Related Sections:

- 1. Section 01 50 00 Temporary Facilities and Controls.
- 2. Section 01 57 00 Environmental Control.
- 3. Section 01 57 23 Stormwater Pollution Prevention.
- 4. Section 03 30 00 Cast-in-Place Concrete.
- 5. Section 13 11 30 Corrosion Monitoring Systems.
- 6. Section 31 00 00 Earthwork.
- 7. Section 31 50 00 Excavation Support and Protection.

1.02 REFERENCE STANDARDS

- A. ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
- B. American Welding Society (AWS) D1.1 Structural Welding Code Steel.

1.03 SUBMITTALS

- A. Qualifications of Proposed Sheet Pile Installer: Submit evidence that Contractor or Subcontractor is qualified to install cutoff walls in conformance with Section 1.04.
- B. Work Management Plan: Submit a Work Management Plan demonstrating that Contractor's proposed sheet pile wall installation equipment and proposed construction techniques will not cause settlement or ground movement at adjacent properties. Submit copies of private property owners' agreements to allow placement of surplus material on their properties.
- C. Storm Water Pollution and Prevention Plan (SWPPP) and Erosion and Sediment Control Plan (ESCP)

- D. Material Data: Submit data indicating the source and material properties for steel sheet pile.
- E. Verification from the sheet pile manufacturer that the pile installation method proposed can deliver the required energy to successfully install sheet piling to the embedment depths shown on the Plans.
- F. Excavation Plan: Obtain favorable review of proposed excavation plan in accordance with Section 31 50 00 before beginning any excavation necessary to remove interfering materials for below grade sheet pile wall installation.
- G. Equipment List: Submit list of proposed equipment, including loaded weights, to be used on the job sites and their weights.

1.04 QUALIFICATIONS

- A. Contractor shall submit evidence that he or his sheet pile wall subcontractor is/are experienced and competent to construct sheet piling seawalls.
- B. Contractor or the subcontractor responsible for sheet piling seawall construction shall have successfully completed at least three similar projects with the same equipment proposed for the Work within the past five years. The amount of sheet piling walls completed by the Contractor or subcontractor must total at least 1,000 continuous lineal feet of wall at least 20 feet deep.
- C. At least one prior sheet piling seawall installation shall have been with comparable sheet piling sections and penetration into soils like those found on the Project Site, using the methods of installation proposed by the Contractor.

1.05 QUALITY CONTROL

- A. Contractor shall employ an ongoing quality control program to ensure that the completed sheet pile cutoff walls meet the requirements specified herein.
- B. Contractor shall complete a trial sheet piling seawall section to the embedment depth indicated on the Plans.
 - 1. All costs for trial cutoff wall reconstruction shall be borne by the Contractor.
 - 2. Trial wall section shall be a minimum of 20 feet in transverse length along the project control line, or as necessary to confirm its conformance with specification.
 - 3. The Engineer will be present for observation during the installation of the trial wall section. A City field representative will observe and record the sheet piling wall depth, inclination, sheet interlock and determine whether the wall construction techniques meet specification for a completed sheet piling seawall.
 - 4. Contractor shall adjust construction techniques as required to meet the specifications and reconstruct the trial cutoff wall.
 - 5. The trial wall section may become part of the completed Work, if the trial wall meets all specifications and the Engineer's approval. The Contractor may install the trial wall section in a project location, or he may construct the wall offsite at a location subject to City approval.

- 6. Any trial sheet piling seawall that does not meet project specification and is located along the final project alignment shall be reconstructed to meet all Project Specifications.
- C. The Engineer will observe and record installed sheet piling wall depths, inclination, and sheet interlock to determine conformance with these Specifications. The Contractor shall stop sheet piling wall construction at the Engineer's direction if his observations indicate that construction does not meet Specification.
- D. The Engineer will observe sheet piling seawall construction to determine if the field conditions encountered agree with previous subsurface investigations and design assumptions. Depending upon actual conditions encountered, it may become necessary to extend the depth of the sheet piling seawall.
- E. The Contractor shall maintain a daily quality control log and present it to the Engineer upon request. At a minimum the daily log shall record:
 - 1. Site and weather conditions
 - 2. Start station and end station of Work accomplished
 - 3. Equipment and personnel at site(s)
 - 4. Date and time (start and finish) of each day's Work
 - 5. Penetration rate, top and bottom depth/elevations and width of the steel sheet piling seawall, as applicable.
 - 6. Obstructions, interruptions, or other difficulties encountered during installations and how they are resolved, as applicable.

1.06 STORAGE AND HANDLING

- A. Do not subject piles to damage by impact bending stresses in transporting to and storing piles onsite.
- B. Store and handle piles so that corrosion protection coatings are not damaged.

PART 2 PRODUCTS

2.01 GENERAL

- A. All steel sheet piling shall be new and unspliced material throughout.
- B. Steel sheet piles and special fabricated shapes shall be of a design that ensures continuous interlock throughout the entire length when in place.
- C. Steel sheet pile sections shown on the Plans are considered the minimum sections allowed. Stronger sections or thicker sections are allowable based on market availability and/or the installation methods used.

2.02 MATERIALS

A. Steel sheet piling shall meet the requirements of ASTM A572 (Grade 50).

- B. Steel corners, tees, wyes, and crosses shall meet the requirements of ASTM A572.
- C. Steel sheet piles shall be the type, section and weight shown on the Plans. Steel piling shall be constructed with a weathering finish.
 - 1. Additional length beyond those indicated on the Plans may be required to provide for trimming of tops of sheet piling.
- D. The interlocks between the steel sheet pile sections shall be configured such that the average width of the annular space between all contact points of the interlocks shall be a maximum of one-eighth (1/8) inch.
- E. Steel sheet piles and interlocks shall not have excessive kinks, camber or twist that would prevent the pile from reasonably free sliding to grade.
- F. Fabricated connections shall be made with the use of angles or bent plates, as necessary, and shall be adequately welded as accepted by the Engineer.
- G. Steel sheet piles shall have appropriate corrosion protection as recommended by Engineer.
- H. Handling Holes:
 - 1. If handling holes are provided, they shall be two (2) standard two and ninesixteenth (2-9/16) inch diameter handling holes located six (6) inches from one end.
 - 2. If for any reason the holes are located below the bottom of the structural cap elevation after the sheet pile is driven to its finish elevation, they shall be plugged by welding a piece of steel of the same material and thickness as the sheet pile over the hole on both sides of the sheet, with the welds ground smooth, prior to installing any riprap or backfill.
 - 3. The plated holes shall be watertight.
 - 4. Holes that would be below original grade after installation shall be plugged as described herein prior to driving the sheet pile.

PART 3 EXECUTION

3.01 PREPARATION

- A. Thoroughly examine the alignment for sheet pile installation and notify Engineer of any circumstances that could interfere with said installation.
- B. Verify that all potentially interfering existing utilities have been cleared or relocated from the sheet pile alignment prior to installation.
- C. Surface Preparation:
 - 1. Prior to steel sheet piling seawall construction, the Work areas shall be cleared, grubbed, and stripped in conformance with Section 31 10 00, and the existing levee shall be excavated as required to facilitate the driving of sheet piling.

- 2. Stabilize the working surface as required to withstand loads which may be placed upon it by the work equipment.
- D. Dust and Erosion Control:
 - 1. Maintain existing paved surfaces on the levees to the maximum extent practicable during sheet piling installation to help control dust and erosion.
 - 2. A temporary layer of aggregate base shall be placed over exposed ground surfaces within the work areas as needed to control dust and erosion during construction.
 - 3. Temporary aggregate shall be removed after floodwall construction, before completing additional backfill or embankment fill.
- E. Environmental Protection
 - 1. Facilities and work required for the protection of environmentally sensitive areas shall be completed in conformance with the Plans and these specifications before beginning site preparation for steel sheet piling seawall construction.
 - 2. The Contractor shall take all means necessary to prevent the discharge of material, spoils, fuel, oil, or other construction debris into the identified environmentally sensitive areas.
 - 3. All spills and other deleterious materials within the work site shall be promptly removed at the end of every workday and hauled offsite.
 - 4. In conformance with Section 01 57 23 and the Special Provisions, sheet piling seawall construction shall be suspended during periods of inclement weather (rain or imminent rain) and extreme tide.

3.02 WORKING CONDITIONS

- A. The Contractor shall, prior to submitting his Bid, visit the site and become familiar with actual site and soil conditions. No allowance will be made by the City for any unfavorable conditions or events which should have been foreseen from a thorough examination of the Contract Documents, the Geotechnical Reports, the Site, available access and working conditions.
 - 1. Observe the location of existing overhead utilities, nearby structures, and make necessary provisions for the installation equipment.
- B. The Contractor is hereby notified that some of the surficial existing fill material is considered 'hard ground conditions' generally classified as follows: dense sand and gravel to hard clay soil, with variable amounts of cobbles, boulders, and manmade debris including concrete, wood, steel, and brick fragments. The existing fill material is generally present above the elevation of softer Young Bay Mud soils along the sheet pile alignment.
- C. To the maximum extent possible within schedule constraints, sheet piling wall construction shall take place during periods of suitable weather conditions.

- D. The Contractor is hereby notified of the continuous presence of tidal, lagoon, and groundwater at the Work sites, the level of which may fluctuate hourly due to tidal influence.
- E. Young Bay Mud: The Contractor is hereby informed that fill of variable thickness overlies Young Bay Mud in most of the Work areas. All construction and excavation close to or into Bay Mud require methods and equipment suitable for soft to very soft soil conditions.

3.03 PROTECTION

- A. If existing live utilities are encountered, they are to be protected from damage and the proper authorities notified before continuing the Work.
- B. Attention is directed to the Plans which indicate the presence of high voltage overhead and underground PG&E electric utilities near the Work sites. Service shall not be interrupted except as directed or accepted.
- C. Record discovered utilities at unmarked utility locations on the Record Drawings.
- D. Open excavations, trenches, and the like are to be protected with fences, barricades, covers and railings as required.
- E. Every precaution shall be taken to prevent spillage when hauling on or adjacent to a street or highway. Spillage shall be promptly removed.

3.04 SAFETY

- A. The Contractor remains solely responsible for job site safety. This responsibility is continuous, not subject to normal workings hours, and is not waived when the Engineer or other City representative enters the Work site.
- B. Excavation to remove interfering materials shall not begin until shoring drawings have been returned by the Engineer in accordance with Section 31 50 00.
- C. Stockpiles of soil, spoils, cuttings, or other materials shall not be placed within 50 feet of a slope.

3.05 LIMITATIONS ON THE USE OF HEAVY EQUIPMENT

- A. Weight of construction equipment shall be adequately distributed or limited to reduce the potential for subgrade disturbance, slope instability, and damage to buried utilities. Contractor shall submit a description of all proposed equipment, including gross vehicle weights and weight distribution methods, prior to bringing any equipment to the Site.
 - 1. Contractor shall utilize methods and equipment suitably sized for soft soil conditions.
 - 2. Contractor shall organize their operation in such a manner to avoid adverse settlement or movement of existing structures or the Work.

- 3. Contractor shall be responsible for restoring existing structures or Work damaged due to its use of equipment.
- B. Construction equipment shall maintain slow velocities; 10 miles per hour maximum.
- C. Lightweight low-ground-pressure equipment shall be used on top of existing levees.
- D. Haul routes for trucks as well as pile driving equipment shall be kept level and smooth to prevent equipment from bouncing and imposing high dynamic loads on subgrades or fill.
- E. Construction equipment shall not be parked within 50 feet of a slope.

3.06 FLOODWALL ALIGNMENT

- A. Horizontal Alignment:
 - 1. The wall alignment shall be accurately staked by the Contractor prior to construction. The Contractor is responsible for providing any offsets he needs for construction.
 - 2. A shallow pre-trench shall be constructed to define the final installation location and shall be approved by the Engineer prior to installation.
 - 3. Continuity shall be maintained. No windows or gaps should exist within the finished walls that are not specifically detailed on the Plans.
- B. Vertical Alignment:
 - 1. Sheet piling seawalls shall be maintained vertical, limiting the amount of inclination during installation.
 - 2. The pile driving equipment operator shall control the vertical alignment of the cutoff wall to the tolerance specified herein. The operator shall adjust the position of the equipment as necessary to maintain vertical installation to the required depth.

3.07 INSTALLATION

- A. Steel sheet piling shall be driven to the depths shown on the Plans.
 - 1. The final depth and penetration of the sheet piling wall shall be measured from shaft penetration, checked by the Contractor, and approved by the Engineer immediately following penetration.
 - 2. To minimize sound levels during sheet pile installation, steel sheet piles shall be vibrated or hydraulically pressed in. Percussive hammers are not allowed to drive sheet piles.
 - 3. See Section 01 57 00, Environmental Control, for vibration criteria that apply to the installation of steel sheet piling.
- B. Steel sheet piling shall be assembled before driving and then driven as a continuous wall, progressively in stages to keep the piles aligned correctly and minimize the danger of breaking the interlock between the sheets.

- C. A driving head shall be used and any piling that is damaged during driving operations or which has broken interlocks between sections shall be pulled and replaced at Contractor's expense.
- D. Contractor shall provide soil grading as necessary during construction operations; however, the sheet pile walls are designed for the soil grades of the final configuration shown on the Plans only. Other temporary configurations during the construction period must be verified by the Engineer prior to such grading activity.
- E. The selected sheet pile installation construction equipment and method(s) shall be determined by the Contractor based on the subsurface conditions described in Paragraph 3.02 and in the Geotechnical Report. The selected equipment and methods shall be capable of advancing the sheet piles through the above-described 'hard ground conditions,' where encountered. The selected sheet pile installation equipment and methods shall be submitted for review.
 - 1. At some locations, the work may require additional excavation to complete the steel sheet piling seawall. Allowances shall be made for the excavation, removal and disposal of interfering buried cobbles, boulders, rubble, and manmade debris that may be present at the sheet piling installation work sites. The sheet piling shall achieve the minimum penetration depth on the Plans.
 - 2. Rocks, broken concrete, or other solid materials larger than 6 inches in greatest dimension removed during steel sheet piling wall installation shall not be placed in fill areas, but removed from project site.
 - 3. Contractor shall protect excavation prior to and during the removal of interfering materials as required by Section 31 50 00.
- F. Sheet piles may not be joined vertically to extend the wall height. If additional sheet piling is needed to reach the required penetration as confirmed by the Engineer in the field, installed sheet piles shall be removed and longer sheet piles furnished and driven to the requisite depth.
- G. Care shall be taken during driving operations to keep from causing deformations of the top of the piles, splitting of sections, or breaking the interlock between sections.
- H. Steel Z piling shall be driven with the ball-end leading.
- I. Alternate Z piles shall be reversed end for end for proper interlocking in the normal position. Piles shall be aligned to maintain a normal driving width.
- J. Alignment: The maximum horizontal deviation of any point from a straight line connecting the two ends of the wall sections shall be six (6) inches.
- K. Plumb: Each individual sheet pile section shall be driven vertical, with a horizontal tolerance of two percent (2%) of any vertical length measured along the pile.
- L. Elevation: Tops of sheet pile sections shall be maintained so that the concrete wall cap is within a tolerance of one (1) inch from Plan elevations.
 - 1. Excess sheet pile trimmed of the end of the pile to meet specification shall not be paid as extra work.

REGULATORY APPROVAL Appendices

for

FOSTER CITY LEVEE IMPROVEMENTS PROJECT NO. CIP 301-657

at

FOSTER CITY, CALIFORNIA 94404

CITY OF FOSTER CITY PUBLIC WORKS DEPARTMENT



City of Foster City Public Works Department 610 Foster City Boulevard Foster City, California 94404

Release Date: May 5, 2020

Bid Open Date: Tuesday June 16, 2020

Contract Number: CIP 301-657

- Appendix 1 Bay Conservation and Development Commission Permit No. 2018.005.00.00 (12/02/19)
- Appendix 2 California Department of Fish and Wildlife Temporary Entry Permit (10/02/19)
- Appendix 3 National Marine Fisheries Service Biological Opinion (8/08/19)
- Appendix 4 San Francisco Regional Water Quality Control Board Clean Water Act Section 401 Water Quality Certification, Regulatory Measure 425529 (Amended 11/26/19)
- Appendix 5 State of California Lands Commission Lease No. PRC 9539.9 (9/19/19)
- Appendix 6 U.S. Army Corps of Engineers File No. 2015-00391S (1/06/20)
- Appendix 7 U.S. Fish and Wildlife Service Biological Opinion (10/02/19)
- Appendix 8 Mitigation Monitoring and Reporting Program (April 2017)
- Appendix 9 Local Authorizations to be Obtained by Contractor

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