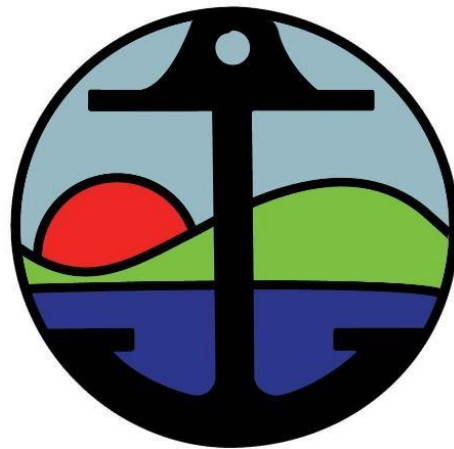


# CITY STANDARD SPECIFICATIONS

JULY 2023



CITY OF PITTSBURG, CALIFORNIA

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## DOCUMENT 00 11 13 – NOTICE INVITING BIDS

1. **Bid Submission.** City of Pittsburg (“City”) will accept sealed bids for its Pittsburg Water Treatment Plant Genius Bus Replacement Project (“Project”), by or before August 7, 2023, at 2:00 p.m., at its City Engineer office, located at 65 Civic Avenue, First Floor, Pittsburg, California, at which time the bids will be publicly opened and read aloud.
2. **Project Information.**
  - 2.1 **Location and Description.** The Project is located at The City of Pittsburg Water Treatment Plant at 300 Olympic Drive and is described as follows: Replacement of existing PLC components, including controllers, input/output modules, and communication modules. Replacement of wiring between components throughout the plant is to be performed and includes the construction of new duct banks and appurtenances.
  - 2.2 **Time for Final Completion.** The Project must be fully completed within 60 working days from the start date set forth in the Notice to Proceed. City anticipates that the Work will begin on or about August 31, but the anticipated start date is provided solely for convenience and is neither certain nor binding.
3. **License and Registration Requirements.**
  - 3.1 **License.** This Project requires a valid California contractor’s license for the following classification(s): [Class A General Engineering] [Class B General Building] [Class C-x Specialty].
  - 3.2 **DIR Registration.** City may not accept a Bid Proposal from or enter into the Contract with a bidder, without proof that the bidder is registered with the California Department of Industrial Relations (“DIR”) to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.
4. **Contract Documents.** The plans, specifications, bid forms and contract documents for the Project, and any addenda thereto (“Contract Documents”) may be downloaded from City’s website located at: <https://www.pittsburgca.gov/business/current-bidding-opportunities>. A printed copy of the Contract Documents are not available.
5. **Bid Security.** The Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier’s or certified check made payable to City, or a bid bond executed by a surety licensed to do business in the State of California on the Bid Bond form included with the Contract Documents. The bid security must guarantee that within ten days after City issues the Notice of Potential Award, the successful bidder will execute the Contract and submit the payment and performance bonds, insurance certificates and endorsements, and any other submittals required by the Contract Documents and as specified in the Notice of Potential Award.
6. **Prevailing Wage Requirements.**
  - 6.1 **General.** Pursuant to California Labor Code § 1720 et seq., this Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes.
  - 6.2 **Rates.** The prevailing rates are on file with the City and are available online at <http://www.dir.ca.gov/DLSR>. Each Contractor and Subcontractor must pay no less than the specified rates to all workers employed to work on the Project. The schedule of per diem

wages is based upon a working day of eight hours. The rate for holiday and overtime work must be at least time and one-half.

- 6.3 Compliance.** The Contract will be subject to compliance monitoring and enforcement by the DIR, under Labor Code § 1771.4.
- 7. Performance and Payment Bonds.** The successful bidder will be required to provide performance and payment bonds, each for 100% of the Contract Price, as further specified in the Contract Documents.
- 8. Substitution of Securities.** Substitution of appropriate securities in lieu of retention amounts from progress payments is permitted under Public Contract Code § 22300.
- 9. Subcontractor List.** Each Subcontractor must be registered with the DIR to perform work on public projects. Each bidder must submit a completed Subcontractor List form with its Bid Proposal, including the name, location of the place of business, California contractor license number, DIR registration number, and percentage of the Work to be performed (based on the base bid price) for each Subcontractor that will perform Work or service or fabricate or install Work for the prime contractor in excess of one-half of 1% of the bid price, using the Subcontractor List form included with the Contract Documents.
- 10. Instructions to Bidders.** All bidders should carefully review the Instructions to Bidders for more detailed information before submitting a Bid Proposal. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, as defined therein, including this Notice Inviting Bids.

By:  \_\_\_\_\_ Date: July 14, 2023

John Samuelson Public Works Director/City Engineer

Publication Date: July 14, 2023

END OF DOCUMENT 00 11 13

DOCUMENT 00 21 13 – INSTRUCTIONS TO BIDDERS

Bids are requested for a general construction contract as follows:

CITY OF PITTSBURG (hereafter “City”)

City of Pittsburg Project 5009  
Pittsburg Water Treatment Plant Genius Bus Replacement Project  
300 Olympia Dr.  
Pittsburg, CA 94565

The work of this Contract consists, in general, of all necessary construction activities to replace existing PLC components, including controllers, input/output modules, and communication modules. Wiring between components throughout the plant is to be performed and includes the construction of new duct banks and appurtenances.

1. RECEIPT OF BIDS. City will receive sealed bids from Bidders up to and including time and date of bid deadline. City will reject any bid received after this time and date.
2. REQUIRED BID FORM. Bidders must submit bids on [Document 00 41 13 - Bid Form](#). City will reject as non-responsive any bid not submitted on the required form. Bidders must complete all bid items and supply all information required by Bid documents and specifications. City reserves the right in its sole discretion to reject any bid as non-responsive as a result of any error or omission in the Bid. Bidders must submit clearly written bids, and City reserves the right to reject any bid not clearly written. Bidders may not modify the Bid Form or qualify their Bids.
3. REQUIRED BID SECURITY. Bidders must submit, with their bids, a cashier's check, a certified check, or a corporate surety bond of not less than ten percent (10%) of the amount bid, including additive alternates, payable to City of Pittsburg. The required form of corporate surety bond is included as [Document 00 43 13 - Bond Accompanying Bid](#). City will reject as non-responsive, any bid submitted without the necessary bid security.
4. REQUIRED SUBCONTRACTORS LIST. Bidders must submit with their bids, the names of all subcontractors and their respective bid item sub-bids on [Document 00 43 36 - Subcontractors List](#) for those subcontractors who will perform any portion of work, including labor, rendering of service, or specially fabricating and in- stalling 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 total bid. Any violation of this requirement may result in Bid being deemed non- responsive and not being considered.

5. REQUIRED NONCOLLUSION DECLARATION. Bidders must submit with their bids [Document 00 45 19 - Noncollusion Declaration](#). City will reject as non-responsive any bid submitted without the Noncollusion Declaration.
6. PRE-BID CONFERENCE AND SITE INSPECTION. City will conduct a Pre-Bid Conference and Site Inspection at time and date at the first-floor conference room of the Civic Center Building at 65 Civic Avenue, Pittsburg, CA.
7. PRE-BID CONFERENCE ADDENDA AND MINUTES. City will transmit to all prospective Bidders of record such Addenda as City in its discretion considers necessary in response to questions arising at the Pre-Bid Conference. Oral statements shall not be relied upon and will not be binding or legally effective. 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 Contract Documents.
8. EXISTING DRAWINGS AND GEOTECHNICAL DATA. Bidders may examine any available existing drawings of previous work by giving the Project Manager reasonable advance notice. City will not be responsible for accuracy of existing drawings or geotechnical data. [Document 00 31 33 - Geotechnical Data and Existing Conditions](#) applies to all supplied existing drawings and geotechnical reports, and all other information supplied regarding existing conditions either above ground or below ground.
9. ADDENDA. Bidders must direct all questions about the meaning or intent of the Contract Documents to City's Project Manager or assigned Agent. Interpretations or clarifications considered necessary by the Project Manager in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the Project Manager as having received the Bidding Documents. Addenda shall be written and will be issued to each Bidder by certified mail to the address supplied to the City by the Bidder. Questions received less than seven (7) calendar days prior to the date for opening Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
  - a. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the Project Manager.
  - b. Addenda shall be acknowledged in the Bid Form by number and shall be part of the Contract Documents. A complete listing of Addenda may be secured from the Project Manager.
10. SUBSTITUTIONS. Bidders must base their bids on products and systems specified in the Contract Documents or listed by name in Addenda. Contractors and materials suppliers may submit substitutions for review, up to thirty-five (35) calendar days following the Notice of Award.
  - a. Submittals of substitutions shall contain sufficient information, as set forth in [Section 01 25 00 – Substitution Procedures](#), to assess acceptability of



product or system. Insufficient information shall be grounds for rejection of substitution.

- b. Substitutions may be requested after the Contract is signed in accordance with requirements specified in [Document 00 72 00 - General Conditions](#) and [Section 01 25 00 – Substitution Procedures](#).
11. WAGE RATES. Notice is hereby given that by Resolution of the City Council that the latest general prevailing rate of wages as determined by the Director of Industrial Relations, State of California, Department of Industrial Relations is to be paid to the various craftsmen and laborers required to construct said improvements and is made a part of the Specifications and Contract for said work to which reference is hereby made for further particulars. Pursuant to Section 1773 of the Labor Code, the Director's prevailing wage determinations shall not be below the California minimum wage of \$10.50 per hour. If the California minimum wage is increased in the future to an amount above that shown in a prevailing wage determination, the basic hourly rate in that determination automatically increases to the new minimum wage. Pursuant to Section 1720.9 to the Labor Code, prevailing wage rates shall be paid to haulers of ready-mixed concrete.
  12. BID SUBMISSION. Bidders shall submit a sealed envelope containing forms listed herein. Envelope shall be hand delivered to City Clerk at the Bid Area located in the Community Development Department on the First Floor, City Hall, 65 Civic Avenue, Pittsburg. CA. Bidder shall submit bid in an opaque, sealed envelope and marked as follows:

"Bid Proposal, Project No. 5009, Bid Opening, August 7, 2023, at 2:00 p.m.

- a. Bids must contain the following, fully executed documents:
  1. [Document 00 41 13 - Bid Form](#). All alternates will be listed. City reserves the right to announce the priority of alternate selection prior to the opening of bids.
  2. Cashier's check, certified check, or corporate surety bond of not less than 10% of the amount bid, including additive alternates. Bidder and its surety must execute [Document 00 43 13 - Bond Accompanying Bid](#), if submitted.
  3. [Document 00 43 36 – Subcontractors List](#). Bidder must furnish the information required on this form in accordance with the instructions contained within.
  4. [Document 00 45 19 – Noncollusion Declaration](#).
  5. [Document 00 45 00 – Representations and Certifications](#).
  6. Addendum Receipt(s): If any addenda are issued, Bidder must provide signed, written receipt of each addendum on [Document 00 41 13 – Bid Form](#).
  7. Bids shall be deemed to include the written responses of the apparent low Bidder to any questions or requests for information of the City

- made as part of the Bid evaluation process after submission of the Bid.
8. The prime contractor (supplying bid) shall perform a minimum of 30% of the bid value of the work with their direct work forces.
    - b. Minority Employment / Local Resident / Local Business Guidelines (Voluntary Program): Attention is given to City Council Resolution 93-8022, included in Appendix "A". The City Council has adopted the voluntary guide- lines set forth to increase awareness and utilization of, and encourage employment opportunities for minorities, local residents, and local businesses, and suppliers, within the City of Pittsburg.
  13. REQUIREMENTS PRIOR TO BIDDING. Submission of Bid signifies careful examination of Contract Documents and complete understanding of the nature, extent, and location of Work to be performed. Bidder must complete the tasks listed in [Document 00 52 13 - Agreement Form](#), Article 5, as a condition to bidding, and submission of Bid shall constitute the Bidder's express representation to City that Bidder has fully completed these tasks.
  14. BID OPENING. On submission of bids, all bid envelopes will be time stamped to accurately reflect their submittal time. Bids will be opened in a designated place and time.
  15. BID EVALUATION. City reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive, unbalanced or conditional Bids, re-bid, and to reject the Bid of any Bidder 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 the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by City. City also reserves the right to waive informalities, inconsequential deviations or minor irregularities not involving price, time, or changes in the Work, to the fullest extent permitted by law. For purposes of this paragraph, an "unbalanced bid" is one having nominal prices for some work items and enhanced prices for other work items.
    - a. In evaluating Bids, City will consider the qualifications of Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
    - b. City may conduct such investigations as City deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed subcontractors, suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to City's satisfaction within the prescribed time. City shall have the right to communicate directly with Bidder's Surety regarding Bidder's bonds.
    - c. 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, or words and numerals, will be resolved in favor of the words.

16. **DETERMINATION OF APPARENT LOW BIDDER.** Basis of Bid; Evaluation of Bids: The criteria which will be used to determine the lowest responsive and responsible Bidder are as follows:
- a. Bidders shall submit a price for each item of Work listed in the Bid Schedule. Bids are to be submitted for the entire work, including Alternates, if any, listed on the Bid Schedule unless otherwise noted. The basis of the evaluation of bid will be the total amount of the base bid as indicated on the contract Bid Schedule. The City will determine which Alternates, if any, will be awarded for construction based upon predetermined priorities and budget. Alternate items are listed in the Bid Schedule in random order.
  - b. Additional criteria that will be used to determine the lowest responsive and responsible Bidder are as follows.
    1. The low bid will be the Bid submitted by a responsive bidder with the lowest total for the base bid item(s).
    2. Responsive Bidder: Means a Bidder who has submitted a Bid that conforms in all material respects to the Bidding Documents.
    3. Responsible Bidder: Means a Bidder who has the capacity and capability in all respects to perform fully the contract requirements and who has the integrity and reliability to assure good faith performance. Among factors to be considered in determining whether the Bidder meets these standards, are financial, material, equipment, facility, and personnel resources and expertise necessary to meet contractual requirements;
    4. Qualified legally to contract with the City, and;
    5. Has not failed to supply any necessary information in connection with the inquiry concerning responsibility.
17. **POST-BID OPENING REQUIREMENTS.** The Apparent Low Bidder must execute and submit the following documents after bids have been opened, duly inspected by the City. The Apparent Low Bidder's failure to properly and timely submit these documents entitles City to reject the bid as non-responsive.
- a. Submit the following documents to the Project Manager by 2:00 PM of the second (2nd) business day (every day except Saturday, Sunday and legal holidays) following bid opening. Award of the Contract depends upon approval of the following document:
    1. [Document 00 52 13 - Agreement Form](#): To be executed by successful Bidder. Submit three (3) copies, each bearing an original signature.
  - b. Upon receipt of the Notice of Award, the Apparent Low Bidder and each of its subcontractors who employs workers in any apprentice-able craft or trade shall apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade for a certificate approving the

- contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices, in accordance with Section 1777.5 of the California Labor Code.
- c. City shall have the right to directly contact the performance bond surety proposed by the Apparent Low Bidder to confirm the performance bond.
  - d. If the Apparent Low Bidder has not returned the Contract by the date listed in Paragraph 17.a above, the City may, at its option, determine that the Apparent Low Bidder has abandoned the Contract, and thereupon this Agreement and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Bid shall operate and the same shall be the property of the City.
18. **AWARD.** If the contract is to be awarded, it will be awarded to the Lowest, Responsive, Responsible Bidder. The Apparent Low Bidder must execute and submit the following documents after bids have been opened, duly inspected and awarded by the Agency. The Apparent Low Bidder's failure to properly and timely submit these documents entitles City to reject the bid as non-responsive.
- a. Submit the following documents to the Project Manager by 5:00 PM of the tenth (10th) calendar day following NOTICE OF AWARD. Award of contract depends upon approval of these documents:
    1. If required by the successful bidder, [Document 00 53 00 - Escrow Agreement for Security Deposits in Lieu of Retention](#), to be executed by successful Bidder: Submit three (3) copies, each bearing an original signature.
    2. [Document 00 61 13 - Construction Performance Bond](#): To be executed by successful Bidder and surety, in the amount set forth in [Document 00 72 00 - General Conditions](#), Paragraph 5.
    3. [Document 00 61 14 - Construction Labor and Material Payment Bond](#): To be executed by successful Bidder and surety, in the amount set forth in [Document 00 72 00 - General Conditions](#), Paragraph 5.
    4. Insurance Certificates and Endorsements required by [Document 00 72 00 - General Conditions](#), Paragraph 5.
    5. If the Apparent Low Bidder has not returned the Bonds and Insurance by the date listed in Paragraph 18.a above, the City may, at its option, determine that the Apparent Low Bidder has abandoned the Contract, and thereupon this Agreement and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Agreement shall operate and the same shall be the property of the City.
19. **BID PROTEST.** Any bid protest must be submitted in writing and received by the Project Manager, before 2:00 PM of the second (2nd) business day (every day except Saturday, Sunday and legal holidays) following bid opening.
- a. The initial protest document must contain a complete statement of the basis for the protest.

- b. The protest must refer to the specific portion of the document which forms the basis for the protest.
  - c. The protest must include the name, address, and telephone number of the person representing the protesting party.
  - d. 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 which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
  - e. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest. The 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.
  - f. Only the second and third lowest responsive responsible bidder is allowed to submit a protest.
20. **FAILURE TO ENTER INTO CONTRACT.** If Bidder to whom Contract is awarded shall for ten (10) calendar days after such award fail or neglect to enter into Contract and file required bonds or other documents, City may deposit surety bond, cashier's check or certified check for collection, and proceeds thereof may be retained by City as liquidated damages for failure of Bidder to enter into Contract, in the sole discretion of City. It is agreed that calculation of damages City may suffer as a result of Bidder's failure to enter into the Contract would be extremely difficult and impractical and that the amount of the Bidder's required bid security shall be the agreed and presumed amount of damages.
21. **DEFINITIONS.** All abbreviations and definition of terms used in these Instructions are set forth in Specifications [Section 01 42 00 - References](#).
22. **MODIFICATIONS AND WITHDRAWAL.** Bids may not be modified after submittal. Bidders may withdraw bids at any time before bid opening, provided that a request in writing, executed by the bidder or its duly-authorized representative, for the withdrawal of such bid, is filed with the City prior to the time fixed for the opening of bids. The withdrawal of a bid shall not prejudice the right of a bidder to file a new bid.
23. **DISQUALIFICATION OF BIDDERS.**
- a. More than one bid from an individual, firm or partnership, corporation or association, under the same or different names, will not be considered. Reasonable grounds for believing that a bidder is interested in more than one bid for the work contemplated will cause the rejection of all bids in which said bidder is interested.
  - b. A bid may be rejected on the basis of a bidder, any officer, or any such employee of such bidder having been disqualified, removed, or otherwise

- prevented from bidding on, or completing a federal, state, or local project because of a violation of law or a safety regulation.
- c. Bids in which prices obviously are unbalanced may be rejected.
24. **QUALIFICATION OF BIDDERS.** Prior to award of the contract, the City shall have the right to require any bidder to submit evidence of their capacity to perform the work on the basis of past experience on similar projects of equal magnitude, to render a statement of financial status, and to submit proof of insurability. Before entering into a contract, the bidder shall satisfy the City that they possess adequate equipment and have the necessary experience and forces to perform the work in the manner set forth in the contract documents. The bidder shall be a licensed contractor in the State of California. The prime contractor and each subcontractor shall be required to obtain a City business license before the contract for the work is approved by the City.

**END OF DOCUMENT 00 21 13**

**DOCUMENT 00 31 33 – GEOTECHNICAL DATA AND EXISTING CONDITIONS**

This document sets forth the terms and conditions under which Contractor may review, study, use or rely upon geotechnical data at or near the Site, and existing conditions information concerning existing conditions at or near the Site.

**1. REPORTS AND INFORMATION**

- A. Documents providing a general description of the Site and conditions of the Work may have been collected by City, its consultants, and prior contractors. These documents may consist of geotechnical reports for and around the Site, from previous projects including as-built drawings, utility drawings, and information regarding Underground Facilities, unless otherwise specified. These reports, documents and other information are not part of the Contract Documents.
- B. If available, copies of the geotechnical reports and information regarding existing conditions are available for review at the Community Development Department - Engineering Division on the first floor of the Civic Center Building at 65 Civic Avenue, Pittsburg. Copies may be made available at a fee to be determined. These reports, documents, and other information, are not part of the Contract Documents.
- C. Reports that may be included in the project manual and any information regarding existing conditions that may also be included in the project manual shall not be considered part of the Contract Documents.
- D. Above-Ground Existing Conditions.  
Under no circumstances shall the City be deemed to make a warranty or representation of existing above-ground conditions, as-built conditions, or other above-ground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation which Bidder must perform prior to bidding and Bidder must not rely on the information supplied by City regarding existing conditions. Bidder represents and agrees that in submitting its bid, it is not relying on any information regarding existing conditions supplied by City.

- E. **Underground Facilities.** 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 or builders of such Underground Facilities or others). The City does not assume responsibility for the completeness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information. Except as expressly set forth in this Document, City will be responsible only for the general accuracy of information regarding Underground Facilities, and only for those Underground Facilities that are owned by City. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

## 2. LIMITED RELIANCE PERMITTED ON CERTAIN INFORMATION

- A. **Geotechnical Data.** Except as expressly set forth in this Document, City does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. 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.
- B. Bidder may rely upon the general accuracy of the "technical data" contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent. The term "technical data" in the referenced reports and drawings shall be limited as follows:
1. 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 exploration.
  2. 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.
  3. The term "technical data" shall not include the location of Underground Facilities.
  4. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the "technical data" contained in such reports or drawings.



5. 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.

3. INVESTIGATIONS

- A. Before submitting a Bid, each Bidder will be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) 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. Time is included in the period prior to bidding for Bidder to perform these investigations.

4. ACCESS TO SITE

- A. On written request to the City's Project Manager, wherever possible, City will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests and studies as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests and studies. Such investigations may be performed only under the provisions of [Document 00 72 00 - General Conditions](#) including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such work.

**END OF DOCUMENT 00 31 33**

**DOCUMENT 00 41 13 – BID FORM**

To be submitted up to and including 2:00 p.m. and August 7, 2023.

CITY OF PITTSBURG  
65 Civic Avenue  
Pittsburg, California 94565

The Work consists, in general, of all necessary construction activities to build Insert brief project description paragraph.

Attention: City Clerk

Re: Pittsburg Water Treatment Plant Genius Bus Replacement Project  
Project 5009  
300 Olympia Dr.  
Pittsburg, California 94565

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the City of Pittsburg ("City") in the form included in the Contract Documents, [Document 00 52 13 – Agreement Form](#), 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.

Bidder accepts all of the terms and conditions of the Contract Documents and the Invitation to Bid and Instructions to Bidders, including without limitation, those dealing with the disposition of Bid Security. This Bid will remain open and subject to acceptance for sixty (60) calendar days after the day of Bid Opening. Bidder will sign and submit the Agreement with Bonds and other documents required by [Document 00 21 13 - Instructions to Bidders](#), within ten (10) calendar days after receipt of City's Notice of Award.

In submitting this Bid, Bidder represents:

1. Bidder has examined all of the Contract Documents, including all Addenda, if any.

Receipt of all Addenda is hereby acknowledged. \_\_\_\_\_(Fill in total number of addenda issued and received).

2. Bidder has visited the site and performed all tasks, research, investigation, reviews, examinations, analysis, and given notices, regarding the Project and the Site.

3. 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 sum of money listed in the following Bid Schedule:

**SCHEDULE OF BID PRICES**

All bid items; including lump sums, unit prices, and deductive alternates must be filled in completely in numerals.

<b>BID ITEM NO.</b>	<b>ITEM DESCRIPTION</b>	<b>EST. QTY.</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>EXTENDED TOTAL AMOUNT</b>
1	Submittals & Coordination	1	LS	\$	\$
2	Fiber Optic Cabling	1000	LF	\$	\$
3	Ethernet Cabling	2000	LF	\$	\$
4	Panel Enclosures/Components	1	LS	\$	\$
5	Control Panel Sub-Assembly	1	LS	\$	\$
6	On Site Panel Modifications	1	LS	\$	\$
7	Spare Parts	1	LS	\$	\$
8	Fiber Optic Terminations	32	EA	\$	\$
9	Conduit Repair	500	LF	\$	\$
10	Ethernet Cable Terminations	20	EA	\$	\$

Bidder Name:

---

The Bidder further represents that:

2. Subcontractors and their sub-bids for work included in all bid items and additive or deductive alternates are listed on the attached [Document 00 43 36 – Subcontractors List](#).
2. The City reserves the right to reject this Bid, but that this Bid shall remain open and shall not be withdrawn for a period specified in Paragraph 2 above.
3. If written notice of the acceptance of this Bid, hereinafter referred to as Notice of Award, is mailed or delivered to the Undersigned within the period specified in paragraph 2 above, or at any other time thereafter before it is withdrawn, the undersigned will execute and deliver the documents required by [Document 00 21 13 - Instructions to Bidders](#) including, but not limited to, [Document 00 52 13 – Agreement Form](#), [Document 00 53 00 - Escrow Agreement for Security Deposits in Lieu of Retention](#), [Document 00 61 13 - Construction Performance Bond](#), and [Document 00 61 14 - Construction Labor and Material Payment Bond](#), all within ten (10) calendar days after personal delivery or after receipt in the mails of the Notice of Award.
4. Notice of Award or request for additional information may be addressed to the undersigned at the address set forth below.
5. The undersigned herewith encloses a cashier's check, certified check, or corporate surety bond in the amount of ten percent (10%) of the combined total of Base Bid Items Numbers and made payable to: City of Pittsburg.
6. The undersigned agrees to commence work under this Contract on the date established in [Document 00 72 00 - General Conditions](#) and to complete all work within the time specified in [Document 00 52 13 – Agreement Form](#).
7. The undersigned agrees that, in accordance with [Document 00 72 00 -General Conditions](#), liquidated damages for failure to complete all work in the contract within the time specified shall be as set forth in [Document 00 52 13 – Agreement Form](#).

The names of all persons interested in the foregoing Bid as principals are as follows:

**IMPORTANT NOTICE:**

If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, the names of president and secretary thereof, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation.

If Bidder or other interested person is a partnership, give the name of the firm and names of all individual co-partners composing the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

If Bidder or other interested person is an individual, give first and last names in full.

Name of Corporation, Partnership, or Individual:

State of Incorporation:

Names of Officers, Partners, or Individual:

Business Address:

Communication Numbers: Land Line Phone

Mobile Phone

Fax

Email

Name of Bidder:

Signature of Bidder:

Contractor License Number:

Public Works Contractor Registration Number:

**END OF DOCUMENT 00 41 13**

**DOCUMENT 00 43 13 – BOND ACCOMPANYING BID**

KNOW ALL BY THESE PRESENTS:

That the undersigned \_\_\_\_\_ herein after referred as PRINCIPAL and the undersigned as Surety are held and firmly bound unto the City of Pittsburg ("City"), a public entity, as obligee, in the penal sum of \_\_\_\_\_ (\$\_\_\_\_\_) lawful money of the United States of America, 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, the said PRINCIPAL is submitting a bid for the Pittsburg Water Treatment Plant Genius Bus Replacement Project 5009.

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 a period of ten (10) calendar days after such award enter into the contract so awarded and provide the required Performance Bond and provide the required Labor and Material Payment Bond, and timely provide all other endorsements, forms and documents required under [Document 00 21 13 - Instructions to Bidders](#), then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument

this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

(Corporate Seal)

By

\_\_\_\_\_

\_\_\_\_\_

PRINCIPAL

\_\_\_\_\_

Surety

\_\_\_\_\_

Attorney in Fact

**END OF DOCUMENT 00 43 13**

**DOCUMENT 00 43 36 – SUBCONTRACTORS LIST**

Bidder submits the following information as to the subcontractors Bidder intends to employ if awarded the contract. Attention is directed to the requirements of Section 4104 California Public Contract Code and [Document 00 21 13 - Instructions to Bidders](#).

**All fields with (\*) are required to be filled out for each subcontractor that will be performing 0.5% of the prime contractor’s total bid or \$10,000 whichever is greater.**

Contractor will not be permitted to change this listing without prior written approval of the City Engineer. If the Bidder fails to stipulate a subcontractor for any portion of the work under this contract, it shall be understood that the Contractor will perform such work without subcontracting the same, and they will not be permitted to subcontract said work without prior written approval of the City Engineer.

(Bidder to attach additional sheets if necessary)

Name and Address of Subcontractor*	Portion of Work*	Prices Under Subcontract or Percentage*	CA Contractor's License
			Class


**END OF DOCUMENT 00 43 36**



**DOCUMENT 00 45 00 – REPRESENTATIONS AND CERTIFICATIONS**

TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

**CERTIFICATE OF NON-DISCRIMINATION**

On behalf of the bidder making this Bid, the undersigned certifies that there will be no discrimination in employment with regard to race, color, religion, sex, sexual orientation, 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 principle of equal opportunity in employment will be demonstrated positively and aggressively.

Signature of Bidder \_\_\_\_\_

**STATEMENT OF CONVICTIONS**

"I hereby swear, under penalty of perjury, that no more than one final, un-appealable finding of contempt of court by a Federal Court has been issued against me within the past two years because of failure to comply with an order of a Federal Court to comply with an order of the National Labor Relations Board."

Signature of Bidder \_\_\_\_\_

**PREVIOUS DISQUALIFICATIONS**

"I hereby swear, under penalty of perjury, that the below indicated bidder, any officer of such bidder, or any employee of such 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 a safety regulation except as indicated on the separate sheet attached hereto entitled "Previous Disqualifications." If such exceptions are attached, please explain the circumstances.

Signature of Bidder \_\_\_\_\_

**CERTIFICATION OF WORKER’S COMPENSATION INSURANCE**

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

Signature of Bidder \_\_\_\_\_

CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

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

General Prevailing Wage Rates Statement

The State of California General Prevailing Wage Rates are hereby incorporated into these Contract Specifications by this reference.

If awarded the Contract, I/we will not pay less than the latest General Prevailing Wage Rates of the State of California (including any and all amendments thereto) to each employee working in connection with this Contract.

In addition, I/we will not pay less than the minimum Federal Wage Rates. I/we will verify wage rates within 10-days of the bid date at the website [www.gpo.gov/davisbacon](http://www.gpo.gov/davisbacon).

Contractor Registration with Department of Industrial Relations

I am aware that I, and each subcontractor listed in a bid proposal pursuant to Public Contract Code Section 4104, must be currently registered and qualified to perform public work pursuant to Section 1725.5 of the California Labor Code, except in limited circumstances as referenced in Labor Code Section 1771.1(a). This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Signature of Bidder \_\_\_\_\_

The information below applies to the above five sections.

Company Name \_\_\_\_\_

Name of Bidder \_\_\_\_\_

Title \_\_\_\_\_

Dated \_\_\_\_\_

**END OF DOCUMENT 00 45 00**

**DOCUMENT 00 45 19 – NONCOLLUSION DECLARATION**

**NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID**

The undersigned declares:

I am the \_\_\_\_\_ of \_\_\_\_\_, the party making the foregoing bid.

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

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

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

(Amended by Stats. 2011, Ch. 432, Sec. 37. Effective January 1, 2012.)

**END OF DOCUMENT 00 45 19**

**SECTION 00 52 13 – AGREEMENT FORM**

THIS AGREEMENT, made and entered into this \_\_\_\_ day of \_\_\_\_\_, YEAR by and between the **City of Pittsburg**, hereinafter referred to as "City" and \_\_\_\_\_ hereinafter referred to as "Contractor".

WITNESSETH:

**ARTICLE 1** - For and in consideration of the payment and agreements hereinafter mentioned, to be made and performed by said City and under the conditions expressed in the Faithful Performance and Labor & Materials Bond(s), bearing even date with these present, and hereunto annexed, Contractor agrees with City, at his/her own cost and expense, to do all the work and furnish all the materials, except such as are mentioned in the Specifications to be furnished by City, necessary to construct and complete in a good, workmanlike and substantial manner the work described in accordance with the Contract Plans and Specifications for **Contract No. [ ]**, **[NAME OF PROJECT]**, which said plans and specifications are hereby specifically referred to, and by such reference made a part hereof.

**ARTICLE 2** – City hereby employs Contractor to provide the materials and to do the work according to the terms and conditions herein contained and referred to, for the contract price stated herein, and hereby promises to pay the same at the time, in the manner and upon the conditions set forth herein; and said parties for themselves, their heirs, executors, and administrators.

**ARTICLE 3** – Contractor agrees to receive and accept the contract price of \_\_\_\_\_ (Amount in words) \_\_\_\_\_ (\$ \_\_\_\_\_) as full compensation for furnishing all materials and for doing all the work contemplated and embraced in this Contract; also for any loss or damage arising out of the nature of the work aforesaid, or from any action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work, until it is accepted by the City of Pittsburg and for all expenses incurred by or in consequence of the suspension or discontinuance of work; and for well and faithfully completing the work, and the whole thereof in the manner and according to the Contract Plans and Specifications, and the requirements of the City Engineer.

**ARTICLE 4** - By my signature hereunder, as Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires 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.

**ARTICLE 5** - It is further expressly agreed by and between the parties hereto that the Notice to Contractors, Contract Proposal, Faithful Performance and Labor & Materials Bonds,

Contract Plans, Contract Specifications and Standard Specifications and Standard Details are all essential parts of this Contract and are specifically referred to, and by such reference, made a part hereof.

The Plans and Specifications and other contract documents will govern the work. The contract documents are intended to be complementary and cooperative and to describe and provide for a complete project. Anything in the Specifications and not on the Plans, or vice versa, shall be as though shown and mentioned in both.

**ARTICLE 6** - By my-signature hereunder, as contractor, I agree to correct and repair all construction work for a minimum of one (1) year from the date of acceptance by the City of Pittsburg against all defects. I also agree to furnish the City with a bond in the amount of ten (10) percent of the final contract price to remain valid for the duration of the correction and repair period. This correction and repair period shall not limit Contractor responsibility for any defects that may occur after the warranty period.

**ARTICLE 7** - The work described in this Contract shall begin within ten (10) working days from the date the Notice to Proceed is received by Contractor, as determined by certified mail return receipt, and shall be diligently prosecuted to completion within the number of days stated in the Special Provisions. If the work items are not completed by the date specified, including any extension of time for excusable delays, as provided herein, the Engineer shall deduct from the Contract price [ \_\_\_\_\_ ] dollars and no cents (\$ \_\_\_\_\_) for each working day of delay beyond the date of completion until the work is completed, as authorized per Government Code Section 53069.85.

**ARTICLE 8** - The State general prevailing wage rates determined by the Director of Industrial Relations are hereby made a part of this contract. It is further expressly agreed by and between the parties hereto that should there be any conflict between the terms of this instrument and the bid or proposal of said Contractor, then this instrument shall control and nothing herein shall be considered as an acceptance of the said terms of said proposal conflicting herewith. In addition, the minimum Federal Wage Rates shall be incorporated into this contract. A copy of the Federal Wage Rates is attached to this contract as Exhibit "B".

**ARTICLE 9** - Contractor, and any subcontractors, must be currently registered with the Department of Industrial Relations and qualified to perform public work consistent with Labor Code section 1725.5, except in limited circumstances as referenced in Labor Code section 1771.1(a).

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

**ARTICLE 10** - Procedures for the Contractor to make claims for: (1) an extension of time, including relief from damages or penalties for delay; (2) payment by the City of money or damages arising from work done by, or on behalf of, the Contractor, where the underlying

contract does not expressly provide for payment or payment to which the Contractor is not otherwise entitled; or (3) the payment of an amount disputed by the City are set forth in Section 7-2.01 of the Special Provisions.

IN WITNESS WHEREOF, the City and the Contractor have caused the names of said parties to be affixed hereto, the day and year first above written.

CITY OF PITTSBURG:

CONTRACTOR:

\_\_\_\_\_  
GARRETT EVANS  
CITY MANAGER

\_\_\_\_\_  
BY:

ATTEST:

\_\_\_\_\_  
ATTEST:

\_\_\_\_\_  
ALICE E. EVENSON  
CITY CLERK

\_\_\_\_\_  
BY:

**END OF SECTION 00 52 13**

**SECTION 00 52 14 – AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS**

This Agreement and Release of Claims ("Agreement and Release"), made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the City of Pittsburg ("City"), and \_\_\_\_\_ ("Contractor"), whose place of business is at \_\_\_\_\_.

RECITALS

1. City and Contractor entered into Contract No. \_\_\_\_\_ in the City of Pittsburg, County of Contra Costa, State of California.
2. The Work under Contract No. \_\_\_\_\_ has been completed.

Now, therefore, it is mutually agreed between City and Contractor as follows:

AGREEMENT

3. 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     \$ \_\_\_\_\_

4. Subject to the provisions of this Agreement and Release, City shall forthwith pay to Contractor the sum of \$ \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents under Contract No. \_\_\_\_\_, less any amounts withheld under the Contract or represented by any "Stop Notice" on file with City as of the date of such payment.

5. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against City arising from the performance of work under Contract No. \_\_\_\_\_. 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 , City of Pittsburg, and all their respective directors, agents, officers, volunteers, consultants (including, but not limited to, Project Construction Manager and Architect/Engineer), employees, inspectors, assignees and transferees except for the Disputed Claims set forth in Paragraph 6, and continuing obligations described

in Paragraph 8, below.

6. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

<u>Claim No.</u>	<u>Date Submitted</u>	<u>Description of Claim</u>	<u>Amount of Claim</u>
------------------	-----------------------	-----------------------------	------------------------

7. Consistent with California Public Contract Code, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 4, above, Contractor hereby releases and forever discharges City, all its respective directors, agents, officers, volunteers, employees, 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.

8. 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.

9. Contractor shall immediately defend, indemnify and hold harmless City of Pittsburg, and all its respective directors, agents, officers, volunteers, consultants, employees, 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 Contract No. \_\_\_\_\_, except for the Disputed Claims set forth in Paragraph 6, above.

10. Contractor hereby waives the provisions of California Civil Code, Section 1542, which provides as follows:

A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him, must have materially affected his settlement with the debtor.

11. 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, city, municipal or other law, ruling or regulations, 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.

- 12. All rights of City shall survive completion of the Work or termination of Contract, and execution of this Release.

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

CITY OF PITTSBURG

CONTRACTOR

BY: \_\_\_\_\_ BY: \_\_\_\_\_

Date: \_\_\_\_\_ Date: \_\_\_\_\_

**END OF SECTION 00 52 14**

**DOCUMENT 00 53 00 – ESCROW AGREEMENT FOR SECURITY  
DEPOSITS IN LIEU OF RETENTION**

P.C.C. ' 22300

This Escrow Agreement ("Escrow Agreement") is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by and between the City of Pittsburg ("City"), whose address is 65 Civic Avenue, Pittsburg, CA 94565; \_\_\_\_\_ Contractor"), whose place of business is located at \_\_\_\_\_ and, \_\_\_\_\_ state or federally chartered bank in the State of California, whose place of business is located at \_\_\_\_\_ ("Escrow Agent"). The intent of this Escrow Agreement is to comply with P.C.C. ' 22300 that is incorporated herein by this reference.

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

1. Pursuant to Section 22300 of Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by City pursuant to the Construction Contract No. \_\_\_\_\_ entered into between City and Contractor for the \_\_\_\_\_ project in the amount of \_\_\_\_\_ dated \_\_\_\_\_ (the "Contract"). Alternatively, on written request of Contractor, City 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 City within ten (10) calendar 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 City and Contractor. Securities shall be held in name of \_\_\_\_\_, and shall designate Contractor as the beneficial owner.
2. City 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 above.
3. When City makes payment of retention earned directly to Escrow Agent, Escrow Agent shall hold them 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 City 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 City. Such expenses and payment terms shall be determined by City, 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 City.
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 City to Escrow Agent that City consents to withdrawal of amount sought to be withdrawn by Contractor.

ESCROW AGREEMENT FOR SECURITY  
DEPOSITS IN LIEU OF RETENTION  
Genius Bus Replacement Project

00 53 00 - 1

- 7. City shall have the right to draw upon the securities in event of default by Contractor. Upon seven (7) days written notice to Escrow Agent from City of the default, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by City.
- 8. Upon receipt of written notification from City certifying that the Contract is final and 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 monies and securities on deposit and payments of fees and charges.
- 9. Escrow Agent shall rely on written notifications from City and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Escrow Agreement and City and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth above.
- 10. Names of persons who are authorized to give written notice or to receive written notice on behalf of City and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

**On behalf of City of Pittsburg:**

**On behalf of Contractor:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

**On behalf of Escrow Agent:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

At the time the Escrow Account is opened, City and Contractor shall deliver to Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

**On behalf of City of Pittsburg:**

**On behalf of Contractor:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_

**On behalf of Escrow Agent:**

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

**END OF DOCUMENT 00 53 00**

**DOCUMENT 00 61 13 – CONSTRUCTION PERFORMANCE BOND**

This Construction Performance Bond ("Bond") is dated \_\_\_\_\_, 2023, is in the penal sum of \$ \_\_\_\_\_, and is entered into by and between the parties listed below to ensure the faithful performance of the Construction Contract listed below. This Bond consists of this page and the Bond Terms and Conditions, Paragraphs 1 through 12, attached to this page. Any singular reference to ("Contractor"), ("Surety"), the City of Pittsburg ("City") or other party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

\_\_\_\_\_  
Name

\_\_\_\_\_  
Name

Address

Principal Place of Business

CITY OF PITTSBURG

CONSTRUCTION CONTRACT

Address

Pittsburg Water Treatment Plant  
Genius Bus Replacement Project  
Contract 5009  
300 Olympia Dr.  
Pittsburg, CA 94565

Attn: \_\_\_\_\_

Dated \_\_\_\_\_, 2023 in the  
amount of \$ \_\_\_\_\_.

CONTRACTOR AS PRINCIPAL

SURETY

Company: (Corp. Seal)

Company: (Corp. Seal)

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

\_\_\_\_\_  
Name and Title:

\_\_\_\_\_  
Name and Title:

## BOND TERMS AND CONDITIONS

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to City for the complete and proper performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor completely and properly performs all of its obligations under the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no City Default, the Surety's obligation under this Bond shall arise after:
  - 3.1 City has declared a Contractor Default under the Construction Contract pursuant to the terms of the Construction Contract; and
  - 3.2 City has agreed to pay the Balance of the Contract Sum to:
    - 3.2.1 The Surety in accordance with the terms of this Bond and the obligations of the City under the Construction Contract with the Contractor;
    - 3.2.2 To a contractor selected to perform the Construction Contract in accordance with the terms of this Bond and the obligations of the City under the Construction Contract with the Contractor.
    - 3.2.3 The City's monetary obligations under this bond are limited by the amount of the Construction Contract.
4. When City has satisfied the conditions of Paragraph 3, the Surety shall promptly (within thirty (30) calendar days) and at the Surety's expense elect to take one of the following actions:
  - 4.1 Arrange for the Contractor, with consent of City, to perform and complete the Construction Contract (but City 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
  - 4.3 Obtain bids from qualified contractors acceptable to City for a contract for performance and completion of the Construction Contract, and, upon determination by City of the lowest responsible bidder, arrange for a contract to be prepared for execution by City and the contractor selected with City'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 the Surety's

obligations defined in Paragraph 6, below, exceed the Balance of the Contract Sum, then the Surety shall pay to City the amount of such excess; or

- 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances, and, after investigation and consultation with City, determine in good faith the amount for which it may then be liable to City 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 therefore to City with full explanation of the payment's calculation. If City accepts the Surety's tender under this paragraph 4.4, City may still hold Surety liable for future damages then unknown or un-liquidated resulting from the Contractor Default. If City disputes the amount of Surety's tender under this paragraph 4.4, City may exercise all remedies available to it at law to enforce the Surety's liability under Paragraph 6, below.
5. If the Surety does not proceed as provided in Paragraph 4 above, then the Surety shall be deemed to be in default on this Bond ten (10) calendar days after receipt of an additional written notice from City to the Surety demanding that the Surety perform its obligations under this Bond. At all times City shall be entitled to enforce any remedy available to City at law or under the Construction Contract including, without limitation, and by way of example only, rights to perform work, protect work, mitigate damages, or coordinate work with other consultants or contractors.
6. The Surety's monetary obligation under this Bond for completion of the Construction Contract is limited by the amount of this Bond. Subject to these limits, the Surety's obligations under this Bond are commensurate with the obligations of the Contractor under the Construction Contract. The Surety's obligations shall include, but are not limited to:
  - 6.1 The responsibilities of the Contractor under the Construction Contract for completion of the Construction Contract and correction of defective work;
  - 6.2 The responsibilities of the Contractor under the Construction Contract to pay liquidated damages, and for damages for which no liquidated damages are specified in the Construction Contract, actual damages caused by non-performance of the Construction Contract, including but not limited to, all valid and proper back charges, offsets, payments, indemnities, or other damages;
  - 6.3 Additional legal, design professional and delay costs resulting from the Contractor Default or resulting from the actions or failure to act of the Surety under Paragraph 4, above.
7. No right of action shall accrue on this Bond to any person or entity other than City or its heirs, executors, administrators, assigns, or successors.

8. The Surety hereby waives notice of any change, alteration or addition to the Construction Contract or to related subcontracts, purchase orders and other obligations, including changes of time. The 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 required there-under, shall release or exonerate Surety on this Bond or in any way affect the obligations of Surety on this Bond.
9. Any proceeding, legal or equitable, under this Bond shall be instituted in any court of competent jurisdiction where a proceeding is pending between City and the Contractor regarding the Construction Contract, or in the courts of the County of Contra Costa, or in a court of competent jurisdiction in the location in which the work is located.
10. Notice to the Surety, City or the Contractor shall be mailed or delivered to the address shown on the signature page.
11. Any provision in this Bond conflicting with any statutory or regulatory requirement shall be deemed deleted here-from and provisions conforming to such statutory requirement shall be deemed incorporated herein.
12. Definitions.
  - 12.1 Balance of the Contract Sum: The total amount payable by City to the 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.
  - 12.2 Construction Contract: The agreement between City and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
  - 12.3 Contractor Default: Material failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract, including but not limited to, the provisions of [Document 00 72 00 - General Conditions](#).
  - 12.4 City Default: Material failure of City, which has neither been remedied nor waived, to pay the 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.

**END OF SECTION 00 61 13**



**DOCUMENT 00 61 14 – CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND**

This Construction Labor and Material Payment Bond ("Bond") is dated \_\_\_\_\_ 2023, is in the penal sum of \$ \_\_\_\_\_, and is entered into by and between the parties listed below to ensure the payment of claimants under the Construction Contract listed below. This Bond consists of this page and the Bond Terms and Conditions, Paragraphs 1 through 13, attached to this page. Any singular reference to \_\_\_\_\_ ("Contractor"), \_\_\_\_\_ ("Surety"), City of Pittsburg ("City") or other party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

Name

Name

Address

Principal Place of Business

CITY OF PITTSBURG

CONSTRUCTION CONTRACT

Address

Pittsburg Water Treatment Plant  
Genius Bus Replacement Project  
Contract 5009  
300 Olympia Dr.  
Pittsburg, CA 94565

Dated \_\_\_\_\_, 2023 in the

Attn: \_\_\_\_\_

amount of \$ \_\_\_\_\_.

CONTRACTOR AS PRINCIPAL

SURETY

Company: (Corp. Seal)

Company: (Corp. Seal)

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

\_\_\_\_\_  
Name and Title:

\_\_\_\_\_  
Name and Title:

## BOND TERMS AND CONDITIONS

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to City and to Claimants, to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to City, this obligation shall be null and void if the Contractor:
  - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - 2.2 Defends, indemnifies and holds harmless City from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Construction Contract, provided City has promptly notified the Contractor and the Surety (at the address described in Paragraph 10) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no City Default.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly through its subcontractors, for all sums due Claimants. However, if Contractor or its subcontractors fail to pay any of the persons named in Section 9100 of the California Civil Code, or amounts due under the 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 Employment Development Department from the wages of employees of Contractor or subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, then Surety will pay for the same, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court.
4. Consistent with the California Mechanic's Lien Law, Civil Code, Section 8200 - 8216-et seq., the Surety shall have no obligation to Claimants under this Bond unless the Claimant has satisfied all applicable notice requirements.
5. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety under this Bond.
6. Amounts due the Contractor under the Construction Contract shall be applied first to satisfy claims, if any, under any Construction Performance Bond and second, to satisfy obligations of the Contractor and the Surety under this Bond.

7. City shall not be liable for payment of any costs, expenses, or attorney's fees of any Claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
9. Suit against Surety on this Payment Bond may be brought by any Claimant, or its assigns, at any time after the Claimant has furnished the last of the labor or materials, or both, but, per Civil Code, Section 9558, must be commenced before the expiration of six months after the period in which stop notices may be filed as provided in Civil Code, Section 9356.
10. Notice to the Surety, City or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, City or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
11. This Bond has been furnished to comply with the California Mechanic's Lien Law, including, but not limited to, Civil Code, Sections 9550, et seq. Any provision in this Bond conflicting with said statutory requirements shall be deemed deleted here-from and provisions conforming to such statutory or other legal requirements shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
12. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
13. **DEFINITIONS**
  - 13.1 **Claimant:** An individual or entity having a direct contract with this Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract, as further defined in California Civil Code, Section 9100. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a stop notice might be asserted.

- 13.2 Construction Contract: The agreement between City and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 13.3 City Default: Material failure of City, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract, provided that failure is the cause of the failure of Contractor to pay the Claimants and is sufficient to justify termination of the Construction Contract.

**END OF SECTION 00 61 14**

SAMPLE

**DOCUMENT 00 72 00 – GENERAL CONDITIONS**

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GENERAL CONDITIONS

1. GENERAL

A. DOCUMENTS

- 1. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between Architect/Engineer or Construction Manager and Contractor, (2) between City, or its representatives and a Subcontractor or Sub-sub-contractor, or (3) between any persons or entities other than City and Contractor. Contractor is fully responsible for all acts and omissions of its Subcontractors, suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions.

**B. EXERCISE OF CONTRACT RESPONSIBILITIES**

1. City, and Project Manager, as City's representative, do not, in exercising their responsibilities and authorities under the Contract Documents, assume any duties or responsibilities to any subcontractor or supplier, nor do City or Project Manager assume any duty of care to Contractor, its subcontractors, or suppliers. Architect/Engineer and Construction Manager, in exercising their responsibilities and authorities under the Contract Documents, do not assume any duties or responsibilities to any subcontractor or supplier, nor does Architect/Engineer or Construction Manager assume any duty of care to Contractor, its Subcontractors, or suppliers, except as expressly set forth in the Contract Documents. However, Architect/Engineer and Construction Manager shall be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of Architect/Engineer's and Construction Manager's duties.

**2. BIDDING****A. BID SUBMISSIONS**

1. Contractors shall follow the instructions in [Document 00 21 13 - Instructions to Bidders](#), and shall submit all documents, forms and information required for consideration of a bid. City will evaluate qualification information submitted by apparent low Bidder (including but not limited to [Document 00 45 00 – Representations and Certifications](#)) and, if incomplete or unsatisfactory to City, Bidder's bid may be rejected, in the sole discretion of City.

**B. INVESTIGATION PRIOR TO BIDDING**

1. Bidders must, prior to bidding, perform the work, investigations, research and analysis required by [Document 00 52 13 – Agreement Form](#). Contractor under this Contract is charged with all information and knowledge that a reasonable bidder would ascertain from having performed this required work, investigation, research and analysis. Bid prices must include entire cost of all work "incidental" to completion of the Work, as that term is defined in this Document.
2. Conditions Shown on the Contract Documents: Information as to underground conditions, as-built conditions, or other conditions or obstructions, indicated in the Contract Documents, e.g., on Drawings or in Special Provisions or Specifications, has been obtained with reasonable care, and has been recorded in good faith. However, City only warrants, and Contractor may only rely, on the accuracy of limited types of information.
  - a. As to above-ground conditions or as-built conditions shown or indicated in the Contract Documents, there is no warranty, express or implied, or any representation express or implied,



that such information is correctly shown or indicated or complete. This information is verifiable by independent investigation and Contractor is required to make such verification as a condition to bidding. In submitting its Bid, Contractor shall rely on the results of its own independent investigation. In submitting its Bid, Contractor shall not rely on City-supplied information regarding above ground conditions or as-built conditions.

- b. As to any subsurface condition shown or indicated in the Contract Documents, 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. City is not responsible for the completeness of such information for bidding or construction; nor is City responsible in any way for any conclusions or opinions of Contractor drawn from such information; nor is the City responsible for 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).
- c. Conditions Shown in Reports and Drawings Supplied for Informational Purposes: Reference is made to [Document 00 31 33 - Geotechnical Data and Existing Conditions](#) for identification of geotechnical reports, "as built" information, and other drawings or other documents describing physical conditions in or relating to existing surface or subsurface conditions or structures at or contiguous to the Site.
- d. These reports and drawings are not Contract Documents and, except for any "technical data" regarding subsurface conditions specifically identified in [Document 00 31 33 -Geotechnical Data and Existing Conditions](#), and "Underground Facilities" data (as limited in Document 00 31 33), Contractor may not in any manner rely on the information in these reports and drawings. Subject to the foregoing, Contractor must make its own independent investigation of all conditions affecting the Work and must not rely on information provided by City. City reserves the right not to use [Document 00 31 33](#) if such information is not available.

### 3. SUBCONTRACTORS

- A. In accordance with Public Contract Code, Section 4101 et seq., Contractor shall not substitute any other person or firm as a subcontractor in place of any of those listed in bid, nor shall any subcontractor assign or transfer subcontract, or permit the same to be performed by any other contractor without written approval of City. At City's request, Contractor shall provide

City with a complete copy of all executed subcontracts or other final contractual agreements with subcontractors and/or suppliers.

#### 4. CONTRACT AWARD AND COMMENCEMENT OF THE WORK

##### A. AWARD OF CONTRACT

1. The Contractor will return to the City an executed Agreement by 2:00 PM on the second (2nd) business day (every day except Saturday, Sunday, and legal holidays) following the bid opening. The City will make the award of contract by issuing a Notice of Award.
2. Contractor will be allowed ten (10) calendar days after receipt of the Notice of Award to deliver to City the bonds and insurance prescribed by this Agreement. (See Paragraphs on surety bonds and certificates of insurance.) City will return to the Contractor a fully executed Contract within ten (10) calendar days of its receipt from Contractor.

##### B. COMMENCEMENT OF WORK

1. Times will commence to run on the thirtieth (30th) calendar day after the issuance of the Notice of Award, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. City may give a Notice to Proceed at any time within thirty (30) calendar days after the Notice of Award. See also Paragraph 15 hereof. Contractor shall start to perform the Work on the date when the Contract Times commence to run, but no work shall be done at the site prior to the date on which the Contract Times commence to run.

#### 5. BONDS AND INSURANCE

##### A. BONDS

1. At or before 5 o'clock p.m. of the tenth (10th) calendar day following Notice of Award of Contract, Contractor must file with City the following bonds:
  - a. Corporate surety bond, in the form of [Document 00 61 13 - Construction Performance Bond](#), in a sum not less than 100 percent of amount of Contract, to guarantee faithful performance of Contract ("Construction Performance Bond"); and
  - b. Corporate surety bond, in the form of [Document 00 61 14 - Construction Labor and Material Payment Bond](#), in a sum not less than 100 percent of amount of Contract, to guarantee payment of wages for services engaged and of bills contracted for materials, supplies, and equipment used in performance of Contract ("Construction Labor and Material Payment Bond").
2. Corporate sureties on these bonds and on bonds accompanying Bids must be legally authorized to engage in business of furnishing surety bonds in State of California. Sureties must be satisfactory to City.

3. Amount of Contract, as used to determine amounts of bonds, shall be total amount fixed in Contractor's Bid for performance of required Work (or corrected total if errors are found.)

B. INSURANCE

1. By 5:00 PM of the tenth (10th) calendar day following Notice of Award of Contract, Contractor shall furnish to City satisfactory proof that Contractor has taken out for the entire period covered by proposed contract the following insurance with an insurance carrier satisfactory to City:
  - a. Comprehensive general liability insurance with limits as specified in [Document 00 73 00 – Supplementary Conditions](#), each occurrence Bodily Injury and as specified in 00 73 00 – Supplementary Conditions, each occurrence Property Damage, including contractual liability, explosion, collapse and underground (XCU), broadform property damages, City's and Contractor's protective, and completed operations coverages. Coverage shall be at least as broad as Insurance Services Office form no. GL 002 (Ed. 1/73) covering Comprehensive General Liability and Insurance Services Office form no. GL 0404 covering Broad Form Commercial General Liability; or Insurance Services Office Commercial General Liability Coverage (occurrence form CG 0001).
  - b. Comprehensive automobile liability insurance with limits as specified in [Document 00 73 00 – Supplementary Conditions](#) each person Bodily Injury, as specified in Document 00 73 00 – Supplementary Conditions, each occurrence Bodily Injury and as specified in [Document 00 73 00 – Supplementary Conditions](#) each occurrence Property Damage, including coverage for owned, non-owned and hired vehicles. Coverage shall be at least as broad as Insurance Services Office form no. CA 0001 (Ed. 1/78) covering Automobile Liability, Code 1 “any auto” and endorsement CA 0025.
  - c. All-risk course of construction insurance in an amount as specified in [Document 00 73 00 – Supplementary Conditions](#), including fire damage to property owned by City, Contractor or third parties. Any deductible shall not exceed the amount specified in [Document 00 73 00 – Supplementary Conditions](#), for each loss and shall be borne by Contractor. Such “all risks” (excluding earthquake and flood) Builder's Risk Insurance shall cover the entire work of the contract for 100% of the replacement value thereof, including items of labor and materials in place or to be used as part of the permanent construction, including surplus miscellaneous materials and supplies incident to the work, and such scaffoldings, staging, towers, forms and equipment not owned or rented by the

- Contractor, the cost of which is not included in the cost of the work. EXCLUSIONS: The insurance need not cover any tools owned by mechanics, or tools, equipment, scaffoldings, staging, towers, and forms, rented or owned by the Contractor, the value of which is not included in the cost of the work, or any shanties or other structures erected for the sole convenience of the workers.
- d. Full workers' compensation insurance for all persons whom Contractor may employ in carrying out Work contemplated under Contract, in accordance with 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. Workers' compensation policy shall include Employer Liability Insurance with limits as specified in [Document 00 73 00 – Supplementary Conditions](#), for each accident.
2. Contractor shall furnish the City with certificates of insurance and with original endorsements effecting coverage required by this Contract. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its part. The certificates and endorsements are to be on forms provided by the City. Where by statute, the City's workers' compensation related forms cannot be used, equivalent forms approved by the Insurance Commissioner are to be substituted. All certificates and endorsements are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all insurance policies at any time. In addition, Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.
  3. Insurance policies shall contain an endorsement containing the following terms:
    - a. The City, its officials, officers, employees, volunteers, representatives and agents, consultants (including, but not limited to the Architect/Engineer and Construction Manager) ("Additional Insureds" or "Indemnitees"), shall be covered as additional insureds. City are to be covered as insured as respects: Liability arising out of activities performed by or on behalf of the Contractor, products and completed operation of Contractor, premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Indemnitees. Any failure to comply with reporting provisions

- of the policies shall not affect coverage provided to the Indemnitees.
- b. The policies shall apply separately to each insured against whom claim is made or suit is brought except with respect to the limits of the Contractor's liability.
  - c. Each insurance policy required by this Contract shall be endorsed to state that coverage shall not be suspended, voided, cancelled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the City. Written notice of cancellation or of any limits reduction changes in said policy shall be mailed by certified mail, return receipt requested, to the City of Pittsburg, Project Manager: 65 Civic Avenue, Pittsburg, CA 94565, thirty (30) calendar days in advance of the effective date thereof.
  - d. Any deductibles or self-insured retentions must be declared to and approved by the City. At the City's option the Contractor shall (1) reduce or eliminate the deductibles or self-insured retentions with respect to the Additional Insureds, or (2) procure a guaranteeing payment of losses and related investigations, claim administration, and defense expenses.
  - e. Contractor's insurance shall be primary insurance and no other insurance or self-insured retention carried or held by the Additional Insureds shall be called upon to contribute to a loss covered by insurance for the named insured.
4. Certificates of Insurance and Endorsements shall have clearly typed thereon City Contract number and title of Contract.
  5. At time of making application for extension of time, Contractor shall submit evidence that insurance policies will be in effect during requested additional period of time.
  6. Nothing herein contained 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.
  7. Required minimum amounts of insurance may be increased should conditions of Work, in the opinion of the City, warrant such increase, and Contractor shall increase amounts of insurance required herein when so directed by City to such higher amounts as City may direct.
  8. Insurance shall be maintained by Contractor in full force and effect during entire period of performance of Contract and shall be kept in force during warranty and guarantee periods, except that all-risk course of construction insurance may be discontinued 30 calendar days after Council acceptance and recording of "Notice of Completion".
  9. If Contractor fails to maintain insurance, City Council may take out insurance to cover any damages of the above mentioned classes for that City might be held liable on account of Contractor's failure to pay

such damages, or compensation that City might be liable to under provisions of Workers' Compensation Insurance and Safety Act, by reason of employee of Contractor being injured or killed, and deduct and retain amount of premium from any sums due Contractor under Contract.

10. If injury occurs to employee of Contractor for which employee, or employee's dependents in the event of employee's death, is entitled to compensation from City under provisions of 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, amount sufficient to cover such compensation, as fixed by Act as amended, until such compensation is paid, or until it is determined that no compensation is due, and if City is compelled to pay compensation, City will deduct and retain from such sums the amount to be paid.
11. In the event of a loss by the perils insured against under this Contract, of any or all of the work and/or materials herein provided for, at any time prior to the final completion of the Contract and the final acceptance by the City, the Contractor shall promptly reconstruct, repair, replace or restore all work or materials so destroyed. Nothing herein provided for shall in anyway excuse the Contractor or the Contractor's surety from the obligation of furnishing all the required materials in completing the work in full compliance with the terms of the Contract.

## 6. DRAWINGS, SPECIAL PROVISIONS, AND SPECIFICATIONS

### A. INTENT

1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. It is the intent of the Drawings, Special Provisions, and Specifications to describe a functionally complete and operable Project (and all parts thereof) to be constructed in accordance with the requirements of the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the requirements of the Contract Documents or from prevailing custom or trade usage as being required to produce this intended result will be furnished and performed whether or not specifically called for. When words or phrases that have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. The intent of the Drawings specifically includes the intent to depict construction that complies with all applicable laws, codes and standards. The Divisions and Sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among

Subcontractors or suppliers or delineating the work to be performed by any specific trade.

2. Reasonably implied parts of the Work shall be performed as "incidental work" even though absent from the Drawings, Special Provisions, and Specifications. "Incidental" work shall be performed by Contractor without extra cost to City. Incidental work includes any work not shown on Drawings nor described in Special Provisions or Specifications, but which is necessary or normally or customarily required as a part of the Work shown on the Drawings or described in the Special Provisions, Specifications, or is necessary or required to make each installation satisfactory, legally operable, functional, consistent with the intent of the Drawings, Special Provisions, and Specifications or the requirements of the Contract Documents. Incidental work shall be treated as if fully described in Special Provisions or Specifications and shown on Drawings, and expense thereof shall be included in price bid. Incidental work includes, but is not limited to, tasks required to be performed under Special Provisions.

**B. DRAWING DETAILS**

1. A typical or representative detail on the Drawings shall constitute the standard for workmanship and material throughout corresponding parts of Work. Where necessary, and where reasonably inferable from the Drawings, 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 Project Manager. Repetitive features shown in outline on the Drawing shall be in exact accordance with corresponding features completely shown.

**C. INTERPRETATION OF DRAWINGS, SPECIAL PROVISIONS, AND SPECIFICATIONS**

1. Should any discrepancy appear or any misunderstanding arises as to the import of anything contained in the Drawings, Special Provisions, and Specifications prepared by Architect/Engineer, the matter shall be referred to the Project Manager in writing. Project Manager shall coordinate with Architect/Engineer and shall issue with reasonable promptness such written clarifications or interpretations of the requirements of the Drawings, Special Provisions, and Specifications as Architect/Engineer may determine necessary that shall be consistent with the intent of and reasonably inferable from the Drawings, Special Provisions, and Specifications. If Contractor believes that a written clarification or interpretation justifies an adjustment in the Contract Sum or Contract Times, the Project Manager shall be notified and a Request for Proposal shall be issued. If the parties are unable to agree to the amount or extent thereof, if

any, then Contractor shall perform the Work subject to the clarification and may make a written claim therefore as provided in Paragraph 12.

D. CHECKING OF DRAWINGS

1. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall be responsible for any errors, which might have been avoided by such comparison. Figures shown on Drawings shall be followed; do not scale measurements. The Contractor shall promptly report in writing to the Project Manager, any conflict, error, ambiguity or discrepancy that Contractor may discover and shall obtain a written interpretation or clarification from Project Manager before proceeding with any Work affected thereby.

E. STANDARDS TO APPLY WHERE DETAILED SPECIAL PROVISIONS OR SPECIFICATIONS ARE NOT FURNISHED

1. Wherever in Special Provisions or Specifications, or in any orders given by Project Manager or Architect pursuant to or supplementing Special Provisions or Specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do work for which no detailed special provisions or specifications are set forth, the following general specifications shall apply. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation, or, if not ordinarily carried in stock, shall conform to the usual 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 for which no detailed standard detail, special provisions or specifications are set forth herein shall conform to the usual standards for first-class work of the kind required. Contractor shall specify in writing to Project Manager the materials used or work performed under this section no later than five (5) working days from furnishing such materials or performance of such work.

F. DEVIATIONS FROM SPECIAL PROVISIONS, SPECIFICATIONS, AND DRAWINGS

1. No modification or deviation from the plans, special provisions, and specifications will be permitted. Contractor must perform work in strict accord with Drawings, Special Provisions, and Specifications. No order for any alteration, modification or extra that shall increase or decrease the cost of work or Contract Time shall be valid unless the resulting increase or decrease in price or Contract Time shall have been agreed upon in writing, and the order signed by Contractor and City. Deviations from Drawings and from the dimensions therein given, or from the Special Provisions or Specifications, whether or not error



is believed to exist, shall be made only when approved in writing by Project Manager.

2. Project Manager may order that locations, lines and grades for Work vary from those shown on Drawings. Changes may be made in location, lines or grades for Work under any item of Contract. No extra payment in addition to unit price fixed in Contract for Work under respective items will be allowed on account of variations from Drawings in unit price items. In lump sum contracts, or where there are no unit price items covering work affected by variations of locations, lines or grades, all changes in Contract will be made in accordance with Paragraph 14, Modifications.

G. PRECEDENCE OF DOCUMENTS

1. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:
  - a. Modifications in inverse chronological order, and in the same order as specific portions they are modifying.
  - b. Signed Agreement, and terms and conditions referenced therein.
  - c. Supplementary Conditions - spell out permits, change orders, addendum and bid proposal?
  - d. General Conditions.
  - e. Special Provisions
  - f. Specifications and material data shown on the Drawings and/or Product Information contained within the Project Manual.
  - g. Project Drawings
  - h. Standard Specifications (Last version or the version that was specified in the Special Provisions)
  - i. Written numbers over figures, unless obviously incorrect.
  - j. Figured dimensions over scaled dimensions.
  - k. Large-scale Drawings over small-scale Drawings.
  - l. City Standard Technical Specification
  - m. Caltrans Standard Specifications
  - n. Caltrans Standard Plans.
2. Should any provision or requirement of any Contract Document conflict with another provision or requirement in the Contract Documents on subject matters of hazardous waste abatement, clean up, disposal, or required safety standards or methods, then the most stringent provision or requirement shall control.
3. However, in the case of discrepancy or ambiguity solely between and among the Drawings and Specifications referenced in item 6 immediately above, the discrepancy or ambiguity shall be resolved in favor of the interpretation that will provide City with the functionally complete and operable Project described in the Drawings and Specifications.

H. OWNERSHIP AND USE OF DRAWINGS, SPECIAL PROVISIONS, SPECIFICATIONS AND OTHER DOCUMENTS

1. The Contract Documents were prepared for use for the Work of this Contract only. No part of the 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 the Contract Documents is prohibited and at the sole liability of the user.

I. DOCUMENT PROVISIONS

1. At time of Notice of Award, City shall furnish contractor eight (8) additional full size and four (4) half size Plan sets.
2. At time of Notice of Award, City shall furnish contractor eight (8) additional Project Manuals.
3. Additional project plans and specifications as well as City Standards may be purchased for costs described in Notice of Award.

7. CONSTRUCTION BY CITY OR BY SEPARATE CONTRACTORS

A. CITY'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

1. City may perform construction or operations related to the Project with its own forces, or 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 of the Contract similar to these (including those portions related to insurance and waiver of subrogation), or have other work performed by utility owners. When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate City/Contractor Agreement.

B. MUTUAL RESPONSIBILITY

1. Contractor shall afford all other contractors, utility owners, 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, shall ensure that the execution of its Work properly connects and coordinates with their work, and shall cooperate with them to facilitate the progress of the Work.
2. Contractor shall coordinate its work with the work of other separate contractors, City, and utility owners, including holding of monthly coordination meetings with them. City or its designee shall have the right to participate in these coordination meetings, and shall be advised of the results of these coordination meetings at the weekly Progress Meeting.
3. Unless otherwise provided in the Contract Documents, Contractor shall 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. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of Project Manager and the others whose work will be affected.

4. The duties and responsibilities of Contractor under paragraphs 1 to 3 above are for the benefit of City and also for the benefit of such utility owners and other contractors working at the site to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between City and such utility owners and other contractors.
5. To the extent that any part of Contractor's Work is to interface with work performed or installed by other contractors, Contractor shall inspect and measure the in-place work and promptly report to Project Manager in writing any defect in such in-place work that will impede or increase the cost of Contractor's interface unless corrected. Project Manager and/or its authorized representative will require the Contractor responsible for the defective work to make corrections so as to conform to its contract requirements, or, if the defect is the result of an error or omission in the Contract Documents, issue a change order. If Contractor fails to measure, inspect and/or report to Project Manager in writing defects that are reasonably discoverable, all costs of accomplishing the interface acceptably shall be borne by Contractor. This provision shall be included in any and all other contracts or subcontracts for Work to be performed where such a conflict could exist.

C. PROJECT MANAGER AUTHORITY OVER COORDINATION

1. Project Manager shall have authority over coordination of the activities of multiple contractors in those cases where City contracts with others for the performance of other work on the Project, City performs work with its own forces, or utilities perform work on the site. The authority of Project Manager with respect to coordination of the activities of multiple prime contractors and utility owners, however, shall not in any manner relieve Contractor of its obligation to other contractors and utility owners to coordinate its work with utility owners and other contractors as specified above. Contractor shall promptly notify Project Manager in writing when another contractor on this Project fails to coordinate its work with the Work of this Contract.
2. Contractor shall suspend any part of the Work herein specified or shall carry on the same in such manner if directed by Project Manager when such suspension or prosecution is necessary to facilitate the work of other contractors or workers. No damages or claims by Contractor will be allowed therefore if the suspension or work change is due in whole or in part to Contractor's failure to perform its obligation herein specified to coordinate its Work with utility owners and other

contractors. If the suspension or Work change is due in whole or in part to the failure of another contractor to coordinate its work with Contractor and other contractors and utility owners, then resulting damages or claims by Contractor will be allowed only to the extent of fault by others. City reserves the right to back charge Contractor for any damages or claims of other contractors incurred as a result of Contractor's failure to perform its obligations to coordinate with other contractors and utility owners, and in its discretion, may interplead funds retained and Contractor releases City of further liability for such funds.

3. City may at any time and in its sole discretion, designate a person, firm or corporation other than the Project Manager, to have authority over the coordination of the activities among the various prime contractors.

## 8. CITY AND PAYMENT

### A. CITY'S REPRESENTATIVES

1. City's designated authorized representatives will have limited authority to act on behalf of City as expressly set forth in the Contract Documents. Except as otherwise provided in these General Conditions, City shall issue all communications to Contractor through Project Manager, and Contractor shall issue all communications to the City through Project Manager. All Contractor correspondence to the City or to the Architect/Engineer shall be to the Project Manager.

### B. MEANS AND METHODS OF CONSTRUCTION

1. Subject to those rights specifically reserved in the Contract Documents, City and Project Manager shall not supervise, direct, or have control over, or be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction or for the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to the furnishing or performance of Work. City and Project Manager shall not be responsible for Contractor's failure to perform or furnish the Work in accordance with Contract Documents.
2. Nothing contained in these Contract Documents or inferable therefrom shall be deemed or construed (1) to make Contractor the agent, servant or employee of City, or (2) to create any partnership, joint venture or other association between City and Contractor.

C. RECEIPT AND PROCESSING OF APPLICATIONS FOR PAYMENT

1. Contractor shall prepare the necessary schedules required by [Section 01 29 00 - Payment Procedures](#), submit applications for progress payments or final payments, and warrant title to all Work covered by each application for payment, as required by [Section 01 29 00 - Payment Procedures](#). City shall review Contractor's applications for payment and make payment thereon as required by [Section 01 29 00 - Payment Procedures](#).

9. CONTROL OF THE WORK

A. SUPERVISION OF WORK BY CONTRACTOR

1. Contractor accepts the relationship of trust and confidence established between it and the City by this Contract. Contractor covenants with the City to furnish his best skill and judgment and to cooperate with Project Manager in furthering the City's interests. Contractor agrees to furnish efficient business administration and superintendence and to use its best efforts to furnish at all times an adequate supply of workers and materials, and to perform the Work in the best and soundest way and in an expeditious and economical manner consistent with the City's interests.
2. Contractor shall supervise, inspect and direct the work competently and efficiently, devoting such attention thereto and applying such personal skills and expertise as may be required and necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, and to develop and implement all safety plans and procedures for the Work. The Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.
3. Contractor shall keep on the Site at all times during Work progress a competent resident Superintendent, who shall not be replaced without the express written consent of City. The Superintendent will be Contractor's representative at the site and shall have complete authority to act on behalf of Contractor. All communications to the Superintendent shall be as binding as if given to the Contractor.

B. OBSERVATION OF WORK BY PROJECT MANAGER & ARCHITECT/ENGINEER

1. Work shall be performed under the general observation and administration of Project Manager. Contractor shall immediately comply with orders and instructions given in accordance with terms of Contract by Project Manager, or by any authorized assistant, inspector or other representative of Project Manager acting within scope of

- duties entrusted, but nothing herein contained shall be taken to relieve Contractor of obligations or liabilities under Contract.
2. Project Manager will provide administration of Contract and observation of the Work as hereinafter described.
  3. Architect/Engineer will advise and consult with Project Manager and City. Architect/Engineer will act only as an advisor to the City and Project Manager.
  4. Architect/Engineer may visit Site at intervals appropriate to stage of construction to become familiar generally with progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. However, Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of Work. On basis of on-site observations, Architect/Engineer will keep Project Manager and City informed of its opinion as to the progress of Work, workmanship, defects and deficiencies in work of Contractor.
  5. Architect/Engineer 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 the Work.
  6. Architect/Engineer will not be responsible for or have control or charge over acts or omissions of Contractor, subcontractors, or any of their agents or employees, or any other persons performing Work.
  7. Architect/Engineer will review Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with design concept of Work and with information given in Contract Documents.
  8. Project Manager will conduct inspections to determine dates of substantial completion and final acceptance, will receive and forward to Architect/Engineer for review written warranties and related documents required by Contract and assembled by Contractor.
  9. Architect/Engineer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings and Specifications or otherwise) as Architect/Engineer may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on the Contractor, unless City in its discretion directs otherwise. If Contractor believes that a written clarification or interpretation justifies an adjustment in the Contract Sum or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, then Contractor shall perform the Work as so clarified or interpreted and may make a written claim therefore as provided in this Section.
  10. Based on the observations of Architect/Engineer, Architect/Engineer will make recommendations to Project Manager to disapprove or

reject Work which Architect/Engineer believes to be defective, or that Architect/Engineer believes will not produce a complete Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Architect/Engineer will also have authority to require special inspection or testing of Work, whether or not the work is fabricated, installed or completed.

C. ACCESS TO WORK SITE

1. During performance of Work, City and its agents, consultants, and employees may at any time enter upon Work, shops where any part of 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 therefore, 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, for all purposes required by their respective contracts, enter upon Work. Subject to this right, Contractor shall have sole care, custody and control of its work areas.

D. RIGHT-OF-WAY

1. The site for the installation of equipment or the right of way for the works to be constructed under this contract will be provided by the City.
2. The City will provide the appropriate rights of way and property for pipelines and structures. The Contractor will be held responsible for any damage to structures, streets, and roads, and for any damage that may result from the Contractor's use of City property.
3. In case areas in addition to those available on the City's right of way or property are required by the Contractor for the Contractor's operations, the Contractor shall make arrangements with the property owners for the use of such additional areas at the Contractor's own expense.

E. EXISTING UTILITIES

1. Pursuant to Government Code, Section 4215, City shall be responsible, as between City and Contractor, for the timely removal, relocation or protection of existing main or trunk line utility facilities located on the project site, if, and only if, such utilities are not identified in the Drawings, Special Provisions, and Specifications made a part of the invitation for bids. City shall compensate Contractor for the cost of locating and repairing damage not due to the failure of Contractor to exercise reasonable care, and removing and relocating such utility facilities not indicated on the Drawings, Special Provisions, and Specifications with reasonable accuracy, and for equipment on the

project necessarily idled during such work, such compensation to be determined in accordance with the provisions of these General Conditions.

2. Nothing herein shall be deemed to require City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site can be inferred from the presence of other visible facilities, such as buildings, meters and junction boxes, on or adjacent to the site of the construction. If Contractor, while performing Contract, discovers utility facilities not identified by City in the Contract Drawings, Special Provisions, or Specifications, it shall immediately notify City and the utility in writing.

## 10. WARRANTY, GUARANTEE AND INSPECTION OF WORK

### A. WARRANTY AND GUARANTEE

1. Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every phase of the Work to complete the Work in accordance with the terms of the Contract Documents. Contractor warrants that all construction work and construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices and all requirements of the Contract Documents. Subject to the last sentence of this paragraph, Contractor warrants that the Work, including but not limited to each item of materials and equipment incorporated therein, shall be new, shall be of suitable grade of its respective kind for its intended use, shall be free from defects in design, engineering, materials, construction and workmanship, and shall conform in all respects with all applicable requirements of federal, state and local laws, licenses, and permits, the Drawings, Special Provisions, and Specifications and all descriptions set forth therein, applicable construction codes and standards, and all other requirements of the Contract Documents. Notwithstanding the foregoing, Contractor shall not be responsible for the negligence of others in the specification of specific equipment, materials, design parameters, means or methods of construction, where that is specifically shown and expressly required by the Contract Documents.
2. Extended Guarantees: If any guarantee exceeding one year is provided by the supplier or manufacturer of any equipment used in this Project, then the guarantee for such materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and contractor shall supply Owner with all warranty and guarantee documents relative to equipment and materials incorporated in the job and guaranteed by their suppliers or manufacturers.
3. Environmental and Toxics Warranty: The covenants, warranties and representations contained in this Section will be effective on the date



of recording of the Notice of Completion and will, survive completion of the Project. Contractor covenants, warrants and represents to Owner that:

- a. No litigation is pending or, to Contractor's knowledge, proposed, threatened or anticipated with respect to the Contractor, or with respect to any other matter affecting the Project or the operation thereof.
- b. To Contractor's knowledge after due inquiry, no lead or asbestos-containing materials were installed or were discovered in the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to City.
- c. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCB's are or were located on the Project at any time during Contractor's construction thereof.
- d. 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.
- e. 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.

## B. INSPECTION OF WORK

1. All materials, equipment and workmanship used in the Work shall be subject to inspection or testing at all times during construction and/or manufacture in accordance with the terms of this Contract. 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 Project Manager, its agents, or independent contractors retained by Project Manager 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.
2. Contractor shall give Project Manager timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
  3. 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 Project Manager with the required certificates of inspection, or approval. Contractor shall pay all costs in connection with any follow up or additional testing. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for Project Manager's and/or Architect/Engineer's acceptance of materials or equipment to be incorporated in the Work, or of materials, mixed designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.
  4. If any Work (or the work of others) that is required to be inspected, tested or approved is covered by Contractor prior to such inspection, testing or approval, without written approval of Project Manager, the Work must, if requested by Project Manager, be uncovered. Uncovering Work shall be at Contractor's expense unless Contractor has given Project Manager timely notice of Contractor's intention to cover the same and Project Manager has given its written approval of the covering of the Work.
  5. In any case where Work is covered contrary to the written request of Project Manager, it must, if requested by Project Manager, be uncovered for Project Manager's observation or inspection at Contractor's expense.
  6. Whenever required by Project Manager, 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, examination will be paid for by City in manner herein prescribed for paying for alterations, modifications and extra work, except as otherwise herein specified.

#### C. CORRECTION OF DEFECTIVE WORK

1. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Project Manager may order

Contractor to replace the defective work or to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Project Manager to stop the Work shall not give rise to any duty on the part of Project Manager to exercise this right for the benefit of Contractor or any other party.

2. If required by Project Manager, Contractor shall promptly, as directed by Project Manager, without additional cost to City and in accordance with Project Manager's written instructions, (i) correct such defective Work, whether or not fabricated, installed or completed, or, if it has been rejected by Project Manager, remove it from the Site and replace it with Work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. All claims, costs, losses, and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others) as well as all costs of City incurred in exercising such rights and remedies (including, but not limited to, the costs incurred in the examination, evaluation and determination that such defective Work should be corrected or removed and replaced) will be the responsibility of Contractor and a change order will be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree on the amount of an appropriate decrease in the Contract Sum, City may deduct from monies due Contractor all claims, costs, losses, and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others) as well as all costs of City incurred in exercising such rights and remedies (including, but not limited to, the costs incurred in the examination, evaluation and determination that such defective Work should be corrected or removed and replaced). If Contractor disagrees with City's calculation, it may make a claim as provided in Paragraph 13. City's rights under this paragraph shall be in addition to any other rights it may have under the Contract Documents, including, without means of limitation, in Paragraph 9.C.3 and 9.D.
3. Correction Period: If within one year after the date of Final Acceptance or such longer period of time as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to City and in accordance with City or Project Manager's written instructions, (i) correct such defective Work or, if it has been rejected by City or Project Manager, remove it from the site and replace it with Work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor does not 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, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) shall be paid by Contractor.

4. Where defective or rejected Work (and damage to other work resulting therefrom) has been corrected, removed or replaced under this provision after the commencement of the correction period, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. ACCEPTANCE AND CORRECTION OF DEFECTIVE WORK BY CITY

1. City may accept defective Work: If, instead of requiring correction or removal and replacement of defective Work, City, prior to final payment, prefers to accept it, City may do so. Contractor shall pay all claims, costs, losses and damages attributable to City's evaluation of and determination to accept such defective Work. If any such acceptance occurs prior to final payment, a change order will be issued incorporating the necessary revisions in the Contract Documents with respect to Work, unless the parties are unable to agree upon an appropriate decrease in the Contract Sum, in which case City may deduct from monies due Contractor the amount of any and all claims, costs, losses (including diminution in value), damages, expenses and liabilities attributable to the defective work. If Contractor disagrees with the deduction, the Contractor may make a claim as provided in Paragraph 13. If the acceptance occurs after Final Payment, an appropriate amount shall be paid by Contractor as determined by City.
2. City may correct untimely or defective Work: If Contractor fails within seven (7) calendar days after written notice from Project Manager to correct defective Work or to remove and replace rejected Work as required by Project Manager, or provide a plan for correction of defective Work acceptable to City, or if Contractor otherwise fails to perform the Work in accordance with Contract Documents (including material delays from approved schedules), City may (at its sole option), after seven (7) calendar days written notice to Contractor, correct and remedy any deficiency. 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 the 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 the 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, consultants, and other contractors and Architect/Engineer's consultants access to the site to enable City to exercise the rights and remedies under this paragraph. All claims, costs, losses (including diminution in value), damages, expenses and liabilities incurred or sustained by City in exercising such rights and remedies will be the responsibility of Contractor and a change order will be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree on the amount of an appropriate decrease in the Contract Sum, City may deduct from monies due Contractor all claims, costs, losses (including diminution in value), expenses, damages and liabilities attributable to the defective Work, including all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective Work. (If Contractor disagrees with City's calculation, it may make a claim as provided in Paragraph 13.)

**E. RIGHTS UPON INSPECTION OR CORRECTION**

1. The Contractor shall not be allowed an extension of the Contract Times (or any milestones) because of any delay in the performance of Work attributable to the exercise by City of its rights and remedies under this Paragraph. Where City exercises its rights under this paragraph, it retains all other rights it has by law or under the Contract Documents, including but not limited to, the right to terminate the contract and/or

make a claim or back charge where a change order cannot be agreed upon.

2. Inspection shall not relieve the Contractor of its obligation to have furnished material and workmanship in accordance with Contract Documents. Payment for work completed through periodic progress payments or otherwise shall not operate to waive the City's right to require full compliance with the Contract Documents and shall in no way be deemed as acceptance of the Work paid therefor. Contractor's obligation to complete the Work in accordance with the Contract Documents shall be absolute, unless City agrees otherwise in writing.

F. SAMPLES AND TESTS OF MATERIALS AND WORK

1. Samples or test specimens of all materials to be used or offered for use in connection with this work shall be prepared at expense of Contractor and furnished to Project Manager in such quantities and sizes as may be required for proper examination and tests.
2. All samples shall be submitted in ample time to enable Project Manager to make any tests, analyses or examinations necessary before the time at which it is desired to incorporate the material into the work.
3. Project Manager may refuse consideration of further samples of same brand or make of material or product previously determined as unsatisfactory for testing, analysis or examination.
4. Test samples or specimens of material for testing shall be taken by Architect/Engineer, his or her representative, Project Inspector or representative of the testing agency.

G. PROOF OF COMPLIANCE WITH CONTRACT PROVISIONS

1. In order that City or Project Manager may determine whether Contractor has complied or is complying with requirements of Contract not readily enforceable through inspection and tests of Work and materials, Contractor shall at any time when requested submit to Project Manager properly authenticated documents or other satisfactory proofs of compliance with requirements.

H. ACCEPTANCE

1. Neither inspection by City or its authorized agents or representatives, nor any order or certificate for the payment of money, nor any payment, nor acceptance of the whole or any part of the Work by City, nor any extension of time, nor any position taken by City or its authorized agents or representatives shall operate as a waiver of any provisions of this Contract, or of any power herein reserved by City or any right to damage

herein provided, nor shall any waiver of any breach of this Contract be held to be a waiver of any other subsequent breach.

## 11. CONTRACTOR'S ORGANIZATION AND EQUIPMENT

### A. CONTRACTOR'S LEGAL ADDRESS

1. Address and telecopy number given in bid is hereby designated as legal address and telecopy number of Contractor, but such address and/or number may be changed at any time by notice in writing, delivered to City, which in conspicuous language advises City of a change in legal address or telecopy number. Delivery to Contractor's legal address or depositing in any post office or post office box regularly maintained by United States Postal Service, in a postpaid wrapper, directed to Contractor at legal address, of any drawing, notice, letter or other communication, shall be deemed legal and sufficient service thereof upon Contractor. Telecopy to Contractor's designated telecopy number of any letter, memorandum, or other communication on standard or legal sized paper, with proof of telecopy transmission, shall be deemed legal and sufficient service thereof upon Contractor.

### B. CONTRACTOR'S OFFICE AT THE WORK SITE

1. Contractor is required to maintain an office at Site during construction, which office shall be headquarters of representative authorized to transmit and receive instructions, drawings or other communications to and from Project Manager. Instructions, drawings, or other communications given to Contractor's representative or delivered at work-site office in representative's absence shall be deemed to have been given to Contractor.
2. Layout plans for temporary construction facilities shall be based upon other subsidiary plans, such as approved safety plan, hazardous materials management plan, site drainage plan, security and theft prevention, the construction schedule and other elements of the Contractor's project execution plan.
3. Contractor shall be responsible for paying for utilities and services required for Contractor's own construction facilities, including temporary storage sheds.
4. Contractor shall remove field offices and temporary construction facilities from the site prior to Final Payment. Contractor shall restore the site occupied by said field offices and temporary construction facilities to the original condition unless otherwise indicated by the Contract Documents.

### C. CONTRACTOR'S SUPERINTENDENTS OR FOREPERSONS

1. 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 may be given to them by Project

Manager and Contractor shall be liable for faithful observance of instructions delivered to Contractor or to authorized representative or representatives on Site.

2. All Project Manager(s), Superintendent(s), and/or Foreperson(s) shall demonstrate a proficiency in English.
3. All Project Manager(s) and Superintendent(s) must have a minimum experience of five (5) years with similar commercial projects and a minimum of five (5) years of public works experience, or approved similar qualifications as submitted to and approved by the City Engineer.
4. The City reserves the right to reject the Contractor's Project Managers, General Construction Superintendents, Project Coordinators, and Forepersons at any time for cause as described as incompetence; obnoxious, disorderly behavior; has intimidated or sexually harassed a City employee, agent, or member of the public; or for refusing to carry out the provisions of the Contract. The City shall be given written notice of, and shall have the right to approve, replacement of Contractor's Project Manager(s), Superintendent(s), or Foreperson(s).

D. CONTRACTOR'S EMPLOYEES

1. Contractor shall employ only competent and skillful personnel to do work. If Project Manager shall notify Contractor that any person on Work is incompetent, unfaithful or disorderly, or fails to observe customary standards of conduct or refuses to carry out provisions of Contract, or uses threatening or abusive language to any person on Work representing City, or violates sanitary rules, or is otherwise unsatisfactory, and if Project Manager requests that such person be discharged from the work, then such person shall be immediately discharged from Work and shall not be employed again on it except with consent of Project Manager.

E. CONTRACTOR TO SUPPLY SUFFICIENT WORKERS AND MATERIALS

1. Unless otherwise required by City pursuant to the terms of the Contract Documents, Contractor shall at all times keep on the premises a sufficient amount of materials and employ a sufficient number of qualified workers to prosecute Work at a rate and in a sequence and manner necessary to complete Work herein required within the Contract Times. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.
2. Should Contractor at any time during progress of Work refuse, neglect, or be unable to supply sufficient materials or qualified workers to prosecute Work as required, then upon receipt of notice to that effect from Project Manager, City or its designee may notify Contractor, at no cost to City, to accelerate the Work and/or furnish additional qualified workers or materials as Project Manager may consider necessary, and if Contractor does not comply with notice from Project Manager, City or



City's designee within five (5) calendar days of date of service thereof, City shall have right but not a duty to provide materials and qualified workers to finish the Work or any affected portion of the Work, as City may elect. Sums necessary to meet expenses thereby incurred shall be deducted from monies due or which may thereafter become due under Contract, and paid to persons supplying materials and doing work. Amount of such payments shall be deducted from fund or appropriation set aside for purposes of Contract and charged 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.

3. Exercise by City or Project Manager of the rights conferred upon them in paragraph 2, immediately above, is entirely discretionary on the part of City and Project Manager. Neither City nor Project Manager shall have any duty or obligation to exercise the rights referred to in paragraph 2 above, and the failure to exercise such rights shall not be deemed an approval of existing work progress or a waiver or limitation of City's or Project Manager's right to exercise such rights in other concurrent or future similar circumstances. The rights conferred upon City under paragraph 2 above are cumulative to City's other rights under the Contract Documents.

F. CONTRACTOR TO LIST TRADES WORKING

1. To assist inspectors and Project Manager, Contractor shall list on a daily basis what trades are working on the Site and their scheduled activities.

G. WORKING HOURS

1. Work or activity of any kind shall be limited to the hours from 7:00 a.m. to 5:00 p.m., Monday through Friday, except as stipulated otherwise. Work in excess of eight hours per day, on Saturdays, on Sundays, or on City holidays requires a minimum of two (2) calendar days advance notice and consent of the Project Manager and is subject to Cost of Overtime Construction Inspection.
2. City Holidays are:
  - a. New Years Day
  - b. Martin Luther King, Jr. Day
  - c. Lincoln's Birthday
  - d. Washington's Birthday (3rd Monday in February)
  - e. Cesar Chavez Day
  - f. Memorial Day (last Monday in May)
  - g. Independence Day
  - h. Labor Day
  - i. Columbus Day
  - j. Veterans' Day

- k. Thanksgiving Day and the following Friday
- l. Christmas Day
- m. City of Pittsburg Winter Closure (5 working days, typically between Christmas Eve and New Years Day).

#### H. COST OF OVERTIME INSPECTION

- 1. Overtime construction work performed at the option of, or for the convenience of, the Contractor will be inspected by the City at the expense of the Contractor. For any such overtime beyond the regular 8-hour day and for any time worked on Saturday, Sunday, or holidays, the charges for City personnel and agents for the City will be as shown in the currently adopted rate schedule, available at the Development Services Department.

### 12. PROSECUTION AND PROGRESS OF THE WORK

#### A. SCHEDULES AND EXAMINATION OF CONTRACT DOCUMENTS

- 1. Before undertaking each part of Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements and all actual conditions. Contractor shall promptly report in writing to Project Manager any conflict, error, ambiguity or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Project Manager before proceeding with any Work affected thereby.
- 2. Contractor shall submit to Project Manager for review:
  - a. Progress schedules and reports shall be submitted as required by [Sections 01 32 16 – Construction Progress Schedule](#) and [01 33 00 – Submittal Procedures](#). Contractor shall utilize the Progress Schedule in planning, scheduling, coordinating, performing and controlling the work (including all activities of Subcontractors, assigned contractors, equipment vendors and suppliers). Contractor shall update and submit to the City the Progress Schedule on a monthly basis for purpose of recording and monitoring the progress of Work and evaluating and preparing Contractor's monthly progress payments.
  - b. Within ten (10) calendar days after the Notice of Award, a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal, as required by [Section 01 33 00 – Submittal Procedures](#). If no such schedule is agreed upon, then all Shop Drawings, Samples and product data submittals shall be completed and submitted within thirty-five (35) calendar days after receipt of Notice of Award from City.

- c. Within ten (10) calendar days after the Notice of Award, a preliminary schedule of values for all the Work which includes quantities and prices of items aggregating the Contract Sum and subdivides each schedule of value into component activities in sufficient detail to serve as the basis for progress payments during construction shall be submitted to the Project Manager. Such Schedule of Values will include an appropriate amount of overhead and profit applicable to each item of work, will include a line item for project record documents, and a line item for project scheduling, and will conform to [Section 01 29 00 - Payment Procedures](#).
3. Schedules shall be updated and completed as required by [Sections 01 29 00 - Payment Procedures](#), [01 32 16 – Construction Progress Schedule](#) and [01 33 00 – Submittal Procedures](#). No progress payment shall be due or owing to Contractor until the schedules are submitted to and acceptable to Project Manager as meeting the requirements of the Contract Documents (including Sections 01 29 00 - Payment Procedures, 01 32 16 – Construction Progress Schedule and 01 33 00 – Submittal Procedures.) Project Manager's acceptance of Contractor's schedules will not create any duty of care or impose on City or Project Manager any responsibility for the sequencing, scheduling or progress of Work nor will it interfere with or relieve Contractor from Contractor's full responsibility therefor.
4. Before commencing any portion of Work, Contractor shall inform Project Manager 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 Project Manager 24-hours in advance of which Contractor proposes to begin Work, so that Project Manager may make necessary preliminary work without inconvenience or delay to Contractor.
5. Contractor shall submit submittals and shop drawings to Architect/Engineer for review in strict accordance with [Section 01 33 00 – Submittal Procedures](#). Submission of a Shop Drawing shall constitute Contractor's representation that all requirements of Section 01 33 00 – Submittal Procedures have been complied with. All submittals will be identified as City may require and in the number of copies specified in [Section 01 33 00 – Submittal Procedures](#).
6. Contractor shall not perform work requiring submission of a Shop Drawing or Sample or other submittal prior to submission and favorable review of the Shop Drawing or Sample or submittal. Where a Shop Drawing or Sample or other submittal is required by the Contract Documents or the final schedule of Shop Drawing and Sample submissions accepted by Project Manager any related Work performed prior to the City's approval of the pertinent submittal will be at the sole expense, responsibility and risk of Contractor.

**B. LINES AND GRADES, MEASUREMENTS**

1. Work shall be done to lines and grades established by Contractor in accordance with Contract Documents, unless Project Manager, in its sole discretion, directs otherwise. The cost of surveying to establish lines and grades shall be included in the various items of work and no separate payments will be made.

**C. COST DATA**

1. Contractor shall maintain full and correct information as to number of workers employed in connection with each subdivision of Work, classification and rate of pay of each worker in form of certified payrolls, cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and amount of each class of materials used in each subdivision of Work. Contractor shall provide Project Manager with written monthly summaries of this information.
2. 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 take monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with subcontractors and records of meetings with subcontractors. Contractor shall report to the surety promptly upon receiving requests from the surety to provide reporting. Contractor shall provide daily job reports as required by City and/or specified in [Section 01 32 16 – Construction Progress Schedule](#).
3. City shall have the right to audit, at City's expense, Contractor's books and records 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. City shall have the right to inspect and obtain copies of the following documents at all times: all contract documents, all planning and design documents, all Bid proposal and negotiation documents, all design modification proposals, all value engineering or other cost reduction proposals, all revisions made to the original design, and all job progress reports and photographs.
4. Contractor shall maintain in a safe place at the site one record copy of all Drawings, Special Provisions, Specifications, Addenda, Contract Modifications, Change Orders, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings shall be maintained and be available to Project Manager for reference. Upon completion of the Work, these Record Documents, Samples and Shop Drawings shall be delivered to the Project Manager.
5. City shall have the right to inspect all information and documents

maintained under this provision at any time during the Project and for a period of five years following Final Completion. 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. City's right of inspection shall not relieve Contractor of its duties and obligations under this contract.

D. CONTRACTOR'S DAILY REPORT

1. Contractor shall complete and submit to the City on the next day, consecutively numbered daily construction reports. These reports shall contain the following information:
  - a. Staffing by craft, number of personnel, and hours
  - b. Equipment by description and quantity
  - c. Subcontractors and their staffing count
  - d. Description and location of work accomplished
  - e. Instructions/Directions
2. In addition, whenever Force Account Work is in progress, the Contractor shall complete and submit to the City, detailed written daily Force Account Work reports. These reports must be submitted to the City no later than 12:00 p.m. of the next business day following the performance of the Force Account Work. These reports shall provide an itemized, detailed account of the daily Force Account labor, material, and equipment, including names of the individuals and the specific pieces of equipment identified by manufacturer's model type and serial number. Contractor's authorized representative shall complete and sign the report.

13. CLAIMS BY CONTRACTOR

A. GENERAL

1. Contract Interpretation Disputes: 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, the Contractor shall give written notice to City through Project Manager. Contractor shall bear all costs incurred in the giving of such notice. All issues regarding the interpretation of the Drawings, Special Provisions, or Specifications shall be referred to the Project Manager for interpretation. All issues regarding the General Conditions, Special Provisions, or non-engineering or non-technical aspects of the Work shall be determined by City whose determination shall be final. If the Contractor should disagree with City's decision, the Contractor's sole and exclusive remedy is to file a claim in accordance with this Paragraph. Notwithstanding and pending the resolution of any claim, the Contractor shall diligently prosecute the disputed Work to final completion.

2. Work Disputes: Should any dispute arise under this Contract respecting the true value of any Work performed, of any Work omitted, of any extra Work which the Contractor may be required to perform, time extensions, respecting the size of any payment to the Contractor during the performance of this Contract, or of compliance with Contract procedures, said dispute shall be decided by City and its decision shall be final and conclusive. If the Contractor should disagree with City's decision, the Contractor's sole and exclusive remedy is to file a claim in accordance with this Paragraph. Notwithstanding and pending the resolution of any claim, the Contractor shall diligently prosecute the disputed Work to final completion.
3. "Claim" means a written demand or written assertion by Contractor seeking, as a matter of right, the payment of money, the adjustment or interpretation of Contract terms, or other relief arising under or relating to the Contract Documents. In order to qualify as a "claim," the written demand must state that it is a claim submitted under Paragraph 13 of [Document 00 72 00 - General Conditions](#).
4. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a claim under the Contract. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a claim under the Contract by submitting a separate claim in compliance with claim submission requirements.
5. The provisions of this paragraph survive termination or completion of this Contract. Contractor shall bear all costs incurred in the preparation and submission of its claim.

#### B. PROCEDURE

1. Should any clarification, determination, action or inaction by City pertaining to work, or any other event, in the opinion of Contractor, exceed the requirements of or not comply with the Contract Documents, or otherwise result in Contractor seeking additional compensation for any reason (collectively "disputed Work"), then Contractor and City shall make good faith attempts to resolve any and all such issues, claims and/or disputes. Before commencing the disputed Work, or within seven (7) calendar days after such demand is made or instruction is given, whichever is earlier, Contractor must file a written notice of the disputed work with Project Manager stating clearly and in detail its objection and reasons for contending the Work or interpretation is outside the requirements of the Contract Documents. If a written notice of disputed work is not issued within this time period, or if Contractor proceeds with the disputed Work without first having given the notice required by this paragraph, Contractor shall waive its rights to further claim on the specific issue.
2. City will review Contractor's timely notice of disputed Work and provide a decision. If, after receiving the decision, Contractor disagrees with it

or still considers the Work required to be outside of the requirements of the Contract, it shall so notify Project Manager, in writing, within seven (7) calendar days after receiving the decision, that a formal claim will be issued. Within thirty (30) calendar days of receiving the decision, Contractor shall submit its claim in the form specified herein and all arguments, justification, cost or estimates, schedule analysis, and detailed documentation supporting its position. Contractor's failure to furnish notification within seven (7) calendar days and all justifying documentation within thirty (30) calendar days will result in Contractor waiving its right to the subject claim. If disputed Work persists longer than thirty (30) calendar days, then Contractor shall, every thirty (30) calendar days until the disputed Work ceases, submit to City a document titled "Claim Update" which shall update and quantify all elements of the Claim. Contractor's failure to submit a Claim Update or to quantify costs every thirty (30) calendar days shall result in waiver of the claim for that thirty (30) calendar day period. Claims or claim updates stating that damages will be determined at a later date shall not comply with this paragraph and shall result in Contractor waiving its claim(s).

3. Upon receipt of Contractor's formal claim including all arguments, justifications, cost or estimates, schedule analysis, and documentation supporting its position as previously stipulated, City or its designee will review the issue and render a final determination. If Contractor's claims at project completion total less than \$375,000, then claims resolution shall proceed in the manner prescribed by Article 1.5, Chapter 1, Part 3 of Division 2 of the California Public Contract Code.
  - a. An event or occurrence giving rise to a claim shall be deemed mutually exclusive.
  - b. City and Contractor shall bound by process and time in § 20104, California Public Contract Code.
4. Claims shall be calculated in the same manner as Change Orders. Except where provided by law, or elsewhere in these contract documents (if applicable), City shall not be liable for special or consequential damages, and claims shall not include special or consequential damages.

C. CLAIM FORMAT

1. Contractor shall submit the claim justification in the following format: (a) Cover letter and certification, (b) summary of claim including underlying facts, entitlement, quantum calculations, contract provisions supporting relief, (c) list of documents relating to claim including specifications, drawings, clarifications/requests for information, schedules, other, (d) chronology of events and correspondence, (e) analysis of claim merit, (f) analysis of claim cost, (g) attach supporting documents referenced in (c).

D. EXCLUSIVE REMEDY

1. Contractor's performance of its duties and obligations specified in Paragraph 13 and submission of a claim as provided in this Paragraph 13 is Contractor's sole and exclusive remedy for the payment of money, extension of time, the adjustment or interpretation of Contract terms or other contractual or tort relief arising from this Contract. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout this Agreement) apply notwithstanding the completion, termination, suspension, cancellation, breach or rescission of the Work or this Agreement, negligence or strict liability by City, its representatives, consultants or agents, or the transfer of the Work or the Project to City for any reason whatsoever. Contractor waives all claims of waiver, estoppel, release, bar, or any other type of excuse for non-compliance with the claim submission requirements. Compliance with the notice and claim submission procedures described in this Paragraph 13 is a condition precedent to the right to commence litigation, file a Government Code Claim, or commence any other legal action. No claim or issues not raised in a timely protest and timely claim submitted under this Paragraph may be asserted in any Government Code Claim, subsequent litigation, or legal action.

14. LEGAL AND MISCELLANEOUS

A. LAWS AND REGULATIONS

1. Contractor shall keep fully informed of and shall comply with all laws, ordinances, regulations and orders of any properly constituted authority affecting Contract, Work to be done, and persons connected with Work, and shall protect and indemnify the Indemnitees against any claim or liability, including attorneys' 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 whether laws, ordinances, rules or orders are being complied with.
2. Whenever the Drawings, Special Provisions, and Specifications require large sizes or higher standards than are required by the regulations, the Drawings and Specifications shall govern. Whenever the Drawing, Special Provisions, and Specifications require something that will violate such laws, ordinances, regulations or orders, then such laws, ordinances, regulations or orders shall govern.

B. PERMITS AND TAXES

- a. Contractor and all Subcontractors shall all have an active City of Pittsburg Business License. Payment of fees shall be borne by the each of the respective business entities.
- b. All other permits, government fees, licenses or certifications required for the completion of the Contract.



**C. RESPONSIBILITY OF CONTRACTOR AND INDEMNIFICATION**

1. Indemnitees shall not be liable or accountable in any manner for:
  - a. loss or damage that may happen to Work or any part thereof;
  - b. loss or damage to materials or other things used or employed in performing Work;
  - c. injury, sickness, disease, or death of any person, including, but not limited to, workers and the public; or
  - d. damage to property;resulting from any cause whatsoever except their sole negligence, attributable to performance or character of Work, and Contractor releases said parties from any and all such claims.
2. To the furthest extent permitted by Civil Code Section 2782, the Contractor shall indemnify and save harmless the City, the City Council, each member of the City Council, and the City's officers, agents, volunteers, consultants (Project Construction Manager and Architect/Engineer) and employees (collectively, "Indemnitees"), from all loss, cost, expense, liability and claims of any kind (including, but not limited to, attorney's fees and consultant's expenses), arising out of or in connection with the work to be performed, including but not limited to:
  - a. Liability or claims resulting directly or indirectly from the negligence or carelessness of the Contractor or the Contractor's agents, subcontractors or consultants of any tier in the performance of work, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the Contractor or the Contractor's agents, subcontractors or consultants of any tier;
  - b. Liability or claims arising directly or indirectly from or based on the violation of any law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's agents, subcontractors or consultants of any tier;
  - c. Liability or claims arising directly or indirectly from the use or manufacture by the Contractor, the Contractor's agents, subcontractors or consultants of any tier, or the City in the performance of this contract of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specifically stipulated in this contract;
  - d. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the City or any other parties by the Contractor or the Contractor's agents, subcontractors or consultants of any tier;
  - e. Liability or claims arising directly or indirectly from the willful misconduct of the Contractor or the Contractor's agents,

- subcontractors or consultants of any tier; and
- f. Liability or claims arising directly or indirectly from any breach of the obligations assumed herein by the Contractor.
  - g. Said duty to indemnify shall not be affected or in any way diminished by the fact that the City, the City Council, any member of the City Council, or the City's officers, agents, or employees or Architect may have jointly caused or contributed to the liability or claim by their act, omissions, or conduct amounting to passive negligence.
3. With respect to third party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity against the Indemnitees.
  4. 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.
  5. To the furthest extent permitted by Civil Code, Section 2782, the indemnities, releases of liability and limitations of liability, and limitations of remedy expressed throughout this Contract shall apply even in the event of breach of Contract, negligence (active or passive), fault or strict liability of the party indemnified, released, or limited in liability, and shall survive the termination, rescission, breach, or completion of this Contract. If Contractor fails to perform any of these defense or indemnity obligations, City may in its discretion back charge Contractor for its costs and damages resulting therefrom and withhold such sums from progress payments or other contract monies which may become due.

D. NOTICE OF CONCEALED OR UNKNOWN CONDITIONS

1. Before commencing work of digging trenches or excavation, Contractor shall review all information available regarding subsurface conditions, including but not limited to, information supplied in [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), and subject to the terms and conditions of these documents, Contractor shall also contact Underground Service Alert ("USA") and secure from it all information in its possession regarding underground conditions, including Underground Facilities at the Site. 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 [Document 00 31 33 - Geotechnical Data and Existing Conditions](#) and that provided by USA records.
2. If either of the following conditions is encountered at Site, notice by Contractor shall be given in writing to Project Manager promptly before conditions are disturbed (except in an emergency as required by paragraph 16.D), and in no event later than seven (7) calendar days

after first observance of:

- a. Subsurface or latent physical conditions that differ materially from those indicated in the Contract Documents.
  - b. Unknown physical conditions of an unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in Contract Documents.
3. In response to Contractor's written notice, Project Manager 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 Work, Project Manager will issue a change order under the procedures described in the Contract Documents.
  4. If Project Manager determines that physical conditions at Site are not latent or are not materially different from those indicated in the Contract Documents or that no change in terms of Contract is justified, Project Manager shall so notify Contractor in writing, stating reasons. If City and Contractor do not agree on an adjustment in Contract Sum or Contract Times, Contractor shall proceed with Work as directed by Project Manager and may file a claim as provided for in Paragraph 13.
  5. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed latent or materially different site conditions if:
    - a. Contractor knew of the existence of such conditions at the time Contractor submitted its bid; or
    - b. Contractor should have known of the existence of such condition as a result of having fully complied with the requirements of Paragraph 2 herein; or
    - c. The information or conditions claimed by Contractor to be latent or materially different consist of information, conclusions, opinions or deductions of the kind that Paragraph 2 herein precludes reliance upon; or
    - d. If Contractor failed to give the written notice within the time required above.
  6. If City and Contractor are unable to agree on entitlement to or as to the amount or length of any adjustment in the Contract Sum or Contract Times required under this paragraph, Contractor may make a claim as provided in Paragraph 13.
  7. 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 but not limited to, [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), and information on file at USA;
    - b. Locating all Underground Facilities shown or indicated in Contract Documents, available information, or indicated by visual observation, including but not limited to, and by way of

- example only, engaging qualified locating services and all necessary backhoeing and potholing.
- c. Coordination of 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 Work.
8. If 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 or in information on file at USA, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven (7) calendar days), and prior to performing any Work in connection therewith (except in an emergency as required by paragraph 16.D), identify the owner of such Underground Facility and give written notice to that owner and to Project Manager. During such time, Contractor shall be responsible for the safety/ protection of such Underground Facility.
  9. Contractor shall be allowed an increase in the Contract Sum or an extension of the Contract Times, 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:
    - a. Was not shown or indicated in the Contract Documents or in the information supplied pursuant to [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), or in information on file at USA; and
    - b. The Contractor did not know of it; and
    - c. The 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 a Change Order will not be due, even if the Underground Facility was not indicated in the Contract Documents or in the information supplied to the Contractor pursuant to [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), or in information on file at USA.)
  10. 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 pursuant to [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), or in information on file at USA. Underground Facilities are inherent in construction involving digging of trenches or other excavations and Contractor is to apply its skill and industry to verify the information available.
  11. Paragraphs 14.D.2 through 14.D.4 shall only apply to contracts involving digging of trenches or excavations of greater than four (4) feet in depth, and, for purposes of Public Contract Code Section 7104, specifically identified "technical data" shall be treated as information "indicated" by the Contract Documents.

**E. NOTICE OF HAZARDOUS WASTE OR MATERIALS CONDITIONS**

1. Notice by Contractor shall be given in writing to Project Manager promptly, before any of the following conditions are disturbed (except in an emergency as required by Paragraph 17.D), and in no event later than 24 hours after first observance, of any:
  - a. Material that Contractor believes may be material that is hazardous waste or hazardous material, 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;
  - b. Other material which may present a substantial danger to persons or property exposed thereto in connection with Work at the site.

Except as otherwise provided in the Contract Documents or as provided by applicable law, no notice shall be required to be given by the Contractor for the disturbance or observation of any such hazardous waste or hazardous material where such material is disturbed or observed as part of the scope of Work under the Contract (such as hazardous waste or hazardous material investigation, remediation or disposal activities which are identified as the subject of Work under the Contract), where Contractor complies with all requirements in Contract Documents respecting such materials.

2. Contractor's written notice shall indicate whether the hazardous waste or material was shown or indicated in the Contract Documents to be within the scope of Work, and whether the materials were brought to the site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible. As used in this section the term "hazardous materials" shall include asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material.
3. In response to Contractor's written notice, Project Manager shall promptly investigate the identified conditions, and if finding that conditions do involve hazardous waste or hazardous materials which cause decrease or increase in Contractor's cost of, or time required for, performance of any part of Work, Project Manager will issue a change order under the procedures required by the Contract Documents.
4. If Project Manager determines that conditions do not involve hazardous materials or that no change in terms of Contract is justified, Project Manager shall so notify Contractor in writing, stating reasons. If City and Contractor cannot agree on an adjustment in Contract Sum or Contract Time, Contractor shall proceed with Work as directed by Project Manager and may file a claim as provided under Paragraph 13.
5. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed hazardous waste or materials if:
  - a. Contractor knew of the existence of such hazardous material or hazardous waste at the time Contractor submitted its bid,

including information supplied in [Document 00 31 33 - Geotechnical Data and Existing Conditions](#), Hazardous Material Surveys or information obtained by Consultant as a result of Consultant's additional or supplementary examinations, investigations, explorations, tests, studies and data concerning the conditions at or contiguous to the Site prior to submitting its bid; or

- b. Contractor should have known of the existence of such hazardous material or hazardous waste 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; or
  - c. If Contractor failed to give the written notice within the time required above.
6. If after receipt of notice from Project Manager, Contractor does not agree to resume work based on a reasonable belief it is unsafe, or does not agree to resume work under special conditions, then City may order such portion of Work that is in connection with such hazardous condition or such affected area to be deleted from the Work, or performed by others, or City may invoke its rights to terminate the Contract in whole or in part. City will determine entitlement to or the amount or extent of an adjustment, if any, in Contract Sum or Contract Times as a result of deleting such portion of Work, or performing the Work by others. If Contractor does not agree with City's determination, it may make a claim therefore as provided in Paragraph 13.
  7. If Contractor stops Work in connection with any hazardous condition and in any area affected thereby, Contractor shall immediately redeploy its workers, equipment and materials, as necessary, to other portions of the Work to minimize delay and disruption.

#### F. SUSPENSION OF WORK

1. 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. An adjustment shall be made for increases in cost of performance of Contract caused by any such suspension, delay or interruption. No adjustment shall be made to extent: (a) that performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or (b) that an equitable adjustment is made or denied under another provision of Contract; or (c) that the suspension of work was the direct or indirect result of Contractor's failure to perform any of its obligations hereunder. Adjustments made in cost of performance may have a mutually agreed fixed or percentage fee.

#### G. TERMINATION OF CONTRACT FOR CAUSE

1. Contractor shall be in default of this Contract and City may terminate Contractor's right to proceed under the Contract Documents, for cause:
  - a. Should Contractor make an assignment for the benefit of creditors, admit in writing its inability to pay its debts as they become due, file a voluntary petition in bankruptcy, be adjudged a bankrupt or insolvent, file a petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief under any present or future statute, law, or regulation, filing any answer admitting or not contesting the material allegations of a petition filed against Contractor in any such proceeding, or seek, consent to, or acquiesce in, the appointment of any trustee, receiver, custodian or liquidator of Contractor or of all or any substantial part of the properties of Contractor, or if Contractor, its directors or shareholders, take action to dissolve or liquidate Contractor; or
  - b. Should Contractor commit a material breach of this Agreement and not cure such failure within ten (10) calendar days of the date of notice from City to Contractor demanding such cure; or, if such failure is curable but not curable within such ten (10) calendar day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten (10) calendar days, Contractor must provide City within the ten (10) calendar day period with a written plan acceptable to City to cure said breach, and then diligently commence and continue such cure according to the written plan); or
  - c. Should Contractor violate or allow a violation of any valid law, statute, regulation, rule, ordinance, permit, license or order of any governmental agency applicable to the Project or Work and does not cure such violation within ten (10) calendar days of the date of the notice from City to Contractor demanding such cure; or, if such failure is curable but not curable within such ten (10) calendar day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten (10) calendar days, Contractor must provide City within the ten (10) calendar day period with a written plan to cure said violation acceptable to City, and then diligently commence and continue performance of such cure according to the written plan.)
2. If City at any time reasonably believes that Contractor is or may be in default under its Contract, as defined above, City may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of the Contract and a written plan from Contractor to remedy any failures to perform the terms of the Contract that City may advise the Contractor of in writing. Failure of the Contractor to provide written assurances of performance as required

- herein will constitute a material breach of this Contract sufficient to invoke paragraph 14.G.1.b above.
3. In event of termination for cause, City shall immediately serve written notice thereof upon Surety and Contractor. Surety shall have the rights and obligations set forth in the Performance Bond. Subject to the Surety's rights under the Performance Bond (which rights are waived upon a default under the Performance Bond), City may take over Work and prosecute it to completion by contract or by any other methods it may deem advisable.
  4. In the event of termination by City as provided in subparagraph (1) above for cause,
    - a. City shall compensate Contractor for the value of the Work delivered to City upon termination as determined in accordance with the Contract Documents, subject to all rights of offset and back charges, and provided that Contractor provides City with updated as built and project record documents showing the work performed up to the date of termination. However, City shall not compensate Contractor for its costs in terminating the Work or any cancellation charges owed to third parties;
    - b. Contractor shall deliver to City possession of the Work in its then condition, including but not limited to, all designs, engineering, project records, cost data of all types, Drawings, Special Provisions, and Specifications and contracts with vendors and subcontractors, and all other documentation associated with the Project, and all construction supplies and aids dedicated solely to performing Work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period. 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 Paragraph shall not be interpreted to diminish any right which City may have to claim and recover damages for any breach of this Agreement, but rather, Contractor shall compensate City for all loss, cost, damage, expense, and/or liability suffered by City as a result of such termination and failure to comply with the Contract Documents.
  5. In the event a termination for cause is determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and Contractor shall have no greater rights than it would have had if a termination for convenience had been effected. Any Contractor claim arising out of a termination for default shall be made in accord with the provisions of the Contract Documents on claims and calculated in accordance with the provisions of the Contract Documents on Change Orders and claims. No other loss, cost, damage, expense or liability may be claimed, requested or recovered



by Contractor.

H. TERMINATION OF CONTRACT FOR CONVENIENCE

1. City may terminate performance of Work under Contract in accordance with this clause in whole, or from time to time in part, whenever City shall determine that termination is in best interest of City. Termination shall be effected by delivery to Contractor of notice of termination specifying extent to which performance of Work under Contract is terminated, and date upon which termination becomes effective.
2. After receipt of notice of termination, and except as otherwise directed by City, Contractor shall:
  - a. Stop Work under Contract on date and to extent specified in notice of termination;
  - b. Place no further orders or subcontracts for materials, services, or facilities except as necessary to complete portion of Work under Contract which is not terminated;
  - c. Terminate all orders and subcontracts to extent that they relate to performance of Work terminated by notice of termination;
  - d. Assign to City in manner, at times, and to extent directed by City, all right, title, and interest of Contractor under orders and subcontracts so terminated. City shall have right, in its discretion, to settle or pay any or all claims arising out of termination of orders and subcontracts;
  - e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with approval or ratification of City to extent City may require. City's approval or ratification shall be final for purposes of this clause;
  - f. Transfer title to City, and deliver in manner, at times, to extent, if any, directed by City, fabricated or unfabricated parts, Work in process, completed Work, supplies, and other material produced as part of, or acquired in connection with performance of, Work terminated by notice of termination, and completed or partially completed plans, drawings, information, and other property which, if Contract had been completed, would have been required to be furnished to City;
  - g. Use best efforts to sell, in manner, at times, to extent, and at price or prices that City directs or authorizes, any property of types referred to in Paragraph 2.f. above, but Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under conditions prescribed and at price or prices approved by City. Proceeds of transfer or disposition shall be applied in reduction of payments to be made by City to Contractor under Contract or shall otherwise be credited to price or cost of Work covered by Contract or paid in such other manner as City may direct;
  - h. Complete performance of part of Work as shall not have been

- terminated by notice of termination; and
- i. Take such action as may be necessary, or as City may direct, for protection and preservation of property related to Contract which is in possession of Contractor and in which City has or may acquire interest.
3. After receipt of notice of termination, Contractor shall submit to the City a termination claim, in form and with certification City prescribes. Claim shall be submitted promptly but in no event later than six (6) months from effective date of termination. Contractor and City may agree upon whole or part of amount or amounts to be paid to Contractor because of total or partial termination of Work under this clause. If Contractor and City fail to agree, on whole amount to be paid to Contractor because of termination of Work under this clause, City shall determine, on basis of information available to it, amount, if any, due to Contractor by reason of termination and shall pay to Contractor for Work specified in Contract that is performed before effective date of notice of termination, total (without duplication of any items) of:
- a. Reasonable cost to Contractor, without profit, for all Work performed prior to notice of termination, including Work done to secure project for termination. In determining reasonable cost, deductions will be made for cost of materials to be retained by Contractor, amounts realized by sale of materials, and for other appropriate credits against cost of Work. Reasonable cost will include reasonable allowance for project overhead and general administrative overhead not to exceed a total of ten (10) percent of direct costs of such work.
  - b. When, in opinion of City, cost of contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, reasonable cost to be allowed will be estimated, reasonable cost of performing work in compliance with requirements of Drawings, Special Provisions, and Specifications and excessive actual cost shall be disallowed.
  - c. Reasonable allowance for profit on cost of Work performed as determined under Subsection (1), provided Contractor establishes to satisfaction of City that Contractor would have made a profit had Contract been completed and provided further, that profit allowed shall not exceed five (5) percent of cost.
  - d. Reasonable cost to Contractor of handling material returned to vendor, delivered to City or otherwise disposed of as directed by City.
  - e. Reasonable allowance for Contractor's administrative costs in preparing termination claim.
  - f. City shall have no obligation to pay Contractor under this paragraph 13.H unless and until Contractor provides City with updated and acceptable as-builts and project record documents

- for Work completed prior to termination.
4. In no event shall City be liable for costs incurred by Contractor or subcontractors after receipt of a notice of termination. Such non-recoverable costs include, but are not limited to, anticipated profits on Contract, post-termination employee salaries, post-termination administrative expenses, post-termination overhead or unabsorbed overhead, costs of preparing and submitting bid, attorney's fees or other costs relating to prosecution of claim or lawsuit.
  5. In arriving at amount due Contractor under this clause there shall be deducted:
    - a. all unliquidated advance or other payments on account theretofore made to Contractor, applicable to terminated portion of Contract,
    - b. any claim which City may have against Contractor in connection with Contract, and
    - c. the agreed price for, or proceeds of sale of, any materials, supplies, or other things kept by Contractor or sold, under provisions of this clause, and not otherwise recovered by or credited to City.

I. CONTINGENT ASSIGNMENT OF SUBCONTRACTORS

1. Each subcontract agreement for a portion of the Work is assigned by Contractor to City provided that:
  - a. Assignment is effective only after termination of Contract by City for cause pursuant to Paragraph G above or for convenience pursuant to Paragraph H above; and,
  - b. Assignment is effective only for those subcontract agreements that City accepts by notifying the Subcontractor in writing; and
  - c. Assignment is subject to the prior rights, if any, of the surety, obligated by the bond provided under the Contract, where the Surety exercises its rights to complete the Contract.

J. REMEDIES

1. Subject to the Contract provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, all claims, counter-claims, disputes and other matters in question between City and Contractor arising out of or relating to this agreement or its breach will be decided in a court of competent jurisdiction within the State of California, County of Contra Costa. All City remedies provided in this Contract shall be taken and construed as cumulative; that is, in addition to each and every other remedy herein provided; and City shall have any and all equitable and legal remedies that it would have according to law.

K. PATENTS

1. Fees or claims for any patented invention, article or arrangement that

may be used upon or in any manner connected with performance of Work or any part thereof, shall be included in price bid for doing Work. Contractor shall save, keep, bear harmless, and fully indemnify City and its directors, officers, agents, volunteers and consultants ("Indemnitees") from all damages, claims for damages, costs or expenses in law or equity, including attorneys' fees, that may at any time arise or be set up for any infringement of the patent rights, copyright, trade name, trademark, service mark, trade secret or other like intellectual property of any person or persons in consequence of use by City, or any of its officers, agents, or consultants of articles to be supplied under the contract and of which Contractor is not patentee or assignee or has not lawful right to sell the same. Such costs or expenses for which Contractor agrees to indemnify and hold harmless the above Indemnitees includes, but is not limited to, any and all license fees, whether such fees are agreed to or ordered by a court or administrative body of competent jurisdiction.

L. SUBSTITUTION FOR PATENTED AND SPECIFIED ARTICLES

1. Except as noted specifically in Special Provisions, Specifications, 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 equivalent", and Contractor may offer any substitute material or process which Contractor considers equal in every respect to that so designated, and if material, or process, offered by Contractor is, in opinion of Project Manager, equal in every respect to that so designated, its use will be approved. Contractor shall submit to Project Manager a separate request for substitution pursuant to [Section 01 25 00 - Substitution Procedures](#).

M. INTEREST OF PUBLIC OFFICERS

1. 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 have any interest, direct or indirect, in this contract or the proceeds thereof.

## N. LIMIT OF LIABILITY

1. City of Pittsburg, its employees, officers, directors, agents, volunteers, or consultants 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.

## O. SEVERABILITY

1. Any provisions or portions thereof of this Agreement prohibited by, unlawful, or unenforceable under any applicable law of any jurisdiction shall as to such jurisdiction be ineffective without affecting other provisions or portions thereof in this Agreement. If the provisions of such applicable law may be waived, they are hereby waived to the end that this Agreement may be deemed to be a valid and binding agreement enforceable in accordance with its terms. If any provisions or portion thereof of this Agreement are prohibited by, unlawful, or unenforceable under any applicable law and are therefore stricken or deemed waived, the remainder of the provisions and this Agreement shall be interpreted to achieve the goals or intent of the stricken or waived provisions or portions thereof to the extent such interpretation is consistent with applicable law.

## 15. MODIFICATIONS OF CONTRACT

## A. ALTERATIONS, MODIFICATIONS AND FORCE-ACCOUNT WORK

1. No modification or deviation from the Drawings, Special Provisions, and Specifications will be permitted except by written addenda, written change order or written Supplemental Instruction.
2. Project Manager, before the date of completion of Work, may order changes in Work or Contract Times herein required, and may order extra materials and extra work in connection with performance of Contract, and Contractor shall promptly comply with such orders. Any such orders shall be diligently carried out by Contractor in accordance with the Contract Documents. If changes ordered in design, workmanship or materials are of such a nature as to increase or decrease cost of any part of Work, price fixed in Contract shall be increased or decreased by amount as Contractor and City may agree upon as reasonable and proper allowance for increase or decrease in cost of Work. If agreement cannot be reached, then City shall reach a determination, which shall be final, subject to Contractor's rights under Paragraph 13 herein.
3. Alterations, modifications or extras which result in change in Contract Sum or Contract Times or both, shall be effected by written Contract Modification which has been approved by City. Those alterations or modifications which do not result in change in Contract Sum or Contract Times, and do not substantially change Drawings, Special Provisions,

or Specifications, shall be effected only by written directive to Contractor from Project Manager.

4. Contractor shall, upon request by City, permit inspection of the original unaltered Contract bid estimate, subcontract agreements, and purchase orders relating to the change; and documents substantiating all costs associated with the cost proposal.
5. Changes in the Work made pursuant to this Paragraph and extensions of Contract time necessary by reason thereof shall not in any way release the guarantees/warranties given by Contractor pursuant to provisions of the Contract Documents, nor shall such changes in the Work relieve or release the sureties of bonds executed pursuant to said provisions. The sureties, in executing such bonds, shall be deemed to have expressly agreed to any such change in the Work and to any extension of time made by reason thereof.
6. Procedures for modifications of contract are given in [Section 01 26 00 - Contract Modification Procedures](#).

**B. ENTIRE AGREEMENT**

1. The Contract Documents, and any Contract Modifications, shall represent the entire and integrated agreement between City and Contractor regarding the subject matter of this agreement and shall constitute the exclusive statement of the terms of the parties' agreement. The Contract Documents, and any Contract Modifications, shall supersede any and all prior negotiations, representations or agreements, either written or oral, express or implied, that relate in any way to the subject matter of this agreement or written modifications. City and Contractor represent and agree that they are entering into this agreement and any subsequent written modification in sole reliance upon the information set forth in the Contract Documents or Contract Modifications and the parties are not and will not rely on any other information.

**C. EFFECT OF WAIVERS**

1. 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.

## 16. TIME ALLOWANCES

## A. TIME ALLOWANCE FOR PERFORMANCE OF CONTRACT

1. When Contract has been signed by Contractor and City, City will serve a Notice to Proceed upon Contractor to that effect, either by depositing notice in a post office or post office box regularly maintained by United States Postal Service in a postpaid wrapper directed to Contractor at legal address, or (at City's option) by delivery by other means at legal address.
2. Start date for Contract Time shall be on the date indicated in the Notice to Proceed. If no date is indicated, then the start date for Contract Time shall be as set forth in Paragraph 4.B hereof. Total number of calendar days for completion of Work on Contract shall be as provided in [Document 00 52 13 – Agreement Form](#).

## B. CHANGE OF CONTRACT TIMES

1. The Contract Time (or milestones) may only be changed by Change Order or Written Amendment and all time limits stated in the Contract Documents are of the essence of the Agreement. The Contract Time (or milestones) will be adjusted due to the following:
  - a. Changes in the Work ordered by City;
  - b. Acts or neglect by City, or its Project Manager, acts or neglect of utility owners, acts or neglect of other Contractors performing other Work, provided Contractor has fully and completely performed its responsibilities under the Contract Documents, including but not limited to, its cooperation and coordination responsibilities required by the Contract Documents;
  - c. Fires, floods, abnormal weather conditions, earthquakes, civil disturbances, or acts of God, provided damage resulting therefrom is not the result of Contractor's failure to properly protect the Work as required by the Contract Documents.
2. Notwithstanding the foregoing, the Contract Time (or milestones) shall not be extended unless Contractor has actually been prevented from completing any part of the Work within the Contract Time (or milestones) which are on the critical path of the construction schedule due to delay which is (i) beyond the control of Contractor and (ii) due to reasons for which Contractor is not responsible and (iii) a claim for delay is made as provided for herein. Delays attributable to and within the control of a Contractor, or its subcontractors, or supplier shall be deemed to be delays within the control of Contractor.
3. Where Contractor is prevented from completing any part of the Work within the Contract Time (or milestones) due to delay beyond the control of both City and Contractor, an extension of Contract Time (or milestones) in an amount equal to the time loss due to such delay shall be the Contractor's sole and exclusive remedy for such delay. City shall not be liable to Contractor, any Subcontractor, any supplier, or any

other person or organization, or to any surety for or employee or agent of any of them, for damages or extra costs of any type arising out of or resulting from (i) delays caused by or within the control of Contractor, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, earthquakes and acts of God or acts or neglect by utility owners or other Contractors performing other work as contemplated by Paragraph 7.

4. Delays due to adverse weather conditions will not be allowed for weather conditions that fall within parameters listed herein. Adverse weather delays may be allowed only if number of days of adverse weather exceeds these parameters and Contractor can prove that adverse weather actually caused delays. Parameters are as follows:
5. Rain days: January, 11; February, 10; March, 10; April, 6; May, 3; June, 1; July, 0; August, 0; September, 1; October, 4; November, 7; December, 10.
6. Holidays, weekends, other non-working days.

#### C. NOTICE OF DELAY

1. Within seven (7) calendar days of the beginning of any delay Contractor shall notify Project Manager, in writing, of all anticipated delays resulting from the delay event in question.
  - a. Notice shall constitute application for extension of time only if notice requests extension and sets forth the impact of the delay on the critical path and Contractor's estimate of additional time required together with full recital of causes of unavoidable delays relied upon.
  - b. After receipt of a request for a time extension, with verifiable documents and justifications included, Project Manager will make decision thereon, and will advise Contractor in writing. No time extensions shall be considered without related documents and justifications necessary for Project Manager to make determination.
  - c. No time extensions shall be granted for delays for which Contractor fails to give timely notice and Contractor hereby waives any and all damages for delay for which timely notice is not given.
2. Any request for extension of time shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant is entitled as a result of the occurrence of said event. All claims and adjustments in the Contract Time (or milestones) shall be determined by Project Manager. No claim for an adjustment in the Contract Time (or milestones) will be valid and such claim will be waived if not submitted in accordance with the requirements of this paragraph.

#### D. NO DAMAGE FOR CONTRACTOR CAUSED DELAY



1. Contractor shall not be entitled to any time extension or compensation, including but not limited to extended field or home office overhead, field supervision, costs of capital, interest, escalation charges, acceleration costs or other impacts for any delays caused in whole or in part by Contractor's failure to perform its obligations under this Contract, or during periods of delay concurrently caused by Contractor and either City or others. Contractor may receive time extension and be compensated for delays caused directly and solely by City except that Contractor shall not be entitled to damages for delay to the Work caused by the following reasons:
  - a. City's right to sequence Work in manner which would avoid disruption to the City's tenants and their contractors or other prime contractors and their respective subcontractors, exercised as a result of Contractor's failure to perform its cooperation and coordination responsibilities required by this Contract; City's enforcement of government act or regulation, or the provisions of the Contract Documents;
  - b. For changed site conditions that are beyond contemplation of parties, except that City may approve direct costs associated with unknown conditions but not costs or damages which are result of such delays; and
  - c. Extensive requests for clarifications to construction documents or modifications to contract, provided such clarifications or modifications are processed by City or its consultants in a reasonable time commensurate with provisions of Contract requirements.

E. LIQUIDATED DAMAGES

1. Contract may provide time within which Work or portions thereof shall be completed and may provide for payment of agreed liquidated damages to City for every calendar day thereafter during which Work shall be uncompleted.
2. Execution of Contract by Contractor shall constitute acknowledgement by Contractor that Contractor understands, has ascertained and agrees that City will actually sustain damages in the amount fixed in Contract for each and every calendar day during which completion of Work required is delayed beyond expiration of time fixed for completion or extensions of time as have been allowed pursuant to provisions hereof. Contractor and City agree that such damages shall be presumed to be the damages actually sustained by City as defined below, and that because of the nature of the project, it would be impracticable or extremely difficult to fix the actual damages.
3. There shall be deducted from any money due or to become due to Contractor subsequent to time for completion of entire Work and extensions of time allowed pursuant to provisions hereof, a sum representing the then accrued liquidated damages.

4. Liquidated damages shall be considered not as a penalty but as agreed monetary damage sustained by City for increased project administration expenses, including extra inspection, construction management and architectural and engineering expenses, interest expenses, related to this Contract because Contractor failed to perform and complete Work within time fixed for completion or extensions of time as have been allowed pursuant to provisions hereof. Liquidated damages shall not be deemed to include within their scope additional damages arising from defective work, lost revenues, cost of completion of the contract, cost of substitute facilities, or damages suffered by others or other forms of liability claimed against City as a result of delay (e.g., delay or delay related claims of other contractors, subcontractors or tenants), and defense costs thereof; Contractor shall be responsible for the actual amount of such damages.
5. Should Contractor fall behind approved Progress schedule, City reserves right to deduct liquidated damages based on estimated period of late completion. City need not wait until Contract completion to withhold liquidated damages from Contractor's progress payments. Should money due or to become due to Contractor be insufficient to cover agreed liquidated damages, then Contractor forthwith shall pay remainder to City.

## 17. WORKING CONDITIONS AND PREVAILING WAGES

### A. USE OF SITE/SANITARY RULES

1. All portions of Work shall be maintained at all times in neat, clean and sanitary condition. Toilets shall be furnished by Contractor where needed, for use of employees on Site, and their use shall be strictly enforced. They shall be properly secluded from public observation, and shall be located, constructed and maintained subject to approval of Project Manager.
2. 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 the Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements, or as designated by Project Manager, 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, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of Work.
3. During the progress of Work, Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. If Contractor fails to keep the Project neat, clean, and sanitary, City may do so at Contractor's sole expense should Contractor not remedy the situation within five (5) calendar days written

notice from the Project Manager. At the completion of the Work, Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the site clean and ready for occupancy by City at Substantial Completion of Work. The Contractor shall restore to original condition all property not designated for alteration by Contract Documents.

4. 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 will conduct all necessary existing conditions investigation regarding structural, mechanical, electrical or any other system existing, shall perform its 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.

**B. PROTECTION OF WORK, PERSON AND PROPERTY**

1. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with Work. Contractor shall comply with all safety requirements specified in any safety program established by City in consultation with Contractor. Contractor shall be responsible for all damage to Work, property or structures, and all injuries to persons, arising from the performance of the Contract. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - a. All persons on Work site, adjacent work sites, and any other person who may be affected by the Work;
  - b. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
  - c. All work, property or structures at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities, not designated for removal, relocation or replacement in the course of construction. In particular, but without limiting the foregoing, Contractor shall, on a daily basis, remove or paint over all graffiti, posters, bills or other disfigurements on any and all portions of the Work, construction equipment, materials, fencing, signs and any other property related to the construction of the Work.
2. Where necessary, Contractor shall furnish guards, fences, warning signs, walks and lights and take all necessary precautions to prevent damage or injury. Safety orders, rules and recommendations of Division of Industrial Safety of California or City of Pittsburg or County of Contra Costa applicable to Work shall be obeyed and enforced by Contractor.

3. 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.
4. All damage, injury or loss to any property referred to in subparagraph (b) or (c) of paragraph 1 above, 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, shall be remedied by Contractor. Contractor's duties and responsibilities for safety and for protection of Work shall continue until such time as all the Work is completed and Final Acceptance of the Work. Neither City nor any of its agents assume any responsibility for collecting indemnity from any person or persons causing damage to work of Contractor. The existence of insurance coverage for any damage so incurred shall in no way limit Contractor's liability or City's rights of indemnity.
5. 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.
6. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with laws or regulations.
7. City may, at its option, retain such moneys due under Contract as City deems necessary until any and all suits or claims against Contractor for injury to persons or property shall have been settled and satisfactory evidence to that effect furnished.

C. RESPONSIBILITY FOR SAFETY AND HEALTH

1. Contractor shall insure that Contractor, Contractor's employees, agents, invitees, subcontractors and their employees, agents and invitees while at Site comply with applicable health and safety laws including without limitation, 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 further comply with all directions of City regarding protective clothing, head covering, eye protection, etc.
2. Safety of all persons employed by Contractor or subcontractors and their respective agents and invitees on Site shall be the full responsibility of Contractor. Contractor shall notify Project Manager, in

writing, of existence of hazardous conditions, property or equipment at Site which are not under Contractor's control. However, it shall be Contractor's responsibility to take necessary precautions against injury to persons or damage to the property of Contractor, subcontractors or persons from recognized hazards until corrected by responsible party.

3. Contractor shall confine all persons under Contractor's employ or employ of subcontractors or any other person acting on behalf of Contractor or subcontractors to that portion of Site where work under Contract is to be performed, to routes to be designated by City for ingress and egress thereto and to any other areas City may expressly permit Contractor to use. Within such areas, except those routes for ingress and egress over which Contractor has no right of control, Contractor shall provide safe means of access to all places at which persons may at any time have occasion to be present.

#### D. EMERGENCIES

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

#### E. USE OF ROADWAYS AND WALKWAYS

1. Contractor shall not unnecessarily interfere with use of any roadway, walkway or other facility for vehicular or pedestrian traffic. Wherever interference becomes necessary for proper and convenient performance of Work, and no satisfactory detour route exists, Contractor shall, before beginning interference, provide satisfactory protection, detour, temporary bridge, or other proper facility for traffic to pass through, around or over interference and shall maintain it in satisfactory condition as long as interference continues, all without direct payment unless otherwise provided in Contract Documents

#### F. EQUAL OPPORTUNITY AND NON-DISCRIMINATION

1. Attention is directed to the provisions of Government Code Section 12940. Contractor shall not refuse to hire or employ a person or refuse to select a person for a training program leading to employment, or to bar or to discharge a person from employment or from a training program leading to employment, or to discriminate against a

person in compensation or in terms, conditions or privileges of employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, or sex.

2. Minority Employment/Local Resident/Local Business Guidelines (Voluntary Program)

a. Objective: To increase awareness and utilization of, and encourage employment opportunities for minorities, local residents and local businesses and suppliers within the City of Pittsburg.

b. Definitions:

1) "City" means the City of Pittsburg.

2) "Contractor" means the individual, partnership, corporation, joint venture or other legal entity desiring to obtain a public works contract with the City.

3) "Local business or supplier" means a business or supplier that is located in the City and meets all of the following criteria:

a) The business is at a fixed, established commercial or residential address, which constitutes the business location, and at which work of an administrative, clerical, professional or production nature pertinent to the contract between the Agency and the contractor is conducted.

b) The business is not a temporary office, movable office or post office box.

c) The business has a City business license tax certificate.

d) The business has been in existence for at least six (6) months in the City; and

e) The business has proof of past contracts citing its Pittsburg business address.

4) "Minority" means a person who is in the following racial or ethnic groups:

a) African American is a person having origins in any of the Black racial groups of Africa.

b) Hispanic is a person of Mexican, Puerto Rican, Cuban, Central or South American descent and Spanish culture.

c) Asian or Pacific Islander is a person having origins in any of the original peoples of the Far East, Southeast Asia, the Pacific Islands or the Indian Subcontinent including China, Japan, Korea, Philippine Islands, Samoa, India, Pakistan, Bangladesh, Nepal, Sikkim, Sri Lanka and Bhutan.

d) Native America is a person having origins in any

of the original peoples of North America and who maintain cultural identification through tribal affiliations.

- e) For purposes of this program, women shall also be included in the definition of minorities.
- 5) "Public works contract" means any construction, alteration, demolition, or repair work done under contract and paid in whole or in part out of public funds or a contractor who receives a subsidy from the City, be it financial or otherwise.
- c. Goals
  - 1) The contractor who is awarded a public works contract by the City is encouraged to use its best efforts to recruit minority candidates for employment positions. The contractor is encouraged to employ and endeavor to maintain a minority work force of at least twenty percent (20%) on a craft-by-craft basis.
  - 2) The contractor who is awarded a public works contract by the City is encouraged to use its best efforts to recruit City residents for employment positions. The contractor is encouraged to employ and endeavor to maintain a local City resident work force of at least fifty percent (50%) on a craft-by-craft basis.
  - 3) The contractor who is awarded a public works contract by the City is encouraged to use its best efforts to utilize local businesses and suppliers in connection with the contract. The contractor is encouraged to allocate at least twenty percent (20%) of the dollar amount of the contract to the utilization of local businesses, such as in the purchase of supplies and services.
- d. A copy of Resolution No. 93-8022 is attached as "Appendix A".
- e. Reporting Requirements
  - 1) Each contractor is required to complete and submit on a monthly basis a Monthly Employment Report and a Monthly Services and Supplier Report. The contractor shall submit these reports at the end of each month until all work on the project has been completed. Samples of the Monthly Employment Report and the Monthly Services and Supplier Report have been provided herewith.





- 2) Upon completion of the public works project, each contractor is required to submit a summary of the actions, activities and efforts it used or attempted to use to meet the guidelines of this program and also any significant problems or difficulties it encountered in achieving the guidelines set forth above.
- f. Voluntary: This program is voluntary in nature and is not intended to supersede nor conflict with any applicable State or Federal regulations nor any State or Federal laws pertaining to the funding of a public works project.

G. PREVAILING WAGES

1. Pursuant to Labor Code, Sections 1770 et seq., Contractor shall pay to persons performing labor in and about Work provided for in Contract 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 legal holiday and overtime work in said locality, which per diem wages shall not be less than the stipulated rates contained in a schedule thereof which has been ascertained and determined by the Director of the State Department of Industrial Relations to be the general prevailing rate of per diem wages for each craft or type of worker or mechanic needed to execute this contract.
2. Contractor shall forfeit, as a penalty to City, Fifty Dollars (\$50.00) for each laborer, worker, or mechanic employed for each calendar day, or portion thereof, of such laborer, worker or mechanic is paid less than the said stipulated rates for any work done under this contract 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 California Labor Code. The sums and amounts that shall be forfeited pursuant this paragraph 2 and the terms of the Labor Code shall be withheld and retained from payments due to Contractor under said contract, pursuant to this contract, and the terms of 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 final amount of forfeiture shall be determined by the Labor Commissioner pursuant to Labor Code section 1775.
3. Contractor shall insert in every subcontract or other arrangement which Contractor may make for performance of work or labor on Work provided for in 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 holidays and overtime work fixed as provided in the Labor Code.

**END OF DOCUMENT 00 72 00**

**SECTION 00 73 00 – SUPPLEMENTARY CONDITIONS**

The following supplements [Document 00 72 00 – General Conditions](#)

Article 5B.1: Provide insurance as specified and with the following limits:

Subparagraph 5.B.1.a: Comprehensive general liability insurance coverage is \$2,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location, or the general aggregate limit shall be twice the required occurrence limit.

Subparagraph 5.B.1.b: Comprehensive automobile liability insurance is \$1,000,000 each person Bodily Injury, \$1,000,000 each occurrence Bodily Injury and \$1,000,000 each occurrence Property Damage.

Subparagraph 5.B.1.c: All-risk course of construction insurance amount is 100% of the completed value of the work to be done under this contract. Deductible is \$10,000.

Subparagraph 5.B.1.d: Employer Liability Insurance (Worker’s Compensation) is \$2,000,000 each accident or disease.

Insurance is to be placed with insurers with BEST’s ratings of no less than A:VII.

Each Insurance policy shall contain endorsements containing the following:

The City of Pittsburg and its respective officials, officers, employees, volunteers, representatives, agents, consultants (including but not limited to Architect/Engineer and Construction Manager), (“Additional insureds” or “Indemnities”) shall be named as additional insured.

**END OF SECTION 00 73 00**

**DOCUMENT 00 91 13 – ADDENDA**

ADDENDUM NO. [#], Dated [Month, Day, Year]

PROJECT: Pittsburg Water Treatment Plant  
Genius Bus Replacement Project  
300 Olympia Dr.  
Pittsburg, CA 94565

CONTRACT NO.: 5009

FROM: City of Pittsburg

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents, dated [Month, Day, Year] and previous Addenda as noted below. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may subject Bidder to disqualification.

This Addendum consists of [##] pages and all attachments noted herein.

1. CHANGES TO PRIOR ADDENDA:

Addendum No. [#], Dated [Month, Day, Year]

Item # [#]: Change:

To Read:

Item # [#]: Change:

To Read:

2. CHANGES TO PROJECT MANUAL:

[Section No.] - [Title]

Item # [#]: Change:

To Read:

Item # [#]: Change:

To Read:

[Section No.] - [Title]

Item # [#]: Change:

To Read:

Item # [#]: Change:

To Read:

3. CHANGES TO DRAWINGS:

[Sheet No.] - [Title]:

Item # [#]: Change:

As Follows:

Item # [#]: Change:

As Follows:

[Sheet No.] - [Title]:

Item # [#]: Change:

As Follows:

Item # [#]: Change:

As Follows:

**END OF DOCUMENT 00 91 13**

**SECTION 01 10 00 – SUMMARY****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section describes the contract and other work, plus project requirements.

**1.2 CONTRACT DESCRIPTION**

- A. Summary of the Work: The work of this Contract consists, in general, of all necessary construction activities to replace existing PLC components, including controllers, input/output modules, and communication modules. Wiring between components throughout the plant is to be per-formed and includes the construction of new duct banks and appurtenances.
- B. Contract: Perform Work of Contract under stipulated sum contract with City per Contract Documents.
- C. Responsible Parties: Construction of the Project is governed by the agreement between the City and the Contractor. Statements in the specifications are directed to this contractor, who has overall responsibility for the subcontractors.
- D. Project Manager: The City will provide a Project Manager who will administer the project during the course of the contract.

**1.3 WORK UNDER OTHER CONTRACTS**

- A. Separate Contracts: The City may award separate contracts for performance of certain construction operations at the site. Those operations will be conducted simultaneously with the work under the Contract.

**1.4 BID ITEMS**

- A. Bid Items: Bid items are described in Document 00 41 13 – Bid Form. Any bid item may be deleted 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.

**1.5 MISCELLANEOUS WORK**

- A. Miscellaneous Work Requirements: Coordinating, handling, transporting, and installing items such as field testing of systems; leveling; furnishing, coordinating, and installing sleeves, anchors, and other embedded items; posting of signs; performing traffic routing work; providing operating and maintenance data and instruction of the City Project Manager; performing warranty work as required; and doing incidental and related work to place all systems and structures in

operating condition as designed and as required by Federal, State and Local codes and regulations. Refer to [Document 00 72 00 - General Conditions](#) for a summary of work requirements.

## 1.6 OWNER-FURNISHED PRODUCTS

### A. Owner's Responsibilities:

1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples to Contractor.
2. Upon delivery, inspect products jointly with Contractor.
3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
4. Arrange for manufacturers' warranties, inspections, and service.

### B. Contractor's Responsibilities:

1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
2. Receive and unload products at Site; inspect for completeness or damage jointly with Owner.
3. Arrange and pay for delivery to Site. Retrieve items from City Corporation Yard or other designated location, as required, and transport to site. Transport salvaged items to City Corporation Yard.
4. Handle, store, install, and finish products.
5. Repair or replace items damaged after receipt.

## 1.7 WORK SEQUENCE

- ### A. Stages: Construct Work in stages and at times to accommodate City operation requirements during the construction period; coordinate construction schedule and operations with Project Manager.

## 1.8 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

- ### A. Coordination: Coordinate with City and any City forces, or other contractors and forces, as required by [Document 00 72 00 - General Conditions](#), Paragraph 1.6.

## 1.9 CONTRACTOR USE OF PREMISES

- ### A. General: During the construction period the Contractor shall have full use of the premises within the "limits of work" for construction operations, including use of the site. The Contractor's use of the premises is limited only by the City's right to perform work or to retain other contractors on portions of the Project.

### B. Use of the Site:

1. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available for emergency vehicles at all times.
2. Traffic and Barrier Plan: When the Contractor needs to access portions of roadways and driveways, on and adjacent to the work, Contractor is

- required to submit a traffic and barrier plan to the City for their review and approval prior to setting up any traffic control devices.
3. Stored Materials: The Contractor assumes all responsibility for protection and safekeeping of material stored on the premises. Moving stored materials which interfere with the operations of the City or other contractors is the responsibility of the Contractor.
  4. Condition of Site: Maintain work areas in a safe condition at all times, remove all graffiti and accumulated rubbish and surplus materials at the end of each work day, and clean and restore the work site at completion of the work to the condition that existed prior to the start of work.
- C. Security of the Contractor's Work Area: The security of the Contractor's work areas and its property, equipment, construction materials, and all other items contained in the Contractor's staging areas or elsewhere on the construction site shall be solely the Contractor's responsibility at all times.

#### 1.10 MAINTENANCE

- A. Contractor's Responsibility: Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

#### 1.11 OCCUPANCY REQUIREMENTS

- A. Early Occupancy: Whenever, in the opinion of Project Manager, Work or any part thereof is in a condition suitable for use, and the best interest of City requires such use, City may take beneficial occupancy of and connect to, open for public use, or use the Work or such part thereof. In such case, City will inspect the Work or part thereof, and issue a Certificate of Substantial Completion for that part of Work.
- B. Repairs: 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 [Document 00 72 00 - General Conditions](#).
- C. Acceptance: 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.
- D. Partial Completion: City may specify in the Contract Documents that portions of the Work, including electrical and mechanical systems or separate structures, shall be substantially completed on milestone dates prior to substantial completion of all of the Work. Contractor shall notify Project Manager in writing when Contractor considers any such part of the Work ready for its intended use



and substantially complete and request Project Manager to issue a Certificate of Substantial Completion for that part of the Work.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 10 00**

## SECTION 01 22 00 –UNIT PRICES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section specifies procedures and requirements for measurement and payment for unit price items listed on the Bid Form for each unit of work described herein.
- B. Refer to [Document 00 72 00 - General Conditions](#) and [Section 01 29 00 – Payment Procedures](#) for related requirements pertaining to change orders, payments and unit prices.
- C. Prices:
  - 1. In addition to Base Bid, Bidder shall quote unit prices, in appropriate spaces on Bid Form for each unit of work as described herein. Change Orders will be based on unit prices quoted on Bid Form for applicable work.
  - 2. In event any unit price quoted appears to compare unfavorably with currently established prices for type of work, City reserves the right to require quoted price to be substantiated or adjusted prior to execution of contract.
  - 3. Unit prices listed on the Bid Form for the following items shall constitute full and complete compensation for each unit, and shall include cost of temporary and administrative work, permits, bonds, insurance, sales taxes, overhead, profit and every other expense, direct or indirect, incident to accomplishment of work under each item.

### PART 2 - PRODUCTS

NOT USED

### PART 3 - EXECUTION

#### 3.1 MEASUREMENT

- A. Measurement of quantities for payment will be made or determined by City's Inspector.
  - 1. Volume of any material shall be based on information included with Drawings and additional measurements obtained by Inspector, or by combination of such information, or in a manner which, in the opinion of the Inspector, is best suited to obtain necessary accuracy.

2. In case of unit prices based upon weight measurement, certified weight tickets shall be supplied at time of delivery of materials.
3. Excess materials delivered to the site, but not incorporated in the work, will not be paid for.

### 3.2 UNIT PRICE ITEMS

\*\* To be edited for specific project and connected with bid items in Special Provisions \*\*

Example:

#### A. Aggregate Base Course:

1. Basis of Measurement: By the cubic yard or tons as specified in the bid form. If measurement is by the ton, water content in excess of optimum moisture content shall be deducted from the total weight of aggregate. If measurement is by the cubic yard, quantities of aggregates will be calculated on the basis of dimensions shown on the plans. No allowance will be made for aggregate rejected or placed outside said dimensions unless otherwise order by the City's Project Manager. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, driveways, curb ramps, median curbs, median nose surfacing, bus turnouts, retaining curbs, and in utility trenches shall not be measured.
2. Basis of Payment: Includes full compensation for furnishing all labor, materials, tools, equipment and incidentals, in aggregate base supplying fill material, stockpiling, scarifying subgrade surface, placing where required, watering, dust palliative, leveling, compacting and certifying the top of aggregate base design grades.
3. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, retaining curbs, etc. shall considered incidental to the item most closely related to and no separate compensation will be allowed therefor. Aggregate base used in utility trenches shall be considered incidental to the cost per linear foot paid for the utility pipes as shown on the bid form and no separate compensation will be allowed therefor.

### 3.3 PAYMENT

- A. Payment will be made for actual quantity of work performed at contract unit price, as directed and accepted, in accordance with requirements of the General Conditions.

**END OF SECTION 01 22 00**

**SECTION 01 23 00 – ALTERNATES****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates. Each Alternate is identified by number and describes the basic changes to be made in the Work.
- B. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for work defined in the Bidding Requirements that the City may elect to add to or deduct from the Base Bid amount, if the City decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.
- C. Related Requirements:
1. Materials and Methods Required by Alternates: Pertinent Specification Sections.
  2. Form for Submitting Proposed Alternate Amounts: [Document 00 41 13 - Bid Form](#).
  3. Incorporation of Alternate into the Work: [Document 00 52 13 - Agreement Form](#).

**PART 2 - PRODUCTS**

## 2.1 ALTERNATE BIDS

- A. Alternates will be accepted at option of the City; the Base Bid, including additive or deductive Alternates accepted by the City, will be an element considered in the award of the Contract.

## 2.2 SCHEDULE OF ALTERNATES

Examples Add Alternate No. x - [Name of Alternate]: Add [item described here]

- B. Deduct Alternate No. x - [Name of Alternate]: Delete [item] specified in Section[s] [\_\_\_\_], shown on Drawing[s] [\_\_\_\_].
- C. Replace Alternate No. x - [Name of Alternate]: Delete [item] specified in Section[s] [\_\_\_\_], shown on Drawing[s] [\_\_\_\_]; replace with [item] specified in Section[s] [\_\_\_\_], shown on Drawing[s] [\_\_\_\_].

**PART 3 - EXECUTION**

3.1 MODIFICATIONS TO WORK

- A. Execute accepted alternates under the same conditions as other Work of this Contract.
- B. Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Modify or adjust affected adjacent Work as required to completely and fully integrate that Work into the Project.

**END OF SECTION 01 23 00**

**SECTION 01 25 00 – SUBSTITUTION PROCEDURES****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. Related Sections:
  - 1. [Section 01 33 00 – Submittal Procedures](#).

## 1.2 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions.
  - 1. Substitutions will not be considered during the Bid process.
  - 2. The following are not considered to be requests for substitution:
    - a. Revisions to the Contract Documents requested by the Owner or Architect/Engineer.
    - b. Specified options of products and construction methods included in the Contract Documents.
  - 3. The following are considered to be requests for substitution:
    - a. Any manufacturer, product, process, or method identified in the special provisions, specifications or on the Drawings as either “or equal” or “equal products of another manufacturer when approved in advance by the Architect/Engineer per this Section 01 25 00 – Substitution Procedures”.

## 1.3 SUBMITTALS

- A. Request for Substitution (RFS) Submittal:
  - 1. Receipt:
    - a. The Architect/Engineer will consider requests for substitution (RFS) if received within thirty-five (35) calendar days after the Notice to Proceed.
    - b. Requests received after thirty-five (35) calendar days after the Notice to Proceed may be considered or rejected at the discretion of the Project Manager and/or Architect/Engineer.

2. Submit three (3) copies of each request for substitution for consideration. Submit requests in the form and according to the procedures required under Article 1.2 of [Section 01 33 00 – Submittal Procedures](#).
3. Identify the product or the fabrication or installation method to be replaced in each request. Include related Special Provisions, Specification Section and Drawing numbers.
4. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
  - a. Coordination information, including a list of change or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
  - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, operations, maintenance, and visual effect.
  - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
  - d. Samples, where applicable or requested.
  - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without the approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
  - f. Cost information, including a proposal of net change, if any, in the Contract Sum.
  - g. The Contractor's certification that the proposed substitution conforms to the requirements in the Contract Documents, in every respect and is appropriate for the applications indicated.
  - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
5. Architect/Engineer Action: If necessary, the Architect/Engineer will request additional information or documentation for evaluation within fourteen (14) calendar days of receipt of a request for substitution. The Project Manager will route to the Contractor, the Architect/Engineer's acceptance or rejection of the substitution within fourteen (14) days of the receipt of the request, or receipt of addition information or documentation.

## **PART 2 - PRODUCTS**

### **2.1 SUBSTITUTIONS**

- A. Conditions: The Architect/Engineer will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect/Engineer. If the following conditions are not

satisfied, the Architect/Engineer will return the requests without action except to record non-compliance with these requirements:

1. Extensive revisions to the Contract Documents are not required.
  2. Proposed changes are in keeping with the general intent of the Contract Documents.
  3. The request is timely, fully documented, and properly submitted.
  4. The request is directly related to an “or-equal” clause or similar language in the Contract Documents.
  5. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, maintainability, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner’s additional responsibilities may include compensation to the Architect/Engineer for redesign and evaluation services, compensation to the Project Manager for additional management and coordination, increased cost of other construction by the Owner, and similar considerations.
  6. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
  7. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
  8. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- B. The Contractor’s submittal and the Architect/Engineer acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.

### **PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 25 00**



**SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes general procedural requirements for alterations, modifications and extras.
- B. Related Sections:
  - 1. [Document 00 72 00 – General Conditions](#)
  - 2. [Section 01 29 00 – Payment Procedures](#)

## 1.2 GENERAL

- A. Any change in scope of work or deviation from Drawings, Special Provisions, or Specifications shall be accomplished only when authorized in writing by Project Manager.
- B. Changes in scope of Work or deviation from Drawings, Special Provisions, or Specifications may be initiated only by Contractor or Project Manager.
  - 1. Contractor may initiate changes by submitting Requests for Interpretation (RFI), Requests for Substitution (RFS), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.
    - a. RFIs shall be submitted to seek clarification of Contract Documents in accordance with [Section 01 26 13 – Requests for Interpretation](#).
    - b. RFSs shall be submitted in accordance with [Section 01 25 00 – Substitution Procedures](#) to request substitution of materials or methods of execution.
    - c. Notices of Concealed or Unknown Conditions shall be submitted in accordance with [Document 00 72 00 – General Conditions](#).
    - d. Notices of Hazardous Waste Conditions shall be submitted in accordance with [Document 00 72 00 – General Conditions](#).
  - 2. Contractor shall be responsible for its costs to implement and administer RFIs and RFSs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor will not be entitled to additional compensation. Contractor shall be responsible for both City's and Architect/Engineer's administrative costs for answering its RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by City; such costs will be deducted from progress payments.
  - 3. The City may initiate changes by issuing a Supplemental Instruction.
  - 4. Project Manager may initiate changes in the Work or Contract Time by issuing Requests for Proposal (RFP) to Contractor. Such RFPs will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Time from Contractor.

### 1.3 PROCEDURE

- A. Contractor shall submit RFI to Project Manager in accordance with [Section 01 26 13 – Requests for Interpretation](#). Contractor shall reference each RFI to an activity of Progress Schedule and shall note time criticality of the RFI.
1. If Contractor is satisfied with the Clarification and does not request change in Contract Sum or Contract Time, then the Clarification shall be considered executed without a change.
  2. If Contractor believes that the Clarification results in change in Contract Sum or Contract Time, Contractor shall notify Project Manager who may then deny request for change or issue RFP.
- B. Contractor shall submit RFS to Project Manager who may then approve or deny request. If denied, Project Manager shall set forth in writing reasons for the denial. Contractor may revise and resubmit submittal with a rebuttal based on Section 3400 Public Contract Code CA. The RFS should set forth:
1. Reason for substitution
  2. Any deviations from special provisions or specifications
  3. Cost increase or decrease
  4. Any necessary revisions to drawings/related work
  5. Schedule impacts.
- C. Contractor shall submit Notices of Concealed or Unknown Conditions to resolve unanticipated conditions incurred in the execution of the Work. Procedures in [Document 00 72 00 – General Conditions](#) shall be followed. If Project Manager determines that a change in Contract Sum or Contract Time is justified, Project Manager shall issue RFP.
- D. Contractor shall submit Notices of Hazardous Waste Conditions to resolve problems regarding hazardous materials encountered in the execution of the Work. Procedures in [Document 00 72 00 – General Conditions](#) shall be followed. If Project Manager determines that a change in Contract Sum or Contract Time is justified, Project Manager shall issue RFP.
- E. Project Manager may issue Supplemental Instruction from the Architect/Engineer to Contractor. Contractor shall not proceed with Supplemental Instruction until Project Manager approves it in writing.
1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Time, then Supplemental Instruction shall be executed without a Change Order.
  2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Time, Contractor shall notify Project Manager. Project Manager may then deny request for change, cancel Supplemental Instruction or issue RFP.
- F. If Project Manager issues to Contractor an RFP, then Contractor shall respond to the RFP within fifteen (15) working days by furnishing a complete breakdown of

costs of credits, deducts, extra costs or cost savings, resulting from the change in the Work. Contractor shall itemize materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated.

- G. Upon approval of RFP, Project Manager will issue a Change Order directing Contractor to proceed with extra work. If the parties do not agree on the price for an RFP, the Project Manager may decide the issue per [Document 00 72 00 – General Conditions](#).
- H. Payment shall be made as follows:
  - 1. Change Orders which increase or decrease the Contract Sum or Contract Time shall be included by Contract Modification Form, signed by Project Manager, accepted by Contractor.
  - 2. Payment shall be made for Change Order work along with other work in progress payment following completion of Change Order work. Partial completion of Change Order work shall be paid for that part completed during the period covered by the monthly payment request.

#### 1.4 COST DETERMINATION

- A. Total cost of extra work or of work omitted shall be the sum of labor cost (hourly rate plus employer paid benefits, taxes, insurance, etc.), material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra work, whether calculating Change Orders, RFPs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. No other costs arising out of or connected with the performance of extra work, of any nature, may be recovered by Contractor. No special, incidental or consequential damages may be claimed or recovered against City, their officers, agents, employees, and consultants (including, but not limited to Architect/Engineer or Construction Manager), whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.
- B. Overhead and Profit:
  - 1. "Overhead and Profit" may also be referred to as "Markup".
  - 2. Overhead shall be defined in Paragraph 1.8 below.
  - 3. Overhead and profit on labor for extra work shall be thirty-five percent (35%).
  - 4. Overhead and profit on materials shall be fifteen percent (15%).
  - 5. Overhead and profit on equipment rental for extra work shall be fifteen percent (15%).
  - 6. When extra work is performed by a first tier subcontractor, Contractor shall receive a ten percent (10%) markup on subcontractors' total costs of extra work.
- C. Taxes:
  - 1. Contra Costa County Sales Tax shall be included.

2. Federal and Excise Tax shall not be included.

D. Owner Operated Equipment:

1. When owner-operated equipment is used to perform extra work, Contractor will be paid for equipment and operator as follows:
  - a. Payment for equipment will be made in accordance with Paragraph 1.5.C below.
  - b. Payment for cost of labor will be made at no more than rates of such labor established by collective bargaining agreements for type of worker and location of work, whether or not owner-operator is actually covered by such an agreement.

1.5 COST BREAKDOWN

A. Labor: Contractor will be paid cost of labor for workers (including forepersons when authorized by Project Manager) used in actual and direct performance of extra work. Labor rate, whether employer is Contractor, subcontractor or other forces, will be sum of following:

1. Actual Wages: Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation and similar purposes.
2. Labor Surcharge: Payments imposed by City, County, State and Federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined in subparagraph 1 above, such as taxes and insurances. Labor surcharge shall be as set forth in California Department of Transportation official labor surcharges schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference, as though fully set forth herein.

B. Material: Only materials furnished by Contractor and necessarily used in performance of extra work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, subcontractor or other forces) from supplier thereof, except as the following are applicable:

1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to City notwithstanding the fact that such discount may not have been taken.
2. For materials salvaged upon completion of extra work, salvage value of materials shall be deducted from cost, less discount, of materials.
3. If cost of a material is, in opinion of Project Manager, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in subparagraph 1 above.

C. Equipment Rental:

1. For Contractor- or subcontractor-owned equipment, payment will be made at rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which

extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of five hundred dollars (\$500) or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

2. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra work being performed or on standby as approved by Project Manager. The following shall be used in computing rental time of equipment:
  - a. When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.
  - b. When daily rates are listed, less than four (4) hours of operation shall be considered to be one-half (1/2) day of operation.
3. For equipment which must be brought to Site to be used exclusively on extra work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
  - a. City will pay for costs of loading and unloading equipment.
  - b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
  - c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
  - d. Payment for transporting, and loading and unloading equipment as above provided will not be made if equipment is used on Work in any other way than upon extra work.
4. Rental period shall begin at time equipment is unloaded at Site of extra work and terminate at end of day on which City's Project Manager directs Contractor to discontinue use of equipment. Excluding Saturdays, Sundays, and legal holidays, unless equipment is used to perform extra work on such days, rental time to be paid shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment which is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

D. Work Performed by Special Forces or Other Special Services:

1. When the City's Project Manager and Contractor, by agreement, determine that special service or item of extra work cannot be performed by forces of Contractor or those of any subcontractors, service or extra work item may be performed by specialist. Invoices for service or item of extra work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances, wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra work performed in such facility may, by agreement, be accepted as a specialist billing. The City's Project Manager must be notified in advance of all off-site work. To specialist invoice price, less credit to City for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent (15%) in lieu of overhead and profit provided in Paragraph 1.4.B.

#### 1.6 FORCE-ACCOUNT

- A. City may, at any time, require Contractor to perform Work on a Force Account (time and materials, cost not to exceed) basis. When Contractor performs Force Account Work, the labor, materials and equipment used in performing such Force Account Work shall be subject to City's approval.
- B. Whenever any Force-Account work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to the City's Project Manager each day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account work on preceding work day as required herein. No claim for compensation for Force-Account work will be allowed unless report shall have been made. City may authorize Force Account Work with specific limits on price, which Contractor shall perform up to such limit.
- C. Force Account work shall be paid as extra work under this [Section 01 26 00 – Contract Modification Procedures](#). Above described methods of determining payment for work and materials shall not apply to performance of work or furnishings of material which, in judgment of the City's Project Manager, may properly be classified under items for which prices are established in Contract.

#### 1.7 CITY FURNISHED MATERIALS

- A. City reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

#### 1.8 OVERHEAD DEFINED

- A. The following constitutes charges that are deemed included in overhead for all contract modifications, including Force-Account work for the entire Contract Time:

1. Drawings: Field drawings, shop drawings, etc. including submissions of drawings
2. Routine field inspection of work proposed
3. General superintendence
4. General administration and preparation of change orders
5. Computer services
6. Reproduction services
7. Salaries of project engineer, project manager, superintendent, timekeeper, storekeeper and secretaries
8. Janitorial services
9. Temporary on-site facilities
10. Offices
11. Telephones
12. Plumbing
13. Electrical: Power, lighting
14. Platforms
15. Fencing, etc.
16. Home office expenses.
17. Insurance and Bond premiums.
18. Procurement and use of vehicles and fuel used coincidentally in base bid work.
19. Surveying
20. Estimating
21. Protection of work
22. Final cleanup
23. Other incidental work
24. Labor liability insurance

#### 1.9 RECORDS AND CERTIFICATION

- A. Force-Account (cost reimbursement) charges shall be recorded daily upon Cost Breakdown for Contract Modification Form obtained from Inspector. Contractor or authorized representative shall complete and sign form. Inspector shall sign form for approval. Contract Modification Form shall provide names and classifications of workers and hours worked by each, itemize materials used, and also list size type and identification number of equipment, and hours operated, and shall indicate work done by specialists.
- B. No payment for Force-Account work shall be made until Contractor submits original invoices substantiating materials and specialist charges.
- C. City shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including Force-Account work, as set forth in [Document 00 72 00 – General Conditions](#).
- D. Further, City shall have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of

Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, Contract. If Contractor is a joint venture, right of City shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 26 00**



DAILY EXTRA WORK REPORT

COST BREAKDOWN FORM FOR CONTRACT MODIFICATION  
SHEET 1 OF 3

One separate form shall be used by Contractor, each first tier subcontractor and each lower tier subcontractor. One form for each shall be used for each change order. One form for each, for each day shall be used for Force-Account work.

CHANGE ORDER NUMBER: \_\_\_\_\_ DATE: \_\_\_\_\_

CHANGE ORDER DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

LABOR				
NAME	CLASSIFICATION	HOURS	RATE	TOTAL
TOTAL LABOR COSTS (Enter here and on Line 1 of Sheet 3)				

COST BREAKDOWN FORM FOR CONTRACT MODIFICATION  
SHEET 2 OF 3

MATERIALS	
DESCRIPTION	COST
TOTAL MATERIAL COSTS (Enter here and on Line 4 of Sheet 3)	

EQUIPMENT RENTAL				
SIZE AND TYPE	I.D. #	HOURS	RATE	TOTAL
TOTAL EQUIPMENT RENTAL COSTS (Enter here and on Line 8)				

SPECIALIST	
DESCRIPTION	COST
TOTAL SPECIALIST COSTS (Enter here and on Line 11)	

COST BREAKDOWN FORM FOR CONTRACT MODIFICATION  
SHEET 3 OF 3

TOTAL COSTS		
1. TOTAL LABOR COSTS		
2. 10 % of Line 1		
3. ADD Lines 1 and 2		
4. TOTAL MATERIAL COSTS		
5. 10 % of Line 4		
6. 8.25 % of line 4		
7. ADD Lines 4, 5 and 6		
8. TOTAL EQUIPMENT RENTAL COSTS		
9. 10 % of Line 8		
10. ADD Lines 8 and 9		
11. TOTAL SPECIALIST COSTS		
12. 10 % of Line 11		
13. ADD Lines 11 and 12		
14. TOTAL COST OF EXTRA WORK (ADD Lines 3, 7, 10 and 13)		

CONTRACTOR OR AUTHORIZED REPRESENTATIVE: \_\_\_\_\_

APPROVED BY INSPECTOR: \_\_\_\_\_

**SECTION 01 26 13 – REQUESTS FOR INTERPRETATION****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes procedural requirements for requests for interpretation, information, and/or clarification.
- B. Related Sections:
  - 1. [Document 00 72 00 – General Conditions](#)
  - 2. [Section 01 26 00 – Contract Modification Procedures](#)

## 1.2 GENERAL

- A. Description: Submit RFI to the Project Manager promptly upon identification of need, and in reasonable time so as not to affect the progress of the Work.
- B. Submission Procedures:
  - 1. Pre-submission Review: Before submitting request to the Project Manager, conduct a review to determine that the information requested, including items submitted by subcontractors or suppliers, is not shown in the Contract Documents.
  - 2. Category of Request: Submit requests for interpretation when one or more of the following conditions occur.
    - a. Need for Clarification: When information shown or indicated in the Contract Documents is unclear in its intent.
    - b. Unforeseen Condition: Discovery of unforeseen condition or circumstance that is not shown or indicated in the Contract Documents.
    - c. Conflict Within Documents: Discovery of an apparent inconsistency, conflict, or discrepancy between different portions of the Contract Documents, where the intent cannot be reasonably inferred from information shown or indicated.
    - d. Omission: Discovery of what appears to be an omission in the Contract Documents, where the intent cannot be reasonably inferred from information shown or indicated.
    - e. Coordination Problem: Discovery of unforeseen condition in coordinating placement of work that is specifically related to the Contract Documents.
  - 3. Unacceptable Requests:
    - a. General: Do not submit RFIs for confirmation of any action already taken by the Contractor. Requests will not be accepted that imply confirmation of any unauthorized change to the Work.

- b. **Untimely Submission:** An RFI that is submitted in a belated manner without proper coordination and scheduling of the Work of related subcontractors will not be reviewed and will be returned to the Contractor.
  - c. **Submittal:** An RFI that is included as part of a submittal will not be processed; see [Section 01 33 00 – Submittal Procedures](#).
  - d. **Substitution:** An RFI that is a request for substitution will not be processed; see [Section 01 25 00 – Substitution Procedures](#).
  - e. **Exclusionary Submission:** A request that implies that specific portions of the work are assumed to be excluded or considering a separate portion of the Contract Documents in part rather than as a whole will not be processed.
- C. **Log:** Prepare and maintain the official log of RFIs. Review status of log at each job progress meeting.

## **PART 2 - PRODUCTS**

### **A. SUBMISSION REQUIREMENTS:**

1. **Request for Interpretation (RFI) Form:**
  - a. **General:** Provide a completed and legible PDF of an RFI form that includes the following required information.
  - b. **RFI Number:** Identify RFIs sequentially starting from number one (1); number re-submissions with same number as original and add letter designation A, B, C, etc., in order submitted, until resolution is achieved.
  - c. **PDF Name:** Include RFI number and reference to name of project in file name; if space allows include brief description of subject in RFI file name.
  - d. **Contractor:** Provide company name and mailing address with signature of contact person responsible for work on the subject project, certifying to review of RFI.
  - e. **Subcontractor and/or Supplier** Provide company name, mailing address, telephone number and name and email of contact person responsible for work on the subject project.
  - f. **RFI Description:**
    - 1) **General:** Describe subject of RFI completely.
    - 2) **Drawing References:** Identify specific drawing number and/or detail number or note under consideration.
    - 3) **Specifications References:** Identify specification section number and paragraph number under consideration.
    - 4) **Attachments:** Identify as required, to support description.
    - 5) **Contractor's Proposed Resolution:**
      - a) **General:** Describe suggested resolution; support with attachments as required.

- b) Cost Impact: Indicate impact on costs; explain Contractor's original basis for bid and, based on the current request, reason that additional costs should be considered.
- c) Time Impact: Indicate effect on schedule; explain Contractor's original basis for bid and, based on the current request, why a time extension should be considered.

**PART 3 - EXECUTION**

**A. PROJECT MANAGER'S RESPONSE:**

- 1. General: Project Manager will respond on the RFI Form and include attachments, as referenced. Verbal responses to such requests are to be considered informational; official written response will only be given on annotated PDF of original RFI Form.
- 2. Project Manager's Review:
  - a. General: Allow ten (10) working days after receipt. If more than ten (10) requests are received within one (1) calendar week, the Project Manager will specifically schedule and extend response time as required to accomplish the reviews.
  - b. Prioritization: If more than five (5) requests have been received by the Project Manager, the Contractor shall identify the order of requests most critical to the schedule of the Project.

**B. DISTRIBUTION:**

- 1. General: Submit PDF of original, signed copy. PDF with the official response will be returned to the Contractor.
- 2. Consultants: The Project Manager will distribute copies of requests for information to project consultants, as required for their participation. Direct communication and response between project consultants and Contractor will be considered informational only.
- 3. Response: The Contractor will make and distribute copies of the official response to subcontractors and suppliers, as required.

**END OF SECTION 01 26 13**

**SECTION 01 29 00 – PAYMENT PROCEDURES****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes the procedures for preparation and submittal of Progress Payment Requests.
- B. Related Sections:
  - 1. [Section 00 72 00 – General Conditions](#)
  - 2. [Section 01 32 16 - Construction Progress Schedule](#)

## 1.2 REFERENCES

- A. California Public Contract Code

## 1.3 SCOPE OF WORK

- A. Payment for the various items of the Schedule of Bid Prices, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured products, and for all labor, operations, overhead and profit, applicable taxes, and incidentals appurtenant to the items of Work being described, as necessary to complete the various items of work as specified and as shown on the Drawings. No separate payment will be made for any item that is not specifically set forth in the Schedule of Bid Prices, and all costs therefore shall be included in the prices named in the Schedule of Bid Prices for the various appurtenant items of Work.
- B. Contract Prices shall be deemed to include all bonds and insurance, all appurtenances necessary to complete the required Work, including all costs for compliance with the regulations of the public agencies having jurisdiction, including Health and Safety Requirements of the California Division of Industrial Safety and the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA), and including all costs for loss or damage arising from the Work, or from action of the elements, for any unforeseen difficulties which may be encountered, and for all risks of every description connected with the prosecution of the Work until Project Completion, also for all expenses incurred in consequence of the suspension or discontinuance of the Work as provided in the Contract. Unless the Contract Documents expressly provide otherwise, the Contract Sum shall be deemed to include:
  - 1. Any and all costs arising from any unforeseen difficulties which may be encountered during, and all risks of any description connected with, prosecution of Work until acceptance by City;

2. All expenses incurred due to suspension, or discontinuance of Work as provided in Contract;
  3. Escalation to allow for cost increases between time of Contract Award and completion of Work.
- C. Whenever it is specified herein that Contractor is to do work or furnish materials of any class for which no price is fixed in the Contract, it shall be understood that Contractor is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that cost of doing work or furnishing materials is to be included in price bid, unless it is expressly specified herein, in particular cases, that work or material is to be paid for as extra work.
- D. Neither the payment of any estimate nor of any retained percentages shall relieve Contractor of its obligation to make good all defective work or material.

#### 1.4 DETERMINATION OF QUANTITIES

- A. Quantity of work to be paid for under any item for which a unit price is fixed in Contract shall be number, as determined by Project Manager, of units of work satisfactorily completed in accordance with Drawings, Special Provisions, and Specifications and as directed pursuant to Drawings, Special Provisions, and Specifications. Unless otherwise provided, determination of number of units of work so completed will be based, so far as practicable, on actual measurement or count within prescribed or ordered limits, and no payment will be made for work done outside of limits. Measurements and computations will be made by methods as City's Project Manager may consider appropriate for class of work measured.

#### 1.5 BASIS OF PAYMENT

- A. Unit Pay Quantities: When estimated quantity for specific portions of Work is listed in Bid Form, quantity of work to be paid for shall be actual number of units satisfactorily completed in accordance with Drawings, Special Provisions, and Specifications.
- B. Lump Sum: When estimated quantity for specific portion of Work is not indicated and unit is designated as Lump Sum, payment will be on a Lump Sum basis for Work satisfactorily completed in accordance with Drawings, Special Provisions, and Specifications.
- C. City does not expressly, or by implication, agree, warrant, or represent in any manner, that actual amount of Work will correspond with amount shown or estimated and reserves right to increase or decrease amount of any class or portion of Work, to leave out entire Bid Item or Items, or to add work not included in Bid, when in its judgment such change is in best interest of City. No change in Work shall be considered waiver of any other condition of Contract. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as otherwise expressly provided for in Contract Documents,



because of any differences between amount of work actually done and estimated amount as set forth herein, or for elimination of extra Bid Items.

- D. Monthly payment requests shall be based upon information developed at monthly Application for Payment meetings and shall be prepared by Contractor. The approved Schedule of Values will be the basis for Contractor's payment requests.
1. No partial progress payment shall be made to Contractor until all cost information requested by the City is submitted and reviewed.
  2. The following information shall also be submitted with and as part of the Contractor's progress payment application; all information, noted below, will cover the same period of the progress payment application.
    - a. Progress Schedule: Submittal of one (1) copy of the progress schedule updated to include the progress achieved as of the date of the Application for Payment in accordance with this Section.
      - 1) Contractor shall, at the time any payment request is submitted, certify in writing the accuracy of the payment request and that Contractor has fulfilled all scheduling requirements of [Document 00 72 00 - General Conditions](#) and [Section 01 32 16 - Construction Progress Schedule](#), including updates and revisions. The certification shall be executed by a responsible officer of the Contractor.
    - b. Project Record Drawings: Submit project record drawings with each progress payment application for the City's Project Manager's review. The drawings shall be returned to the Contractor within fourteen (14) calendar days of submittal.
    - c. Certified Payroll: Certified payroll for all Contractor and subcontractor staffing pursuant to Section 1776 of the California Labor Code and including all subcontractors, suppliers, or creditors for all labor and materials incorporated into the work.
    - d. Lien Releases: Conditional or Unconditional lien release for the requested payment. Unconditional lien release for the previous payment.
  3. No progress payment will be processed prior to Project Manager receiving all requested information.
- E. The City will not be liable for costs arising from the delay in making progress payments.

## 1.6 PROGRESS PAYMENT PROCEDURES

- A. If requested by Contractor, progress payments will be made monthly.

B. Schedule of Values:

1. Within ten (10) calendar days from issuance of Notice of Award and prior to the Contractor's application for the first progress payment, the Contractor shall submit a detailed breakdown of its bid by scheduled Work items and/or activities. This breakdown shall be referred to as the Schedule of Values.
2. If City's Project Manager requires substantiating data, Contractor shall submit information requested by Project Manager, with cover letter identifying Project, payment request number and date, and detailed list of enclosures. Contractor shall submit one copy of substantiating data and cover letter for each Payment request submitted.

C. Payment Requests:

1. On or about the 25<sup>th</sup> of each month, the Contractor may submit to the City's Project Manager one (1) copy of an itemized Application of Payment on a standard form acceptable to the City's Project Manager covering the Work completed as of the date of the Application for payment. The following information and/or documentation will be provided as part of the Application for Payment:
  - a. Payment requests may include, but not necessarily limited to the following:
    - 1) Materials, equipment, and labor incorporated into the Work, less any previous payments for the same;
    - 2) A maximum of ninety percent (90%) of the cost of major equipment, if purchased and delivered to the site or stored offsite, as under control of the City, but not installed by the Contractor.
    - 3) Contractor's application for payment shall be accompanied by a bill of sale, invoice, or other documentation warranting that the City has received the materials and equipment free and clear of all liens and evidence that the materials and equipment area covered by appropriate property insurance and other arrangements to protect the City's interest therein.
  - b. Such requests for progress payments shall be based upon Schedule of Values prices of all labor and materials incorporated in the Work during the preceding one-month period, less the aggregate of previous payments.
  - c. Each payment request shall list each Change Order executed prior to the date of submission, including the Change Order Number, a description of the work activities, consistent with the descriptions of original work activities.
    - 1) Contractor shall submit a monthly Change Order status log to the City's Project Manager as part of that Progress Payment Request.
2. Monthly progress payments shall be made, based on total value of activities completed or partially completed, as determined by City with participation of Contractor, and based upon approved activity costs. Accumulated retainage will be shown as separate item in payment summary. If Contractor fails or

refuses to participate in construction progress evaluation with City, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information for City.

D. Progress Payments:

1. Upon receiving Contractor's payment request, Project Manager will review the payment request and make necessary adjustments to percent of completion of each activity. One copy will be returned to Contractor with description of adjustments made. All parties will update percentage of completion values in the same manner, i.e., express value of an accumulated percentage of completion to date.
2. The payment request may be reviewed by Project Manager for the purpose of determining that the payment request is a proper payment request, and shall be rejected, revised or approved by Project Manager pursuant to the cost breakdown prepared in accordance with this Section.
3. If it is determined that the payment request is not a proper payment request suitable for payment, Project Manager shall return it to the Contractor as soon as practicable, but no later than seven (7) working days after receipt, together with a document setting forth in writing the reasons why the payment request is not proper. If Project Manager determines that portions of the payment request are not proper or not due under the Contract Documents, then Project Manager may approve the other portions of the payment request and, in the case of disputed items or defective work not remedied, may withhold up to 150% of the disputed amount from the progress payment.
4. Pursuant to Public Contract Code, Section 20104.50, if City fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted payment request from a contractor, City shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. The thirty (30) day period shall be reduced by the number of days by which City exceeds the seven (7) day return requirement set forth herein.
5. As soon as practicable after approval of each request for progress payment, City will pay to Contractor in manner provided by law, the amounts provided for below:
  - a. City shall pay an amount equal to ninety percent (90%) of Project Manager's estimate, which amount shall remain in effect until such time, if any, that the retention is reduced by Project Manager pursuant to the other provisions of this paragraph.
  - b. At any time after fifty percent (50%) in value of the Work as set forth in the Schedule of Values has been completed and the retained funds are equal to five percent (5%) of the Contract Sum (including Change Orders, if applicable), and if the progress of the Work under the Progress Schedule is satisfactory, Project Manager may, at its sole discretion, but shall not be obligated to, authorize any remaining

- progress payment to be made in the amount of ninety-five percent (95%) of the amount approved for payment.
- c. When Project Manager determines that at least ninety-five percent (95%) in value of the Work as set forth in the Schedule of Values is completed, Project Manager may, at its sole discretion, but shall not be obligated to, reduce the amount of the retained funds to one hundred twenty-five percent (125%) of the value of the Work yet to be completed, as determined by Project Manager.
  - d. After all Work is completed in accordance with Contract, the remaining retention amount shall be paid to the Contractor in accordance with Paragraph 1.9, below.
  - e. If a lesser payment amount is provided in the Contract Documents, such lesser amount shall apply instead of the amounts set forth above in this paragraph.
  - f. Progress payments may at any time be withheld if, in judgment of Project Manager, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract, or to comply with stop notices or to offset liquidated damages accruing or expected.
6. Retention will not be reduced if Contractor, in the opinion of the Project Manager, is behind schedule. If retention is reduced at any point during Contract and Contractor subsequently falls behind schedule, retention may be raised back to original percentage.
  7. Before any progress payment or final payment is made, the Contractor may be required to submit satisfactory evidence that Contractor is not delinquent in payments to employees, subcontractors, suppliers, or creditors for labor and materials incorporated into Work.
  8. City reserves and shall have the right to withhold payment for any equipment and/or specifically fabricated materials that, in the sole judgment of Project Manager, is not adequately and properly protected against weather and/or damage, prior to or following incorporation into the Work.
  9. Approval of progress payment and payment by City, or receipt thereof by Contractor, shall not be understood as constituting in any sense acceptance of Work or of any portion thereof, and shall in no way lessen liability of Contractor to replace unsatisfactory work or material, though unsatisfactory character of work or material may have been apparent or detected at time payment was made.
  10. When City shall charge sum of money against Contractor under any provision of Contract, amount of charge shall be deducted and retained by City from amount of next succeeding progress payment or from any other monies due or that may become due Contractor under Contract. If, on completion or termination of Contract, such monies due Contractor are found insufficient to cover City's charges against Contractor, City shall have right to recover balance from Contractor or Sureties.

## 1.7 SUBSTITUTION OF SECURITIES IN LIEU OF RETENTION

- A. Pursuant to provisions of Public Contract Code, Section 22300, substitution of securities for any monies withheld under Contract to insure performance is permitted under the following conditions:
1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and City which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such monies to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.
  2. Alternatively, Contractor may request and City shall make payment of retentions earned directly to the escrow agent at the expense of the Contractor. At the expense of the Contractor, the Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from City, pursuant to the terms of this section. The Contractor shall pay to each subcontractor, not later than twenty (20) days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor.
  3. Contractor shall be beneficial owner of securities substituted for monies withheld and shall receive any interest thereon.
  4. Contractor shall enter into escrow agreement with Controller according to Document 00 53 00 - Escrow Agreement for Security Deposits in Lieu of Retention, as authorized under Public Contract Code, Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract.

## 1.8 APPLICATION FOR PAYMENT OF SUBSTANTIAL COMPLETION

- A. Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
1. This application shall reflect Certificates of Partial Substantial Completion issued previously for City occupancy of designated portions of the Work.
  2. Administrative actions and submittals that shall precede or coincide with this application include:
    - a. Occupancy permits and similar approvals.

- b. Warranties, guarantees, and maintenance agreements.
- c. Test/adjust/balance records.
- d. Operations and Maintenance instructions.
- e. Meter readings.
- f. Startup performance reports.
- g. Changeover information related to City's occupancy, use, operation, and maintenance.
- h. Final cleaning.
- i. Application for reduction of retainage and consent of surety.
- j. Final progress photographs.
- k. List of incomplete Work, recognized as exceptions to Architect/Engineer's Certificate of Substantial Completion.

#### 1.9 FINAL PAYMENT

- A. As soon as practicable after all required Work is completed in accordance with Contract, including Contractor maintenance after Final Acceptance, City will pay to Contractor, in manner provided by law, unpaid balance of contract price of Work, or whole contract price of Work if no progress payment has been made, determined in accordance with terms of Contract, less sums as may be lawfully retained under any provisions of Contract or by law.
- B. Prior progress payments shall be subject to correction in the final payment. Project Manager's determination of amount due as final payment shall be final and conclusive evidence of amount of Work performed by Contractor under Contract, and shall be full measure of compensation to be received by Contractor.
- C. Contractor and each assignee under an assignment in effect at time of final payment shall execute and deliver at time of final payment and as a condition precedent to final payment, Document 00 52 13 – Agreement Form, and Release of Any and All Claims, discharging City of Pittsburg, their officers, agents, employees, and consultants (including, but not limited to Architect/Engineer and Construction Manager) of and from liabilities, obligations, and claims arising under Contract.
- D. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
  - 1. Completion of Project closeout requirements.
  - 2. Completion of items specified for completion after Substantial Completion.
  - 3. Ensure that unsettled claims will be settled.
  - 4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
  - 5. Transmittal of required Project construction records to the City.
  - 6. Certified property survey.
  - 7. Proof that taxes, fees, and similar obligations were paid.
  - 8. Removal of temporary facilities and services.

9. Removal of surplus materials, rubbish, and similar elements.
10. Change of door locks to City's access.
11. All as-built drawings.
12. Lien releases from Contractor and subcontractors.

#### 1.10 EFFECT OF PAYMENT

- A. Payment will be made by City, based on Project Manager's observations at the site and the data comprising the Application for Payment. Payment will not be a representation that Project Manager has:
  1. made exhaustive or continuous on-site inspections to check the quality or quantity of Work;
  2. reviewed construction means, methods, techniques, sequences or procedures;
  3. reviewed copies of requisitions received from subcontractors and material suppliers and other data requested by City to substantiate Contractor's right to payment; or
  4. made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

#### **PART 2 - PRODUCTS**

NOT USED

#### **PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 29 00**

**SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This section describes requirements for coordination and meetings.
- B. Related Sections:
  - 1. [Document 00 72 00 – General Conditions](#)
  - 2. [Section 01 32 16 - Construction Progress Schedule](#)

## 1.2 COORDINATION

- A. The Contractor shall be responsible for all Project coordination.
- B. Duties of Contractor:
  - 1. Coordinate Work of all subcontractors.
  - 2. Establish on-site lines of authority and communication. Schedule and conduct progress meetings with City and subcontractors.
  - 3. Construction schedules:
    - a. Prepare detailed schedule of operations of all subcontractors on Project in accordance with [Section 01 32 16 – Construction Progress Schedule](#).
    - b. Monitor and update schedules as Work progresses.
    - c. Observe Work to monitor compliance with schedule.
  - 4. Temporary facilities:
    - a. Prepare temporary facilities site plan for City's approval.
    - b. Allocate space for temporary structures furnished by subcontractors.
    - c. Monitor use of temporary utilities.
    - d. Verify that adequate services are provided to comply with requirements for Work and climatic conditions.
    - e. Coordinate traffic control.
    - f. Administer traffic and parking controls.
  - 5. Changes:
    - a. Recommend necessary or desirable changes to Architect/Engineer.
    - b. Review subcontractor's request for changes and for substitutions.
    - c. Submit recommendations to Architect/Engineer, through the Project Manager.
    - d. Process Change Orders.
  - 6. Permits and fees: Verify that subcontractors have obtained permits for inspections.
  - 7. Review all Shop Drawings, Product Data, and Samples for compliance with Contract Documents prior to submittal to Project Manager.



8. Interpretation of Contract Documents:
  - a. Consult with Project Manager and Architect/Engineer to obtain interpretations.
  - b. Assist in resolution of questions which may arise.
  - c. Transmit written interpretations to concerned parties.
9. Maintain reports and records at Project Site:
  - a. Daily log progress of Work; make available to Project Manager and Architect/Engineer.
  - b. Records.
  - c. Contracts.
  - d. Purchases.
  - e. Materials and equipment.
  - f. Applicable handbooks, codes and standards.
  - g. Obtain information from subcontractors and maintain record documents. Assemble documentation for handling of claims and disputes.
10. Verify that specified cleaning is done during progress of Work and at completion of each contract.
11. For project requiring building permit, coordinate with the Building Division, City of Pittsburg, for inspections.
12. Start-up:
  - a. Direct the checkout of utilities, operational systems and equipment.
  - b. Assist in initial start-up testing.
  - c. Record dates of start of operation of systems and equipment.
  - d. Submit to City written notice of beginning of Warranty period for equipment put in service.

### 1.3 COORDINATION REQUIREMENTS

- A. Coordination: Contractor shall coordinate the Work as stated in the [Document 00 72 00 – General Conditions](#). Contractor shall also coordinate Work under the Contract with work under separate contracts by City. Contractor shall cooperate with City and others as directed by City in scheduling and sequencing the incorporation into the Work of City Furnished/Contractor installed products identified in the Contract Drawings, Special Provisions, and Specifications.
- B. Relationship of Contract Documents: Drawings, Special Provisions, Specifications, and other Contract Documents in the Project Manual are intended to be complementary. What is required by one shall be as if required by all. What is shown or required, or may be reasonably inferred to be required, or that is usually and customarily provided for similar work, shall be included in the Work.
- C. Discrepancies in Contract Documents: In the event of error, omission, ambiguity or conflict in Drawings, Special Provisions, or Specifications, Contractor shall bring the matter to the Architect/Engineer's attention, through the Project Manager, in a timely manner, for the Architect/Engineer's determination and

direction in accordance with provisions of [Document 00 72 00 – General Conditions](#).

- D. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely Contractor's responsibility. Contractor shall bring together the various parts, components, systems, and assemblies as required for the correct interfacing and integration of all elements of Work.
- E. Contractor shall coordinate Work to correctly and accurately connect abutting adjoining, overlapping and related elements, including work under separate contracts by City, utility agencies and companies.

#### 1.4 COORDINATION OF SUBCONTRACTS AND SEPARATE CONTRACTS

- A. Superintendence of Work: Contractor shall appoint a field superintendent who shall directly supervise and coordinate Work shown on the Drawings, Special Provisions, and in the Specifications at all times. In order to maintain an uninterrupted construction schedule, the field superintendent shall not be replaced by the Contractor, for other than extenuating circumstances, without prior approval by the Architect/Engineer and/or City.
- B. Subcontractors, Trades and Materials Suppliers: Contractor shall require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the Superintendent, Engineer and Construction Project Manager to prevent scheduling, sequencing, dimensional and other conflicts and omissions.
- C. Coordination with Work under Separate Contracts: Contractor shall coordinate and schedule Work under the Contract with work being performed for Project under separate contracts by City, serving utilities and public agencies. Contractor shall make direct contacts with parties responsible for work of the Project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

#### 1.5 PRECONSTRUCTION CONFERENCE

- A. Project Manager will call for and administer Preconstruction Conference at time and place to be announced. Conference will occur as soon after award as can be reasonably scheduled.
- B. Contractor, all subcontractors, and major suppliers shall attend Preconstruction Conference.
- C. Agenda will include, but not be limited to, the following items:
  - 1. Lines of Communication
  - 2. Schedules
  - 3. Employment Goals
  - 4. Personnel
  - 5. Use of premises

6. Location of Contractor's on-site facilities
7. Project access
8. Employee parking
9. Security
10. NPDES Storm Water Pollution Prevention BMPs
11. Contractor's Questions
12. Housekeeping
13. Submittals
14. Inspection and testing procedures, on-site and off-site
15. Utility shutdown procedures
16. Control and reference point survey procedures
17. Injury and Illness Prevention Program
18. Contractor's Initial CPM Schedule
19. Preparation of Record Documents.

- D. Project Manager will distribute copies of minutes to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the Preconstruction Conference.

## 1.6 SCHEDULING MEETINGS

- A. Meet with Project Manager no later than Start Date of Contract and conduct initial review of Contractor's Initial Progress Schedule submittal, draft Shop Drawing and Sample Submittal Schedule, and draft Schedule of Values ("Schedule Review Meeting").
- B. Authorized representative in Contractor's organization, designated in writing, who will be responsible for working and coordinating with Project Manager's representative(s) relative to preparation and maintenance of Progress Schedule, shall attend initial Schedule Review Meeting.
- C. Contractor shall, within thirty (30) calendar days from the Notice to Proceed date, meet with City to review Contractor's Original CPM Schedule submittal, and final Shop Drawing and Sample Submittal Schedule, and final Schedule of Values.
1. Contractor shall have its manager, superintendent, scheduler, and key subcontractor representatives, as required by City, in attendance. The meeting will take place over a continuous one-day period.
  2. City's review of Schedule Submittals will be limited to conformance to Contract requirements, including, but not limited to, coordination requirements. However, review may also include:
    - a. Clarifications of Contract Requirements
    - b. Directions to include activities and information missing from submittal
    - c. Requests to Contractor to clarify its schedule
  3. Within five (5) working days of the initial Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by City at the meeting.

- D. Project Manager will administer scheduling meetings and shall distribute minutes of scheduling meetings to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the scheduling meetings.

#### 1.7 PROGRESS MEETINGS

- A. A progress meeting will be held weekly to review the schedule update submittal and progress payment application. At this meeting, at a minimum, the following items will be reviewed:
  1. Previous meeting notes.
  2. Percent complete of each activity
  3. Time impact evaluations for Change Orders and Time Extension Request
  4. Actual and anticipated activity sequence changes
  5. Actual and anticipated duration change
  6. Actual and anticipated contractor delays
  7. Interface requirement
  8. Status on submittals
  9. Documentation of information for payment request.
- B. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.
- C. Project Manager will record and distribute minutes to Contractor, Building and/or Special Inspector, Architect/Engineer, and all other participants, and those affected by decisions made at the meeting, within five (5) working days after the meeting. Attendees shall have five (5) working days to submit comments or additions to the minutes. The Minutes will constitute final memorialization of the results of the progress meeting.

#### 1.8 SPECIAL MEETINGS

- A. Special meetings may be called by any party by notifying all desired participants, Project Manager, and Building and/or Special Inspector five (5) working days in advance, giving reason for meeting. Special Meetings may be held without advance notice in emergency situations.
- B. At any time during the progress of the Work, any party shall have the right to require attendance at conference, and notice of such conference shall be duly observed and complied with by Contractor.
- C. Contractors shall schedule and conduct coordination meetings as necessary to discharge coordination responsibilities in [Document 00 72 00 – General Conditions](#). Project Manager shall be given five (5) working days written notice of coordination meetings. Contractors shall maintain minutes of coordination

meetings. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the meetings.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 31 00**

**SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Preconstruction photographs and videos.
2. Periodic construction photographs and videos.

**B. Submittals:**

1. Key Plan: Submit key plan of project site and construction with notation of vantage points marked for location and direction of each photograph and video.
2. Construction Photographs: Submit digital copy of photographs in PDF and JPEG form in a CD or a USB flash drive with a folder containing pictures of each PLC cabinet. Photos shall be taken of the exterior and all interior elevations of each cabinet. Photos shall, at a minimum, be taken prior to the start of construction and at the completion of cabinet modifications.
3. Identification: Identify the project by Contract Number. Identify each photograph by naming it according to the panel number on the drawings. Example: Main Control Panel Exterior; Main Control Panel Interior Elevation; Main Control Panel Back of Door; Main Control Panel Left Elevation.
4. Digital Images:
  - a. General: Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped, at large image size with fine quality. Camera shall be equipped with a sensor with minimum dimensions of 24 mm x 36 mm.
  - b. Usage Rights: Submit statement of transfer copyright usage rights to City allowing unlimited reproduction of photographic documentation.
5. Video:
  - a. General: Submit videos on acceptable electronic transfer medium to the Project Manager, accompanied by a detailed log, including descriptions and corresponding counter numbers to facilitate the quick location of information. Videos will be maintained by the Project Manager during construction and may be viewed at any time by Contractor upon request. Upon final acceptance, the videos will become the permanent property of the City.
  - b. Submit video documentations to the Project Manager prior to start of construction work and as otherwise required.
  - c. Usage Rights: Submit statement of transfer copyright usage rights to City allowing unlimited reproduction of videographic documentation.

**PART 2 - PRODUCTS****2.1 PHOTOGRAPHIC MEDIA**

- A. Digital Images: Provide images capable of a digital capture resolution of not less than 3000x4000 - 12 Megapixels.
- B. Videos: Provide videos in high resolution digital format with audio capability.

**PART 3 - EXECUTION****3.1 CONSTRUCTION PHOTOGRAPHS**

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
- B. Key Plan: Maintain with each set of construction photographs that identifies each photographic location.
- C. Digital Images:
  - 1. General: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 2. Date and Time: Include date and time in filename for each image.
  - 3. Field Office Images: Maintain one set of images on acceptable electronic transfer medium in the field office at Project Site, available at all times for reference. Identify images same as for those submitted to Project Manager.
- D. Preconstruction Photographs:
  - 1. General: Before starting construction, take color photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Project Manager.
  - 2. Construction Limits: Flag before taking construction photographs.
  - 3. Adjacent Conditions:
    - a. General: Take three (3) color photographs, from different views, to show existing conditions adjacent to property before starting the Work.
    - b. Existing Buildings: Take three (3) color photographs, different views, of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.

**3.2 CONSTRUCTION VIDEOS**

- A. Preconstruction Videos: Document existing conditions of adjacent areas (curbs, gutters, sidewalks, driveways, private improvements immediately adjacent to the project site, roadway pavement, access roads, landscaping, etc.) that might be

affected by construction operations. Take care to record all existing conditions which exhibit deterioration, imperfections, structural failures, or situations that would be considered substandard.

- B. All Videos: Provide temporary lighting as necessary to properly videotape areas where natural lighting is insufficient (shadows, etc.). Include an audio soundtrack to provide the following information:
1. Detailed description of location being viewed.
  2. Direction (N, E, S, W, looking up, looking down, etc.) of camera view.
  3. Date, time, temperature, environmental conditions at time of videotaping.
  4. Describe in detail areas not readily visible by video. Unless otherwise approved by the Project Manager, do not perform videotaping during inclement weather or when the ground is covered partially or totally with leaves or debris.

**END OF SECTION 01 32 00**



**SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.
  - 1. Development of schedule, cost and resource loading of the schedule, monthly payment requests and project status reporting requirements of the Contract shall employ scheduling as required in this Document.
  - 2. The Schedule shall be cost loaded based on Schedule of Values as approved by City.
  - 3. Submit schedules and reports as specified in [Document 00 72 00 - General Conditions](#).
- B. Upon Award of Contract, Contractor shall immediately commence development of Initial Schedule to ensure compliance with schedule submittal requirements.
- C. Related Sections
  - 1. [Section 00 52 13 - Agreement Form](#)
  - 2. [Section 01 10 00 – Summary](#)
  - 3. [Section 01 29 00 – Payment Procedures](#)
  - 4. [Section 01 31 00 – Project Management and Coordination](#)
  - 5. [Section 01 33 00 – Submittal Procedures](#)

## 1.2 GENERAL

- A. Progress Schedule shall be based on and incorporate milestone and completion dates specified in Contract Documents.
- B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in [Section 00 52 13 - Agreement Form](#), unless an earlier (advanced) time of completion is requested by Contractor and agreed to by City. Any such agreement shall be formalized by a Change Order.
  - 1. City is not required to accept an earlier (advanced) schedule, i.e., one that shows early completion dates for the Contract Times.
  - 2. Contractor shall not be entitled to extra compensation in event agreement is reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in earlier (advanced) schedule but within the Contract Times.
  - 3. A schedule showing the work completed in less than the Contract Times, which has been accepted by City, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work

and Contract Substantial Completion. Project Float is a resource available to both City and Contractor.

- C. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.
- D. Failure of Progress Schedule to include any element of the Work or any inaccuracy in Progress Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. City's acceptance of Schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests, and shall not, in any manner, impose a duty of care upon City, or act to relieve Contractor of its responsibility for means and methods of construction.
- E. Transmit each item per [Section 01 33 00 – Submittal Procedures](#) under form approved by City.
  - 1. Identify Project with the City Contract number, and name of Contractor.
  - 2. Provide space for Contractor's approval stamp and City's review stamps.
  - 3. Submittals received from sources other than Contractor will be returned to Contractor without City's review.

### 1.3 INITIAL AND ORIGINAL SCHEDULE

- A. Initial Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to thirty (30) calendar days after the Notice to Proceed.
- B. Indicate detailed plan for the Work to be completed in first thirty (30) calendar days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Show Work beyond thirty (30) calendar days in summary form.
- C. Original (or "Baseline") Schedule shall be submitted for review no later than Contractor's first progress payment application submittal.
- D. All schedules shall be time-scaled.
- E. All schedules shall be cost and resource loaded. Accepted cost and resource loaded schedule will be used as basis for monthly progress payments. Use of Initial Schedule for progress payments shall not exceed thirty (30) calendar days.
- F. City and Contractor shall meet to review and discuss the Schedule within seven (7) calendar days after it has been submitted to City.
  - 1. City's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).

2. Contractor shall make corrections to Schedule necessary to comply with Contract requirements and shall adjust Schedule to incorporate any missing information requested by City. Contractor shall resubmit Initial Schedule if requested by City.

#### 1.4 CONSTRUCTION SCHEDULE FORMAT AND LEVEL OF DETAIL

- A. The Construction Schedule is to indicate all separate fabrication and field construction activities required for completion of the work, including but not limited to the following:
  1. All Contractor, Subcontractor and assigned Contractor work shall be shown in a logical work sequence that demonstrates a coordinated plan of work for all contractors. The intent is to provide a common basis of acceptance, understanding and communication, as well as interface with other contractors.
  2. Activities related to the delivery of City-furnished equipment to be contractor-installed per Contract shall be shown.
  3. All activities shall be identified through codes or other identification to indicate the building (i.e. buildings, site work) and Contractor/subcontractor responsibility to which they pertain.
  4. Contractor shall break up the work schedule into activities of durations of approximately fifteen (15) calendar days or less each, except for non-field construction activities or as otherwise deemed acceptable by the Project Manager.
- B. Seasonal weather conditions (which do not constitute a delay as defined herein) shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures or presence of high moisture for the completion of the work within the allotted contract time.
- C. In conformance with the Contract Documents Contractor shall furnish a breakdown of the bid by assigning dollar values (cost estimated) to each applicable network activity, which cumulatively equals the bid. Upon acceptance by City, the values will be used as the basis for determining progress payments. Contractor's overhead, profit, and cost of bonds and insurance, shall be prorated through all activities.
- D. Failure by Contractor to include any element of work required for performance of the work on the detailed construction schedule shall not excuse Contractor from completing all work required within the Contract time.
- E. A two-week "look ahead" detailed, daily bar chart schedule shall be updated and issued weekly, no later than the time of the scheduled weekly meeting.
- F. Contractor shall utilize computer scheduling software, such as PRIMAVERA or approved equivalent software for all scheduling including schedule updates.

Contractor shall supply computer data files for all schedules including the original schedule and monthly schedule updates.

#### 1.5 MONTHLY SCHEDULE UPDATE SUBMITTALS

- A. Following acceptance of Contractor's Initial Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.
  - 1. Each schedule update submitted shall be complete, including all information requested for the Initial Schedule submittal.
  - 2. Each update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.
- B. A meeting will be held after the first Project Meeting of each month to review the schedule update submittal and progress payment application.
  - 1. At this meeting, at a minimum, the following items will be reviewed: percent complete of each activity; time impact evaluations for change orders and time extension requests; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated contractor delays.
  - 2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.
  - 3. Contractor shall plan on the meeting taking no less than two (2) hours.
- C. Within five (5) working days after monthly schedule update meeting, Contractor shall submit the updated Schedule update.
- D. Within five (5) working days of receipt of above noted revised submittals, City will either accept or reject monthly schedule update submittal.
  - 1. If accepted, percent complete shown in monthly update will be basis for Application for Payment by Contractor. The schedule update shall be submitted as part of Contractor's Application for Payment.
  - 2. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.
- E. Neither updating, changing or revising of any report, curve, schedule or narrative submitted to City by Contractor under this Contract, nor City's review or acceptance of any such report, curve, schedule or narrative, shall have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, Contractor's obligations under this Contract.

## 1.6 SCHEDULE REVISIONS

- A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.
- B. To reflect revisions to the schedule, Contractor shall provide City with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, Contractor shall provide a schedule diagram which compares the original sequence to the revised sequence of work. Contractor shall provide the written narrative and schedule diagram for revisions two (2) calendar days in advance of the monthly schedule update meeting.
- C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by City. City may request further information and justification for schedule revisions and Contractor shall, within three (3) calendar days, provide City with a complete written narrative response to City's request.
- D. If Contractor's revision is still not accepted by City, and Contractor disagrees with City's position, Contractor has seven (7) calendar days from receipt of City's letter rejecting the revision, to provide a written narrative providing full justification and explanation for the revision. Contractor's failure to respond in writing within seven (7) calendar days of City's written rejection of a schedule revision shall be contractually interpreted as acceptance of City's position, and Contractor waives its rights to subsequently dispute or file a claim regarding City's position.
- E. At City's discretion, Contractor can be required to provide subcontractor certifications of performance regarding proposed schedule revisions affecting said subcontractors.

## 1.7 RECOVERY SCHEDULE

- A. If the Schedule Update shows a substantial completion date twenty-one (21) calendar days beyond the Contract Substantial Completion date, or individual milestone completion dates, Contractor shall submit to City the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.
- B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by City.
- C. If Contractor's revisions are not accepted by City, City and Contractor shall follow the procedures in paragraph 1.6.C, 1.6.D and 1.6.E above.

- D. At City's discretion, Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

#### 1.8 TIME EXTENSIONS

- A. Contractor is responsible for requesting time extensions for time impacts that, in the opinion of Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accord with [Document 00 72 00 - General Conditions](#).
- B. Where an event for which City is responsible impacts the projected Substantial Completion date, Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how the impact can be mitigated (e.g., increase crew size, overtime, etc.). Contractor shall also include a detailed cost breakdown of the labor, equipment and material Contractor would expend to mitigate City caused time impact. Contractor shall submit its mitigation plan to City within ten (10) working days from the date of discovery of said impact. Contractor is responsible for the cost to prepare the mitigation plan.
- C. Failure to request time or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.
- D. No time will be granted under this Contract for cumulative effect of changes.
- E. City will not be obligated to consider any time extension request unless requirements of Contract Documents are satisfied.
- F. Failure of Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.

#### 1.9 PROJECT STATUS REPORTING

- A. In addition to submittal requirements for scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each Schedule as specified herein. Status reporting shall be in form specified below.
- B. Contractor shall prepare monthly written narrative reports of status of Project for submission to City. Written status reports shall include:
  1. Status of major Project components (percent complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.
  2. Progress made on critical activities indicated on Schedule, inspections and visits by the Building and/or Special Inspection Inspector.
  3. Explanations for any lack of work on critical path activities planned to be performed during last month.
  4. Explanations for any schedule changes, including changes to logic or to activity durations.

5. List of critical activities scheduled to be performed next month.
6. Status of major material and equipment procurement.
7. Any delays encountered during reporting period.
8. Contractor shall provide a printed report indicating actual versus planned resource loading for each trade and each activity. This report shall be provided on weekly and monthly basis.
  - a. Actual resource shall be accumulated in field by Contractor, and shall be as noted on Contractor's daily reports. These reports will be basis for information provided in monthly and weekly printed reports.
  - b. Contractor shall explain all variances and mitigation measures.
9. Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by City at no additional cost.
10. Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 32 16**

**SECTION 01 33 00 – SUBMITTAL PROCEDURES****PART 1 - GENERAL**

## 1.1 SUMMARY

A. This section describes general requirements for submittals for the Work:

1. Procedures
2. Schedule of Shop Drawing and Sample Submittals
3. Safety Plan
4. Progress Schedule
5. Product Data
6. Shop drawings
7. Samples
8. Quality Control Submittals
  - a. Design Data
  - b. Test Reports
  - c. Certificates
  - d. Manufacturers' Instructions
9. Machine Inventory Sheets
10. Operations and Maintenance Manuals
11. Keys
12. Project Record Documents

B. Related Sections:

1. [Section 01 10 00 - Summary](#)
2. [Section 01 25 00 – Substitution Procedures](#)
3. [Section 01 26 00 – Contract Modification Procedures](#)
4. [Section 01 29 00 – Payment Procedures](#)
5. [Section 01 32 16 – Construction Progress Schedule](#)
6. [Section 01 78 00 – Closeout Submittals](#)

## 1.2 PROCEDURES

A. Upon issuance of the “Notice to Proceed”, the Contractor shall have thirty-five (35) calendar days to submit, at Contractor/Vendor expense, sets of the following: Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Quality Control Data, Machine Inventory Sheets, Operations and Maintenance Manuals, and Project Record Documents required by the Contract Documents. Submit these submittals to Project Manager for review and approval in accordance with accepted schedule of Shop Drawings and Samples submittals.



- B. Transmit each item with a standard letter of transmittal. Identify project, Contractor, subcontractor, major supplier, pertinent drawing sheet and detail number, special provisions, and specification section number as appropriate. Provide space for Contractor, Project Manager and Architect/Engineer review stamps. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly to show those portions of the data which are applicable to this project. The transmittal sheet will include the following:
1. Date
  2. Project and Contract Name and Number
  3. Subcontractor or supplier as appropriate
  4. Trade
  5. Contractor Review Stamp
- C. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Project Manager and Architect/Engineer the materials and equipment Contractor proposes to provide and to enable Project Manager and Architect/Engineer to review the information for the limited purposes specified below. Samples shall be identified clearly as to material, supplier; pertinent data such as catalog numbers and the use for which it is intended and otherwise as Project Manager and Architect/Engineer may require enabling Project Manager and Architect/Engineer to review the submittal.
- D. At the time of each submission, Contractor shall give City specific written notice of all variations, if any; that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be a separate document from the submittal. In addition, Contractor shall cause a specific notation to be made on each Shop Drawing and Sample submitted to City for review and approval of each such variation. If City accepts deviation, City shall issue appropriate Contract Modification.
- E. Submittal coordination and verification of contract compliance is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Before submitting each Shop Drawing or Sample, Contractor shall have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents, and shall have determined and verified:
1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
  2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and
  3. All information relative to Contractor's sole responsibilities and of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

- F. Contractor's submission to City of a Shop Drawing or Sample submittal will constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above, with respect to Contractor's review and approval of that submittal.
- G. After review by Project Manager and Architect/Engineer of each of Contractor's submittals, one set of materials will be returned to Contractor with actions defined as follows:
1. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown on the submittal.
  2. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as 1. above, except that minor corrections as noted shall be made by Contractor.
  3. AMEND AND RESUBMIT - Rejected because of major inconsistencies or errors which shall be resolved or corrected by Contractor prior to subsequent review by Project Manager and Architect/Engineer.
  4. REJECTED - RESUBMIT - Submitted material does not conform to Plans and Specifications in major respect, i.e.: wrong size, model, capacity, or material.
- H. It is considered reasonable that Contractor shall make a complete and acceptable submittal at least by second submission. City reserves the right to deduct monies from payments due Contractor to cover additional costs of Project Manager's and Architect/Engineer's review beyond the second submission. Illegible submittals will be rejected and returned to Contractor for resubmission.
- I. Favorable review will not constitute acceptance by City of any responsibility for the accuracy, coordination and completeness of the submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to back check comments, corrections, and modifications resulting from City's review which shall be incorporated in design before fabrication. Submittals may be prepared by Contractor, subcontractors, or suppliers, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Project Manager and Architect/Engineer's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as indicated by the Contract Documents. Favorable review of submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Architect/Engineer or City, or any officer or employee thereof, and Contractor shall have no claim under Contract on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Architect/Engineer or City has no objection to

Contractor using, upon his own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

- J. City's review shall not be construed as approval of means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
- K. Submit complete initial submittal for those items where required by individual special provisions, or specification sections. Complete submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in technical specifications, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial submittal, when complete submittal is required, submittal may be returned to Contractor without review.
- L. It shall be Contractor's responsibility to copy, conform and distribute reviewed submittals in sufficient numbers for Contractor's files, subcontractors and vendors.
- M. After Project Manager's and Architect/Engineer's review of submittal, revise and resubmit as required. Identify changes made since previous submittal.
  - 1. Begin no fabrication or work which require submittals until return of submittals not requiring re-submittal.
  - 2. Normally, submittals will be processed and returned to Contractor within fifteen (15) calendar days of receipt.
- N. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

### 1.3 SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS

- A. Submit preliminary Schedule of Shop Drawing and Sample Submittals as required by [Document 00 72 00 - General Conditions](#). Submit three (3) copies and PDF of final and accepted schedule of submittals of shop drawings and samples as required by Document 00 72 00 - General Conditions, and in no event later than thirty-five (35) calendar days following Notice to Proceed.
- B. Schedule of Shop Drawing and Sample Submittals will be used by Project Manager and Architect/Engineer to schedule their activities relating to review of submittals. Schedule of submittals shall indicate a spreading out of submittals and early submittals of long-lead-time items and of items which require extensive review.
- C. Schedule of Shop Drawing and Sample Submittals shall be reviewed by Project Manager and shall be revised and resubmitted until accepted by Project Manager.

#### 1.4 SAFETY PLAN

- A. Submit three (3) copies of Safety Plan specific to this Contract to Project Manager within fifteen (15) calendar days of issuance of the Notice to Proceed.
- B. One (1) copy of accepted Safety Plan will be returned to Contractor.
- C. No on-site work shall be started until Safety Plan has been reviewed and accepted by City. Acceptance of Safety Plan shall not affect Contractor's responsibility for maintaining a safe working place and instituting safety programs in connection with project.

#### 1.5 PROGRESS SCHEDULE

- A. See [Section 01 32 16 – Construction Progress Schedule](#) for schedule and report requirements.
- B. Submit three (3) copies and PDF of schedule at each of the following times:
  - 1. Initial CPM Schedule at the Preconstruction Conference (covering in detail first thirty (30) calendar days of contract performance, and at a summary level for remainder of contract).
  - 2. Original CPM Schedule within thirty (30) calendar days of the Notice to Proceed date (covering in detail entire Work of Contract to completion).
  - 3. Adjustments to the CPM Schedule as required.
  - 4. CPM Schedule updates weekly, two (2) calendar days prior to weekly progress meeting.
- C. Submit three (3) copies and PDF of the reports listed in [Section 01 32 16 – Construction Progress Schedule](#) with:
  - 1. Initial CPM Schedule
  - 2. Original CPM Schedule
  - 3. Each weekly Schedule update
- D. Progress Schedules and Reports shall be submitted electronically and stored in a USB flash drive in addition to hard copies specified above.

#### 1.6 PRODUCT DATA

- A. Within ten (10) calendar days after Start Date of the Contract Times, submit copies of complete list of major products and equipment proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- C. Tabulate products by Special Provisions and Specification Section Number.

- D. Supplemental Data: Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to Project.
- E. Provide copies for Project Record Documents described in [Section 01 78 00 – Closeout Submittals](#).

#### 1.7 SHOP DRAWINGS

- A. Submit three (3) copies and PDF of shop drawings.
- B. Minimum Sheet Size: 8-1/2 inches by 11 inches. All others: Multiples of 8-1/2 inches by 11 inches, 22 inches by 34 inches (ANSI D) maximum.
- C. Original sheet or reproducible transparency will be marked with Project Manager's and/or Architect/Engineer's review comments and returned to Contractor.
- D. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.
- E. Include manufacturers' installation instructions when required by special provisions or specification section.

#### 1.8 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures, and patterns for Project Manager's selection where not indicated in documents or for substitutions or "equals".
- B. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- C. Include identification on each sample, giving full information.
- D. Submit three (3) samples unless otherwise specified.
- E. Sizes: Unless otherwise specified, provide the following:
  - 1. Paint Chips: Manufacturers' standard.
  - 2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square.
  - 3. Linear Products: Minimum 6 inches, maximum 12 inches long.
  - 4. Bulk Products: Minimum 1 pint, maximum 1 gallon.
- F. Full size samples may be used in Work upon approval.
- G. Mock-ups:

1. Erect field samples and mock-ups at Project site in accordance with requirements of Special Provisions or Specification sections.
2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by Project Manager.
3. Approved field samples and mock-ups may be used in Work upon approval.

#### 1.9 QUALITY CONTROL SUBMITTALS

- A. Design Data: Three (3) copies and PDF.
- B. Test Reports: Three (3) copies and PDF.
  1. Indicate that material or product conforms to or exceeds specified requirements.
  2. Reports may be from recent or previous tests on material or product, but must be acceptable to Project Manager. Comply with requirements of each individual special provisions or specification Section.
- C. Certificates: Three (3) copies and PDF.
  1. Indicate that material or product conforms to or exceeds specified requirements.
  2. Submit supporting reference data, affidavits, and certifications as appropriate.
  3. Certificates may be recent or from previous test results on material or product, but must be acceptable to Project Manager.
- D. Manufacturers' Instructions: Three (3) copies and PDF.
  1. Include manufacturer's printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
  2. Identify conflicts between manufacturer's instructions and Contract Documents.

#### 1.10 MACHINE INVENTORY SHEETS

- A. Submit three (3) copies of machine inventory sheets including inventory list for spare parts and materials. If necessary, copies will be marked with Project Manager's and/or Architect/Engineer's review comments and returned to Contractor for correction until satisfactory information is provided. City will retain satisfactorily corrected sheets for its own use.

#### 1.11 OPERATIONS AND MAINTENANCE MANUALS

- A. Submit three (3) copies and PDF of manufacturers' operations and maintenance manuals. If necessary, copies will be marked with City's review comments and returned to Contractor for correction until satisfactory information is provided. City will retain satisfactorily corrected manuals for its own use.
- B. Operations and maintenance manuals shall include the following as appropriate:
  1. Operating instructions.
  2. Preventive maintenance instructions.

3. Cleaning instructions.
  4. Safety precautions.
  5. Trouble shooting procedures.
  6. Theory of operation to discrete component level.
  7. Schematic diagrams, flow diagrams, wiring diagrams, logic diagrams, etc. to discrete component level.
  8. Parts lists showing all discrete components with part number, current prices and availability.
  9. List of replaceable supplies; paper, ink, ribbon, etc. with part numbers, current prices and availability.
  10. Recommended levels of spare parts and supplies to keep on hand.
  11. Manufacturers' service and maintenance technical manuals.
  12. Names, addresses and telephone numbers of service and repair firms for the equipment.
- C. Manuals shall be the same as are used by manufacturers' authorized technicians to completely service and repair the equipment.
- 1.12 KEYS
- A. Submit two (2) complete sets of keys for the Project and all related facilities.
  - B. Submit an inventory list of keys.
- 1.13 PROJECT RECORD DOCUMENTS
- A. Submit copies of each of the Project Record Documents as listed in [Section 01 78 00 – Closeout Submittals](#).

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 33 00**

## SECTION 01 41 00 – REGULATORY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes regulatory requirements applicable to Contract.

#### 1.2 REFERENCES TO REGULATORY REQUIREMENTS

- A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these specifications.
- B. Conform to referenced codes, laws, ordinances, rules and regulations which are in effect on date of receipt of bids.

#### 1.3 CODES

- A. Codes which apply to Contract include, but are not limited to, the following:
  - 1. California Building Code (CBC) – Latest Edition:
    - a. California Administrative Code: Title 24, Part 1.
    - b. California Building Code: Title 24, Part 2 (Includes the California Historical Building Code, Part 8 and California Existing Building Code, Part 10).
    - c. California Residential Code: Title 24, Part 2.5
    - d. California Electrical Code: Title 24, Part 3.
    - e. California Mechanical Code: Title 24, Part 4.
    - f. California Plumbing Code: Title 24, Part 5.
    - g. California Energy Code: Title 24, Part 6.
    - h. California Fire Code: Title 24, Part 9.
    - i. California Green Building Standards Code (CALGreen): Title 24, Part 11.
    - j. California Referenced Standards Code: Title 24, Part 12.

#### 1.4 LAWS, ORDINANCES, RULES AND REGULATIONS

- A. During prosecution of Work to be done under Contract, comply with applicable laws, ordinances, rules and regulations, including, but not limited to, the following:
  - 1. Federal/National:
    - a. Americans with Disabilities Act (ADA): Latest edition; Civil Rights Division, Office on the Americans with Disabilities Act, U.S. Department of Justice
    - b. National Fire Protection Association (NFPA): Life Safety Code - NFPA 101.
    - c. U. S. Environmental Protection Agency (EPA): Laws and regulations.



- d. 29 CFR, Section 1910.1001, Asbestos
- e. 40 CFR, Subpart M, National Emission Standards for Asbestos
- f. Executive Order 11246
- 2. State of California:
  - a. California Code of Regulations, Titles 5, 8, 19, 21, 24
  - b. California Education Code
  - c. California Public Contract Code
  - d. California Health and Safety Code
  - e. California Government Code
  - f. California Labor Code
  - g. California Civil Code
  - h. California Code of Civil Procedure
  - i. CPUC General Order 95, Rules for Overhead Electric Line Construction
  - j. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
- 3. State of California Agencies:
  - a. State and Consumer Services Agency
  - b. Department of Industrial Relations – Public Works
  - c. Office of the State Fire Marshal
  - d. California Environmental Protection Agency (CalEPA): State regulations and standards.
  - e. California Integrated Waste Management Board:
    - 1) General: Sustainable Building Guidelines.
    - 2) Construction Waste Management: Construction and Demolition Debris Recycling.
  - f. California State Water Resources Control Board (SWRCB): SWPPP Standards.
  - g. California Department of Toxic Substances Control (DTSC): Hazardous Waste Management standards.
- 4. City Codes:
  - a. Pittsburg Municipal Code
- 5. Local Agencies:
  - a. Bay Area Air Quality Management
  - b. County of Contra Costa
  - c. City of Pittsburg

#### 1.5 REQUIRED PROVISIONS ON CONTRACT CLAIM RESOLUTION

- A. The California Public Contract Code specifies required provisions on resolving contract claims less than \$375,000, which are set forth below, and constitute a part of this Contract.
- B. For the purposes of this section, "CLAIM" means a separate demand by Contractor of \$375,000 or less for (1) a time extension, (2) payment of money or damages arising from work done by or on behalf of Contractor arising under the Contract Documents and payment of which is not otherwise expressly provided

for or the claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by City. In order to qualify as a CLAIM, the written demand must state that it is a claim submitted under [Document 00 72 00 - General Conditions](#) and be submitted in compliance with all requirements of Document 00 72 00 - General Conditions. Separate claims which total more than \$375,000 do not qualify as a "separate demand of \$375,000 or less", as referenced above, and are not subject to this section.

- C. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a claim under the Contract. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a claim under the Contract by submitting a separate claim in compliance with Contract claim submission requirements.
- D. CAUTION: This section does not apply to tort claims and nothing in this section is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 and Chapter 2 of Part 3 of Division 3.6 of Title 1 of the California Government Code.
- E. PROCEDURE
  - 1. The CLAIM must be in writing, submitted in compliance with all requirements of [Document 00 72 00 - General Conditions](#), including, but not limited to, the time prescribed by and including the documents necessary to substantiate the CLAIM, pursuant to [Document 00 72 00 - General Conditions](#). CLAIMS must be filed on or before the day of final payment. Nothing in this section is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in [Document 00 72 00 - General Conditions](#) or elsewhere in the Contract Documents.
  - 2. For CLAIMS of fifty thousand dollars (\$50,000) or less:
    - a. City shall respond in writing within 45 calendar days of receipt of the CLAIM, or
    - b. City may request in writing within 30 calendar days of receipt of the CLAIM, any additional documentation supporting the CLAIM or relating to any defenses or claims City may have against Claimant.
      - 1) If additional information is thereafter required, it shall be requested and provided in accordance with this section, upon mutual agreement of City and Claimant.
      - 2) City's written response to the CLAIM, as further documented, shall be submitted to Claimant within 15 calendar days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.
  - 3. For CLAIMS over fifty thousand dollars (\$50,000) and less than or equal to \$375,000:
    - a. City shall respond in writing within 60 calendar days of receipt of the CLAIM, or

- b. City may request in writing within 30 calendar days of receipt of the CLAIM, any additional documentation supporting the CLAIM or relating to any defenses or claims City may have against Claimant.
  - 1) If additional information is thereafter required, it shall be requested and provided in accordance with this section, upon mutual agreement of City and Claimant;
  - 2) City's written response to the CLAIM, as further documented, shall be submitted to Claimant within 30 calendar days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.
- c. Meet and Confer:
  - 1) If Claimant disputes City's written response, or City fails to respond within the time prescribed above, Claimant shall notify City, in writing, either 15 calendar days of receipt of City's response or within 15 calendar days of City's failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand City will schedule a meet and confer conference within 30 calendar days for settlement of the dispute.
  - 2) Following the meet and confer conference, if the CLAIM or any portion remains in dispute, Claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the California Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time Claimant submits his or her written claim as set forth above in [Document 00 72 00:13B](#), until the time that CLAIM is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

#### F. MEDIATION/ARBITRATION

1. In accordance with Subparagraph 20104.4 of The California Public Contract Code, the following procedures are established for all civil actions filed to resolve CLAIMS subject to this article:
  - a. Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator

within the 15-day period, any party may petition the court to appoint the mediator.

b. Judicial Arbitration:

1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 (commencing with Section 2016.010) of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

c. The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

2. In accordance with Subparagraph 20104.6:

a. No local agency shall fail to pay money as to any portion of a CLAIM which is undisputed except as otherwise provided in the contract.

b. In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 41 00**

**SECTION 01 42 00 – REFERENCES****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. This section includes reference standards, symbols and definitions used in Contract Documents.
2. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.
3. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor, since manufacturers and trades involved are assumed to be familiar with their requirements.

## 1.2 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES:

- A. Latest in Effect: 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.
- B. Discrepancies: 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 Inspector, with copies to Project Manager and Architect/Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by Project Manager.
- C. Precedence: Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, 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:

1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
2. 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).
3. No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of City, Contractor, Project Manager, or Architect/Engineer, 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, Architect/Engineer, Project Manager, or any of their consultants, agents 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.

### 1.3 STANDARDS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
APWA	American Public Works Association
AREMA	The American Railway Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers

ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BASMAA	Bay Area Stormwater Management Agencies Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BFL	Bay Friendly Landscaping
CALOSHA	California Occupational Safety and Health Administration
CA MUTCD	California Manual on Uniform Traffic Control Devices
CALTRANS	State of California Department of Transportation
CBC	California Building Code
CCR	California Code of Regulations
CLFMI	Chain Link Fence Manufacturer's Institute
CRSI	Concrete Reinforcing Steel Institute
DDW	Division of Drinking Water
EIA	Electronic Industries Association
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MSS	Manufacturers Standardization Society
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code

NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration (Federal)
PCA	Portland Cement Association
PUC	Public Utilities Commission
SSPC	Steel Structures Painting Council
STA	Seal of Testing Assurance Program
UL	Underwriters Laboratories, Inc
USCC	U S Composting Council

#### 1.4 SYMBOLS

- A. Symbols, used only on Drawings, are shown thereon.

#### 1.5 DEFINITIONS

- A. 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:
1. ADDENDUM/ADDENDA: Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding requirements or the Contract Documents.
  2. ADDITIVE BID: The sum to be added to the Base Bid if the change in scope of work as described in Additive Bid is accepted by City.
  3. AGREEMENT ([Document 00 52 13 – Agreement Form](#)): Agreement is the basic contract document that binds the parties to construction Work. Agreement defines relationships and obligations between City and Contractor and by reference incorporates Conditions of the Contract, Drawings, Special Provisions, Specifications and contains Addenda and all Modifications subsequent to execution of Contract.
  4. ALTERNATE: Work added to or deducted from the Base Bid, if accepted by City.
  5. APPROVED EQUAL: Approved in writing by City as being of equivalent quality, utility and appearance.



6. ARCHITECT/ENGINEER:
  - a. Design Architect: The person holding a valid California State Architect's or Landscape Architect's license, whose firm has been designated within the Contract Documents to provide architectural or landscape architectural services on the project, and who may have engaged engineering subconsultants to provide services on Project.
  - b. Design Engineer: The person holding a valid California State Engineering license, whose firm has been designated within the Contract Documents to provide civil, structural, traffic or other engineering services on the project, and who may have engaged engineering subconsultants to provide services on Project.
  - c. When the Architect/Engineer is referred to within the Contract Documents and no Architect or Engineer has in fact been designated, then the matter shall be referred to City. The term Architect/Engineer shall be construed to include all his or her consultants retained for the Project, as well as employees of the Architect/Engineer. When the designated Architect/Engineer is an employee of City, his or her authorized representatives on the Project within the district will be included under the term Architect/Engineer.
7. AS-BUILTS: Project Record Documents as required by the General Conditions and [Section 01 78 00 – Closeout Submittals](#).
8. BID: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
9. BIDDER: One who submits a Bid.
10. BY CITY: Work that will be performed by City or its agents at the City's expense.
11. BY OTHERS: 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.
12. CITY: City of Pittsburg, acting through its City Council or any of its authorized agents.
13. CITY CORPORATION YARD: Located at 357 East 12<sup>th</sup> Street, Pittsburg, CA 94565-2628.
14. CITY ENGINEER: City employee in charge of Engineering.
15. CITY-FURNISHED, CONTRACTOR-INSTALLED: Items furnished by City at its cost for installation by Contractor at its cost under this Contract.
16. CITY'S PROJECT MANAGER(S): The person or persons assigned by City to be City's agent(s) or representative(s) at the site. City's authorized agent representing City on all matters of the Contract. Project Manager may authorize agents and representatives to act in carrying out Project Manager's duties, including a "Construction Manager", to act under the authority of the Project Manager. As City's agent, the Project Manager is the beneficiary of all contract obligations of Contractor to City, including without limitation, all releases and indemnities.
17. CHANGE ORDER: A written instrument prepared by City and signed by City and Contractor, stating their agreement upon all of the following:

- a. a change in the Work,
  - b. the amount of the adjustment in the Contract Sum, if any, and
  - c. the amount of the adjustment in the Contract Time, if any.
18. CONCEALED: Work not exposed to view in the finished Work, including within or behind various construction elements.
19. CONTRACT CONDITIONS: Conditions of the Contract define basic rights, responsibilities and relationships of Contractor and City and consists of two parts: General Conditions and Supplementary Conditions.
- a. General Conditions are general clauses which are common to the City Contracts.
  - b. Supplementary conditions modify or supplement General Conditions to meet specific requirements for this Contract.
20. CONTRACT DOCUMENTS: Contract Documents shall consist of the documents identified as the Contract Documents in [Document 00 52 13 – Agreement Form](#), plus all changes, addenda and modifications thereto.
21. CONTRACT MODIFICATION: Either:
- a. a written amendment to Contract signed by Contractor and City; or
  - b. a Change Order; or
  - c. a written directive for a minor change in the Work issued by City.
22. CONTRACT SUM: 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 referred to as the Contract Price or the Contract Amount.
23. CONTRACT TIMES or CONTRACT TIME: The number or numbers of days or the dates stated in the Agreement (i) to achieve substantial completion of the Work or designated milestones and/or (ii) to complete the Work so that it is ready for final payment and is accepted.
24. CONSTRUCTION MANAGER: A representative of City with authority to act on behalf of City, as specified by City or Project Manager.
25. CONTRACTOR: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neuter in gender. The term "Contractor" means the Contractor or its authorized representative.
26. CONTRACTOR'S EMPLOYEES: Persons engaged in execution of Work under Contract as direct employees of Contractor, as subcontractors, or as employees of subcontractors.
27. DATE OF SUBSTANTIAL COMPLETION: Date of Substantial Completion of Work or designated portion thereof is date certified by Project Manager when construction is sufficiently complete in accordance with Contract Documents for City to occupy Work or designated portion thereof and have beneficial use of it for the purposes intended.
28. DAY: One calendar day, unless the word "day" is specifically modified to the contrary.
29. DEFECTIVE: An adjective which, when modifying the word "Work", refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that it 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 but not limited to 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). Project Manager is the judge of whether Work is defective.
30. DRAWINGS: 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.
  31. EQUAL: Equal in opinion of Project Manager. Burden of proof of equality is responsibility of Contractor.
  32. EXPOSED: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.
  33. FINAL ACCEPTANCE or FINAL COMPLETION: 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. All Systems having been tested and accepted as having met requirements of Contract Documents.
    - b. All required instructions and training sessions having been given by Contractor.
    - c. All as-built drawings, operations and maintenance manuals, and other closeout submittals having been submitted by Contractor, and reviewed and accepted by City.
    - d. All punch list work, as directed by City, having been completed by Contractor.
    - e. All Work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of City.
    - f. See [Section 01 29 00 – Payment Procedures](#), 1.9.D regarding Final Payment.
    - g. See [Section 01 77 00 – Closeout Requirements](#).
  34. FORCE ACCOUNT: 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.
  35. FURNISH: Supply and deliver to the jobsite.
  36. INDICATED: Shown or noted on the Drawings.
  37. INSPECTOR: The person engaged by City to inspect 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.
  38. INSTALL: Anchor, fasten, or connect in place and adjust for use; place or apply in proper position and location; establish in place for use or service.

39. LATENT: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.
40. MATERIAL OR MATERIALS: These words 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. MILESTONE: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.
42. MODIFICATION: Same as Contract Modification.
43. NOT IN CONTRACT: Work that is outside the scope of work to be performed by Contractor under this Contract.
44. NOTICE OF AWARD: A written notice given by City to lowest responsive, responsible bidder advising that Bidder's bid and other qualifying information is acceptable to City, requiring Bidder to fulfill the requirements of Article 4 of [Document 00 72 00 - General Conditions](#).
45. NOTICE TO PROCEED: A written notice given by City to Contractor fixing the date on which the Contract Time will commence to run and on which contractor shall start to perform Contractor's obligations under the Contract Documents.
46. OFF SITE: Outside geographical location of the Project.
47. OWNER: City of Pittsburg, acting through its officers, employees, or its authorized agent.
48. PROGRESS REPORT: A periodic report submitted by Contractor to City with progress payment invoices accompanying actual work accomplished to the Program Schedule. See [Section 01 32 16 - Construction Progress Schedule](#) and Reports required in [Document 00 72 00 - General Conditions](#).
49. PROJECT: Total construction of which Work performed under this Contract may be whole or part.
50. PROJECT MANUAL: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, Special Provisions, and Specifications.
51. PROVIDE: Furnish and install.
52. REQUESTS FOR INTERPRETATION ("RFI"): A document prepared by Contractor requesting interpretation, information, and/or clarification regarding the Project or Contract Documents.
53. SAMPLES: 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.
54. SHOP DRAWINGS: 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.
55. SITE/JOBSITE: The particular geographical location of Work performed pursuant to Contract.

56. SPECIAL PROVISIONS: Document 00 80 00 – Special Provisions, which states project-specific requirements.
57. SPECIFICATIONS: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services; and are contained in Divisions 01 through 48.
58. SPECIFIED: As written in Special Provisions and Specifications.
59. SUBCONTRACTOR: A person or entity who 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 neuter 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.
60. SUBMITTALS: Shop drawings, samples and other items specified in [Section 01 33 00 - Submittal Procedures](#).
61. SUBSTANTIAL COMPLETION: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the Project Manager and Architect/Engineer and as evidenced by a 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; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by written recommendation of Project Manager and/or Architect/Engineer for final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof. See [Section 01 29 00 – Payment Procedures](#), 1.8.A.2 regarding application for payment of Substantial Completion and [Section 01 77 00 – Closeout Requirements](#).
62. SUPPLEMENTAL INSTRUCTION: A written work change directive to Contractor from Project Manager or Architect/Engineer, approved by Project Manager, ordering alterations or modifications which do not result in change in Contract Sum or Contract Times, and do not substantially change Drawings, Special Provisions, or Specifications.
63. UNDERGROUND FACILITIES: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: Electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.
64. WORK: The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services

and furnishing documents, all as required by the Contract Documents including the Drawings, Special Provisions, and Specifications. Wherever the word "work" is used, rather than the word "Work", it shall be understood to have its ordinary and customary meaning.

- 65. WORKING DAY. A working day is defined as any day, except as follows:
  - a. Saturdays, Sundays, and legal holidays
  - b. Days on which the Contractor is prevented from performing work by inclement weather or conditions resulting therefrom.
  
- B. 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 or Project Manager is intended. Words "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary or proper in judgment of City or Project Manager. Words "approved", "acceptable", "satisfactory", or words of like import, shall mean approved by, or acceptable to, or satisfactory to, City or Project Manager.
  
- C. Wherever the word "may" is used, the action to which it refers is discretionary. Wherever the word "shall" is used, the action to which it refers is mandatory. Where a colon (:) is used within sentences or phrases, the words "shall" or "shall be" are included by inference. Such imperative statements in the specifications are directed to the Contractor, who has overall responsibility for the subcontractors.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 42 00**

**SECTION 01 42 13 - ABBREVIATIONS****PART 1 - GENERAL**

## 1.1 GENERAL

- A. Wherever in these Specifications references are made to the Standards, Specifications or other published data of the various national, regional, or local organizations, such organization may be referred to by their acronym or abbreviation only. As a guide to the use of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meaning indicated herein.

## 1.2 ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGC	Associated General Contractors
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
APWA	American Public Works Association
AREMA	The American Railway Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects

ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BASMAA	Bay Area Stormwater Management Agencies Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BFL	Bay Friendly Landscaping
CALOSHA	California Occupational Safety and Health Administration
CA MUTCD	California Manual on Uniform Traffic Control Devices
CALTRANS	State of California Department of Transportation
CBC	California Building Code
CCR	California Code of Regulations
CFC	California Fire Code
CLFMI	Chain Link Fence Manufacturer's Institute
CPC	California Plumbing Code
CRSI	Concrete Reinforcing Steel Institute
CVC	California Vehicle Code
DBE	Disadvantaged Business Enterprise
DDW	Division of Drinking Water
EIA	Electronic Industries Association
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers



MSS	Manufacturers Standardization Society
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration (Federal)
PCA	Portland Cement Association
PUC	Public Utilities Commission
SSPC	Steel Structures Painting Council
STA	Seal of Testing Assurance Program
UL	Underwriters Laboratories, Inc
USCC	U S Composting Council

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 42 13**

## SECTION 01 43 00 – QUALITY ASSURANCE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section includes administrative and procedural requirements for quality assurance.
  - 1. Workmanship: Quality of work.
  - 2. Tolerances: Finished surfaces.
- B. References:
  - 1. General: Refer to [Document 00 72 00 – General Conditions](#) and [Section 01 42 00 - References](#). Products or workmanship specified in the Project Manual by association, trade, or other consensus standards shall conform to the requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
  - 2. Contractual Relationship: The contractual duties and responsibilities of the parties of the Contract and those of the Project Manager shall not be altered from the requirements of the Contract Documents by any statement or inference in any reference document.
- C. Testing: Refer to [Section 01 45 00 – Quality Control](#).

### PART 2 - PRODUCTS

- 2.1 Refer to [Section 01 60 00 – Product Requirements](#); assure a consistent quality of products furnished by suppliers and manufacturers as indicated throughout the Project Manual.

### PART 3 - EXECUTION

#### 3.1 PERFORMANCE

- A. Refer to [Section 01 70 00 – Execution](#).
- B. Workmanship: Perform shop and field work with mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation of work specified. Install and erect work plumb, level, square, and true, or true to indicated angle, and in proper alignment and relationship to other work. Finished work shall be free from defects and damage. Quality of work shall conform to the highest established standards and practices of the various trades required. The Project Manager reserves the right to reject materials and work quality which

does not meet accepted standards. Repair or replace substandard material or work as directed, at no additional cost to the City.

### 3.2 INSTALLATION

- A. General: Conduct quality control in concert with suppliers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Manufacturer's Instructions:
  - 1. General: Follow manufacturer's instructions, including each step in progression of installation. If manufacturer's instructions conflict with Contract Documents, request clarification from Project Manager before commencing Work.
  - 2. Installer: Manufacturer approved, as required in the technical sections of the Project Manual.
  - 3. Field Services: Coordinate with manufacturer of a product, system, or assembly which requires special knowledge and skill for proper application/installation of the product, system, or assembly to obtain field service, consultation and inspection as required for the application/installation work at no additional cost to the City.
- C. Reference Standards: Conform to specified standards as minimum quality for the Work except where more stringent codes or specified requirements indicate higher standards or more precise workmanship.
- D. Anchorage: Secure products in place with positive anchorage devices designed and sized to withstand stress, vibration, physical distortion, or disfigurement.
- E. Tolerances: Adjust products to appropriate dimensions; position before securing in place. Monitor and control tolerances of installed products to produce acceptable Work.

**END OF SECTION 01 43 00**

**SECTION 01 45 00 – QUALITY CONTROL****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality-control services.
- B. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Owner.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
- E. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products. Refer to the following:
  - 1. [Section 03 30 00 – Utility Cast-in-place Concrete](#) - 3.9 Field Quality Control
  - 2. [Section 03 60 00 – Grouting](#) - 3.4 Field Quality Control
  - 3. [Section 31 05 13 – Clearing & Grubbing, Excavation, and Earthwork](#) – 2.5 – Source Quality Control.
  - 4. [Section 31 23 16 – Utility Trenching](#) - 3.17 Field Quality Control
  - 5. [Section 32 11 23 – Aggregate Base Courses](#) – 3.5 Field Quality Control
  - 6. [Section 32 12 16 – Asphalt Paving](#) – 1.5 Quality Control Plan & 3.13 – Field Quality Control
  - 7. [Section 32 12 17 – Asphalt Paving Rehabilitation](#) – 1.5 Quality Control Plan & 3.17 – Field Quality Control
  - 8. [Section 32 13 13 – Concrete Surface Improvements](#) – 3.5 Field Quality Control
  - 9. [Section 32 17 26 – Detectable Warning Surfacing](#) – 3.4 Field Quality Control
  - 10. [Section 33 01 30 – Testing for Sanitary Sewer, Storm Drainage – Piping and Manholes](#) – 3.3 Field Quality Control
  - 11. [Section 33 05 13 – Manholes and Structures](#) – 3.4 Field Quality Control
  - 12. [Section 33 05 17 – Precast Concrete Valve Vaults and Meter Boxes](#) – 3.4 Field Quality Control
  - 13. [Section 33 11 13 – Water Distribution Piping](#) – 3.6 Field Quality Control
  - 14. [Section 33 12 00 – Water Distribution Equipment](#) – 3.4 Field Quality Control
  - 15. [Section 33 12 13 – Water Service Connections](#) – 3.4 Field Quality Control

16. [Section 33 12 16 – Water Distribution Valves](#) – 3.4 Field Quality Control
17. [Section 33 12 19 – Water Distribution Fire Hydrants](#) – 3.4 Field Quality Control
18. [Section 33 13 00 –Disinfecting of Water Distribution](#) – 3.3 Field Quality Control
19. [Section 33 31 13 – Sanitary Sewer Piping](#) – 3.4 Field Quality Control
20. [Section 33 41 13 – Storm Drainage Piping](#) – 3.5 Field Quality Control

- F. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
- G. Requirements for Contractor to provide quality-control services required by Owner, or authorities having jurisdiction are not limited by provisions of this Section.

## 1.2 RESPONSIBILITIES

- A. Owner's Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the Owner shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction.
- B. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.'
- C. Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.
- D. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility. Refer to [Document 00 72 00 – General Conditions](#).
  1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility and will be at no cost to the Owner where required tests performed on original construction indicated noncompliance with Contract Document requirements.
- E. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.
  2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
  3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
  4. Provide facilities for storage and curing of test samples.
  5. Deliver samples to testing laboratories.
  6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
  7. Provide security and protection of samples and test equipment at the Project Site.
- F. Duties of the Owner: Owner will retain a qualified independent agency to perform inspections, sampling, and testing of materials and construction specified in individual Sections.
1. Upon receipt of notice from the testing agency, Owner will notify the Contractor promptly of irregularities or deficiencies identified in the testing Work performance.
  2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
  3. The agency shall not perform any duties of the Contractor.

### 1.3 SUBMITTALS

- A. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Owner. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
  2. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    - a. Date of issue.
    - b. Project title and number.
    - c. Name, address, and telephone number of testing agency.
    - d. Dates and locations of samples and tests or inspections.
    - e. Names of individuals making the inspection or test.
    - f. Designation of the Work and test method.
    - g. Identification of product and Special Provisions/Specification Section.
    - h. Complete inspection or test data.
    - i. Test results and an interpretation of test results.
    - j. Ambient conditions at the time of sample taking and testing.
    - k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

- I. Name and signature of laboratory inspector.
- m. Recommendations on retesting.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Owner will engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.
  - 1. Each independent inspection and testing agency engaged on the Project shall be authorized by (authorities having jurisdiction) to operate in the state where the Project is located.

### **PART 2 - PRODUCTS**

NOT USED

### **PART 3 - EXECUTION**

#### 3.1 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for [Section 01 70 00 - Execution](#).
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

**END OF SECTION 01 45 00**

## **SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. This Section includes requirements for installation and removal of temporary facilities and controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
  - 1. Water service and distribution.
  - 2. Temporary electric power and light.
  - 3. Temporary heat.
  - 4. Ventilation.
  - 5. Sanitary facilities, including drinking water.
  - 6. Fire protection water service.
- C. Support facilities include, but are not limited to, the following:
  - 1. Temporary enclosures.
  - 2. Temporary project identification signs and bulletin boards.
  - 3. Waste disposal services.
  - 4. Rodent and pest control.
  - 5. Signs.
- D. Security and protection facilities include, but are not limited to, the following:
  - 1. Barricades, warning signs, and lights.
  - 2. Sidewalk bridge or enclosure fence for the site.
  - 3. Environmental protection.

#### **1.2 SUBMITTALS**

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within ten (10) working days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.
- C. Temporary Facilities Plan: Within ten (10) working days prior to scheduled installation of any temporary facility, submit a plan to the Project Manager for review and approval.

#### **1.3 TEMPORARY FACILITIES**



- A. Temporary Structures: Obtain permits for, install and maintain in safe condition, whatever scaffolds, hoisting equipment, barricades, walkways, or other temporary structures which may be required to accomplish the work on the Project. Such structures shall be adequate for the intended use and capable of safely accepting all loads that may be imposed upon them. They shall be installed and maintained in accordance with all applicable State and local codes and regulations.
- B. Temporary Heat: Provide and maintain temporary heat from an approved source whenever in the course of the Work it may become necessary for curing and drying of materials, or to warm spaces as may be required for the installation of materials or finishes.
- C. Dewatering: Provide and maintain facilities that may be required for dewatering in order that work may proceed on the Project. If it is necessary for dewatering to occur continually, have on hand whatever spare parts or equipment that may be required to prevent interruption of dewatering. If required, obtain Dewatering Permit from Delta Diablo (Sewer District) for waste discharge.
- D. Temporary Utilities: Provide and maintain all utility services necessary to perform the work under this Contract. These may include, but are not limited to, temporary electricity, water, gas, sewer and telephone, including charges and installation fees. Furnish and maintain all means of distribution of utility services required within the site to properly complete the Project.
- E. Storage: Store materials, tools, accessories, etc., only where directed by City. Keep storage area neat and clean. Security of stored items is Contractor's responsibility.
- F. Flammable Materials: When flammable materials are stored on site, take extra precautions, including clear identification.
- G. Sanitary Facilities: Provide and maintain temporary toilets and wash facilities in quantities and locations as required by CAL/OSHA and other local codes and regulations. Keep them maintained and supplied in a usable and sanitary condition at all times.
- H. Drinking Water: Provide and maintain adequate potable water stations at site until final completion of the Project.
- I. Field Office: If required by the Special Provisions, maintain an office at the Project site which will be the Contractor's headquarters for the Project. Any communications delivered to this office shall be considered as delivered to Contractor. Location and size of office shall be such that it will adequately serve the needs of Contractor's superintendent and assistants in the performance of their duties.

- J. Removal of Temporary Facilities: Promptly remove temporary facilities when they are no longer needed for the work or for completion of the Project, mutually agreed upon by Contractor and City.
- K. Fire Hydrant: Provide site access and operational fire hydrant prior to any combustible construction on site. Fire hydrants to be relocated shall remain operational until the replacement fire hydrant is operational.

#### 1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 1. Building code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, fire department, and rescue squad rules.
  - 5. Environmental protection regulations.
- B. Standards: Comply with the following:
  - 1. NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations,"
  - 2. ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and
  - 3. NECA Electrical Design Library "Temporary Electrical Facilities."
- C. Electrical Service:
  - 1. Comply with NEMA, NECA, and UL standards and regulations for temporary electric service.
  - 2. Install service in compliance with NFPA 70 "National Electric Code" and PG&E Green Book, latest edition.
- D. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

#### 1.5 SIGNS

- A. No signs may be displayed on or about City's property (except those required by law) without City's specific approval; the size, content, and location to be as specified by City.

## 1.6 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.
- C. Use of Roadways and Walkways: Do not block or interfere with use of any existing roadway, walkway or other facility for vehicular or pedestrian traffic, from any party entitled to use it. Wherever and whenever such interference becomes necessary for the proper and convenient performance of the Work, and no satisfactory detour route exists, before beginning the interference, notify City and post signs at least 72 hours in advance of such interference, and provide a satisfactory detour, including temporary bridge if necessary, or other proper facility for traffic to pass around or over the interference. Maintain the detour in a safe and satisfactory condition as long as the interference continues, all without extra payment unless otherwise expressly stipulated in the Special Provisions. Refer to [Section 01 55 26 – Temporary Traffic Control](#).

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Owner's Representative, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood:
  - 1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
  - 2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thicknesses indicated.
  - 3. For fences and vision barriers, provide minimum 3/8-inch-thick exterior plywood.
  - 4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch-thick exterior plywood.

- C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.
- D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.
- E. Paint: Comply with requirements of [Section 09 90 00 – Painting and Coating](#). For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
- F. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- G. Water: Provide potable water approved by local health authorities.
- H. Open-Mesh Fencing: Provide 0.120-inch-thick, galvanized 2-inch chain link fabric fencing 6 feet high with galvanized steel pipe posts; 1-1/2 inches I.D. for line posts and 2-1/2 inches I.D. for corner posts.

## 2.2 EQUIPMENT

- A. General: Provide new equipment. The Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: For non-potable use (construction water) provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge and backflow devices as required per City standards.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: Provide general service lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- G. Temporary Offices: If required by the Special Provisions, provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
- J. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

#### **3.2 TEMPORARY UTILITY INSTALLATION**

- A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
  - 1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
  - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
  - 3. Obtain easements to bring temporary utilities to the site where the Owner's

easements cannot be used for that purpose.

- B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping prior to use in compliance with City Standards. Refer to [Section 33 13 00 - Disinfecting of Water Distribution](#).
- C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switchgear. Install wiring overhead and rise vertically where least exposed to damage.
- D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
- E. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel oil heaters with individual space thermostatic control.
- G. Sanitary Facilities: Provide lockable temporary toilets and wash facilities. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs. Locate away from storm drainage inlets and other water bodies. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, and other temporary construction and support facilities for easy access. Location will be subject to City's approval.
- B. Provide incombustible construction for offices, shops, and sheds located within the construction area or within 30 feet of building lines. Comply with requirements of NFPA 241.
- C. Field Offices: Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep the office clean and orderly for use for small progress meetings.
- D. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
  - 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
  - 3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
- F. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.
- G. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- H. Rodent and Pest Control: Before deep foundation work has been completed, retain an Integrated Pest Management (IPM) Certified exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and

control procedures at regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using EPA recommended environmentally safe materials.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
  - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
  - 2. Store combustible materials in containers in fire-safe locations.
  - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
  - 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- B. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- D. Enclosure Fence: Before construction begins, install an enclosure fence with lockable entrance gates. Provide open-mesh, chain link fencing with posts. Locate where indicated, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
- E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- F. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental



regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site. Contractor is responsible for locking, and any vandalism, theft, unauthorized access and violation are Contractor's responsibility.

### 3.5 SIGNS

- A. Project Construction Sign: Provide minimum 32-square foot Project identification sign of wood frame and exterior grade plywood construction painted, with exhibit lettering by professional sign painter.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  - 2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are the Contractor's property.
  - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
  - 3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
    - a. Replace air filters and clean inside of ductwork and housings.
    - b. Replace significantly worn parts and parts subject to unusual operating conditions.

- c. Replace lamps burned out or noticeably dimmed by hours of use.

**END OF SECTION 01 50 00**

## SECTION 01 55 26 – TEMPORARY TRAFFIC CONTROL

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: temporary traffic control system including preparing and submitting temporary traffic control, pedestrian and bicycle access plans, temporary traffic signal, traffic control for utility trenching and backfill, utility coordination, vehicular traffic control, traffic control for adjacent property owners, traffic control for on-street parking, traffic control for bus stops and coordination with Tri Delta transit, maintaining traffic, temporary railing (type K), temporary crash cushion module, construction area signs, and temporary signing and striping.
- B. All temporary traffic control plans including temporary pedestrian and bicycle access plans submitted by the Contractor shall conform to California Manual of Uniform Traffic Control Devices (CA MUTCD) – Latest Edition.

#### 1.2 REFERENCES

- A. California Manual of Uniform Traffic Control Devices (CA MUTCD) – Latest Edition.
- B. Cal/OSHA – California Division of Occupation Safety and Health
- C. Caltrans Standard Specifications
  - 1. Section 7 – Legal Relations and Responsibility to the Public
  - 2. Section 12 – Temporary Traffic Control

#### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Measurement and Payment:
  - 1. When temporary traffic control is included as a bid item, measurement will be made as a percentage of the costs incurred according to the list submitted except that not more than 75% of the bid price shall be paid prior to the final estimate for payment being due, said remaining 25% paid upon completion of cleanup and removal with final payment.
  - 2. When the contract does not include a contract pay item for temporary traffic control, full compensation for any necessary traffic control required shall be

considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

3. The adjustment provisions in the State Standard Specifications, Section 4.1.05, "Changes and Extra Work", shall not apply to the item of temporary traffic control system. Any adjustment in compensation for temporary traffic control due to an increase or decrease in the amount of traffic control system required by changes ordered by the Project Manager will be made on the basis of the cost of the increased or decreased temporary traffic control necessary. Such adjustment will be made on a force-account basis as provided in Section 9-1.04, "Force Account", of the State Standard Specifications for increased work.

## **PART 2 - (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 TEMPORARY TRAFFIC CONTROL SYSTEM**

- A. A temporary traffic control system shall consist of closing traffic lanes in conformance with the CA MUTCD, details shown on the Drawings, the provisions in Section 12, "Temporary Traffic Control", of the State Standard Specifications, the provisions under "Maintaining Traffic", and "Construction Area Signs" of the State Standard Specifications and the Special Provisions.
- B. The provisions in this section will not relieve the Contractor of responsibility for providing additional devices or taking measures as may be necessary to comply with the provisions in Section 7-1.04, "Public Safety," of the State Standard Specifications and CA MUTCD.
- C. During traffic striping and pavement marker placement activities using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving lane closures. During other operations, traffic shall be controlled with stationary lane closures. Attention is directed to the provisions in Section 12-6.03, "Construction," of the State Standard Specifications.
- D. If components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.
- E. A traffic control system shall consist of closing traffic lanes in accordance with the details shown on T-9 through T-17 of the latest edition of the Caltrans Standard Plans, California Manual of Uniform Traffic Control Devices (CA MUTCD), the

contract plans, the provisions of Section 12, " Temporary Traffic Control" of the State Standard Specifications and the Special Provisions.

- F. Each vehicle used to place, maintain, and remove components of a traffic control system on multilane roadways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing said components. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion.
- G. The location of temporary traffic control devices shall be checked by the Contractor especially at the beginning of the work period and periodically throughout the work day, to ensure that the devices are properly placed and maintained.
- H. If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately notify the Project Manager and repair the said component to its original condition or replace said component and shall restore the component to its original location. The cost of providing temporary traffic control as required by the Project Manager shall be considered as included in the cost of traffic control. No additional compensation will be allowed therefor.
- I. The Contractor shall furnish competent Flaggers whose sole duties shall consist of directing the movement of traffic through or around the work. Flaggers shall not be used during the hours of darkness unless authorized by the City.
- J. The Contractor shall conduct all operations with the least possible obstruction and inconvenience to the public. The Contractor shall have under construction no greater length or amount of work than can be completed within a workday with due regards to the rights of the public.
- K. The Contractor shall provide and maintain all traffic control and safety items. The Contractor assumes sole and complete responsibility for the job and site conditions during the course of construction, including safety of all persons and property. This requirement shall apply continuously twenty-four (24) hours/day and shall not be limited to normal work hours.
- L. Personal and work vehicles of the Contractor, subcontractor or the Contractor's employees shall not be parked on the paved shoulders, sidewalk or the traveled way, including any section closed to public traffic. No vehicles of the Contractor shall be parked or driven on the sidewalk.
- M. All personnel occupying the roadway shall be required to wear approved safety vests with protective coloration.
- N. The Contractor shall notify local authorities of his intent to begin work at least five (5) working days before work is begun. The Contractor shall cooperate with local

authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.

- O. Upon completion of all work requiring use of lane closures, the Contractor shall remove all temporary signs, barricades, and markers and shall return the roadway and roadside areas to a condition equal to that which existed prior to construction.
- P. All asphalt concrete and temporary pavement delineations including pavement markers at the end of each stage shall be considered as a part of Traffic Control work.
- Q. No full road closures are allowed unless approved by the City Manager.
- R. No lane closures will be allowed on weekdays from 6:00 AM to 8:30 AM, or from 3:00 PM to 6:00 PM, except for emergencies or unless otherwise approved by the City Traffic Engineer.
- S. The full width of the traveled way shall be open for use by public traffic on Fridays after 3:00pm, Saturdays, Sundays and designated legal holidays, and when construction operations are not actively in progress.
- T. Two or more lane closures and lane closures with reversible control will not be allowed on weekdays before 9:00 AM, or after 3:00 PM.
- U. The lane closure(s) must be limited in duration and area as practicable and the times and dates of closure must be stated on the approved temporary traffic control plan.
- V. Lane closures and lane reduction shall conform to the provisions in "Maintaining Traffic" of the State Standard Specifications and the CA MUTCD.
- W. When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except temporary portable delineators, K-rails and crash cushions placed along open trenches or excavation adjacent to the traveled way shall be removed from the traveled way and shoulder.
- X. To minimize the disruption to traffic, the Contractor shall:
  - 1. Permit local traffic to pass through the work with the least possible inconvenience or delay.
  - 2. Maintain existing driveways, commercial and residential, within the vicinity of the work area, keeping them open and in good, safe condition at all times.
  - 3. Remove or repair any condition resulting from the work that might impede traffic or create a hazard.
  - 4. Keep existing traffic signal and roadway lighting systems in operation throughout the construction work.
  - 5. Maintain continuous ADA accessible pedestrian and bicycle routes.

### 3.2 TEMPORARY TRAFFIC CONTROL, PEDESTRIAN AND BICYCLE ACCESS PLANS

- A. The Contractor shall provide a Temporary Traffic Control, Pedestrian and Bicycle Access Plans for each stage of construction and for each location.
- B. Temporary Traffic Control, Pedestrian and Bicycle Access Plans will be hand drawn and legible with an approximate graphic scale.
- C. Temporary Traffic Control, Pedestrian and Bicycle Access Plans will show all temporary striping, cones, barricades, channelizers, signs, flaggers, temporary k-rail, crash cushion modules; temporary turn pockets, dimensions of all stripe segments and lane widths, street names, temporary signal modifications, temporary traffic loops, portable changeable message signs, detour signs, construction area signs on all side streets, construction schedule, work hours and all times the temporary traffic control plan will be in effect.
- D. Temporary Traffic Control, Pedestrian and Bicycle Access Plans will also show continuous pedestrian and bicycle path of travel arrows, pedestrian and bicycle signage, pedestrian ADA ramps, bike ramps, temporary pedestrian crosswalks, temporary bike crossings, temporary pedestrian push buttons for signals, pedestrian and bicycle signage on all side streets, pedestrian and bicycle crossing signs, and areas for temporary ADA upgrades along the pedestrian path of travel.
- E. Temporary Traffic Control, Pedestrian and Bicycle Access Plans will be submitted to the City Traffic Engineer two (2) weeks prior to commencement of each stage of construction. The Temporary Traffic Control, Pedestrian and Bicycle Access Plans shall be reviewed by the City Traffic Engineer. Contractor to incorporate all comments from the City Traffic Engineer and resubmit the plans for approval prior to implementation. Assume two (2) rounds of review and resubmittal for each stage of construction.
- F. Once any segment of sidewalk or trail or corner is commenced with sawcut and/or any segment of sidewalk/trail is closed to pedestrians and bicyclists, Contractor will backfill and complete the improvements unless an approved detour plan is provided and approved by the City Traffic Engineer.

### 3.3 TRAFFIC SIGNAL

- A. If traffic signal inductive vehicle loop detectors and lead-in wiring not designated to be replaced on the Plans are damaged during the course of the construction period, they shall be replaced within one (1) week or as directed by the Project Manager. The cost of replacing damaged loop detectors including detector handholes or any other necessary repairs to the components of the traffic signal system shall be included in the cost of traffic control. No additional compensation will be allowed therefore.

### 3.4 UTILITY COORDINATION

- A. Contractor shall notify the utility companies as a first order of work about the project and submit a detailed project schedule to all utility companies.
- B. Each stage of construction shall allow for utility companies to complete their work. If Utility company's utilities are to be constructed, adjusted or relocated. the Contractor shall provide four (4) week window during each stage of construction for utility companies to have unobstructed access to the site. This four (4) week period will likely occur after demolition and setting of curb forms by the Contractor. The related utility work shall be coordinated with the utility companies prior to the two (2) week window. The Contractor shall also allow utility companies to work on site during the remaining time of each construction stage.
- C. The construction schedule shall identify the related utility work during each stage and shall be submitted for approval. Changes during construction that will impact the related utility work shall be identified on the Progress Schedule.
- D. The Contractor shall notify to the utility companies and the Project Manager immediately of any changes to the schedule.

### 3.5 TEMPORARY TRAFFIC CONTROL FOR UTILITY TRENCHING & BACKFILL

- A. All excavations shall be backfilled or covered at the end of each workday. Trench covers will be constructed to withstand pedestrian, bicyclist and vehicle loads. Trench covers in the vehicle areas will be steel plated to withstand vehicle loads. All trench covers shall be non-skid. In sidewalk areas, AC cutback shall be used as temporary ramps. Contractor shall maintain temporary AC surface to provide safe and comfortable passage over or along same, for pedestrian, bicyclist and vehicular traffic to the satisfaction of the Inspector in the field. Items which will require trench plates include, but are not limited to: storm drain, sewer, water main trenches, and irrigation crossings. Contractor to submit shop drawings to demonstrate method of trench plating, anchoring and asphalt tapers.
- B. The Contractor shall comply with the provisions in Section 7-1.02K(6), "Occupational Safety and Health Standards" of the State Standard Specifications.
- C. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor. The Contractor shall leave the project site in a neat, clean, and presentable state at the close of every workday.
- D. If material from the trench excavation spills onto the roadway, the roadway area shall be swept and washed with water to provide a safe and dust free surface before the lane is re-opened.



- E. The Contractor shall conform to the order of work requirements described on the plans and specifications. If the work items are not completed by the time specified, including any extension of time for excusable delays, the Contractor shall be liable to the City for any additional cost incurred by the City in its completion of the work, and the Contractor shall also be liable to the City for liquidated damages for any delay in the completion of the work.

### 3.6 TRAFFIC CONTROL FOR ADJACENT PROPERTY OWNERS

- A. A. The Contractor shall notify residents/businesses within a closed section by door hanger of sidewalk closures stating the date(s) of closure, limits of sidewalk closure, hours of construction, and detours. The door hangers shall be delivered no later than two (2) working days prior to sidewalk closure. Prior to dissemination, the Contractor shall present a copy to the Project Manager and get approval from the Project Manager for the door hanger.
- B. Work shall be accomplished in such a manner as to provide access to all intersecting streets and adjacent properties whenever possible. If during the course of the work, it is necessary to restrict access to certain driveways for an extended period of time, the Contractor shall
  1. Notify the affected residents, in writing, at least two (2) working days in advance.
  2. Provide signage and provide continuous Flaggers to direct traffic in and out of the parking.
  3. Maintain 11' minimum width.
  4. Reopen driveway by the end of the work day.
  5. Include the signage and Flaggers on the Traffic Control and Pedestrian Access Plans.
- C. To protect the rights of abutting property owners, the Contractor shall
  1. Conduct the construction so that the least inconvenience as possible is caused to abutting property owners.
  2. Maintain ready access to houses or businesses along the line of work, including ramps over work area.
  3. Notify all parties at least five (5) days, and again two (2) working days, in advance of work which would affect their property. The Contractor shall coordinate with City to obtain Right of Entry for any work within private property.
  4. The Contractor shall maintain access to adjacent private property at all times, and shall address driveway access on approved Traffic Control Plans.
  5. For Utility company and Developer projects, permittee shall obtain right of entry for any work in private properties.
  6. The Contractor shall maintain safe pedestrian and bicycle access at all times, including crosswalks, when it is required to close sidewalks.

7. Contractor shall provide Temporary Pedestrian and Bicycle Access Plan for any change in pedestrian and bicycle movements. All openings shall be covered or steel plated at the end of each workday, when working in an intersection and traffic lane. Covers in pedestrian areas shall be non-skid and ADA compliant. Contractor shall maintain temporary AC surface to provide safe and comfortable passage over or along same, for pedestrian, bicyclist and vehicular traffic to the satisfaction of the Inspector in the field.
8. The Contractor shall provide temporary pedestrian bridges and walkways as shown on Contractor's approved Temporary Traffic Control Plans. Temporary pedestrian bridges shall be provided to each affected doorway.

### 3.7 TRAFFIC CONTROL FOR ON-STREET PARKING:

- A. To maintain On-Street parking, the Contractor shall provide temporary signs for any existing On-Street parking closure and coordinate with adjacent businesses. Contractor shall restripe the existing On-Street Parking impacted by construction in-kind as required by the Project Manager within the project limits.
- B. The Contractor shall post City approved parking restrictions a minimum two (2) working days before work begins. All legal parking areas must be maintained and access to legally parked vehicles doors and storage areas must be maintained.
- C. Parking restrictions must be limited in time as practicable.

### 3.8 TRAFFIC CONTROL FOR BUS STOPS AND COORDINATION WITH TRANSIT AGENCY (TRI DELTA TRANSIT)

- A. If construction shall obstruct a bus stop, the Contractor shall notify the Transit Agency two (2) working days in advance. The Contractor shall be responsible for providing temporary bus stop with temporary bench, bus stop signs posts and no parking signs at locations specified by Transit Agency within a distance of maximum of 400' from existing bus stop.
- B. The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, and any other needed actions to protect life, health, and safety of the public, and to protect property in connection with the performance of the work covered by the contract. The Contractor shall perform any measures or actions the Project Manager may deem necessary to protect the public and property. Contractor shall install K-rail at all new bus stop pad construction areas.

### 3.9 MAINTAINING TRAFFIC

- A. Maintaining traffic shall conform to CA MUTCD, the provisions in Sections 7-1.03, "Public Convenience," Section 7-1.04, "Public Safety," and Section 12,

"Temporary Traffic Control," of the State Standard Specifications, and the City Standard Specifications.

- B. Closure is defined as the closure of a traffic lane or lanes, including shoulder, ramp or connector lanes, within a single traffic control system.
- C. The full width of the traveled way shall be open for use by public traffic as specified in Part 3.1 above, when construction operations are not actively in progress.
- D. Personal and work vehicles of the Contractor, subcontractor or the Contractor's employees shall not be parked on the traveled way or shoulders including sections closed to public traffic.
- E. The Contractor shall immediately restore to the original position and location a temporary traffic cone or delineator that is displaced or overturned, during the progress of work.
- F. If minor deviations from the Contractor's approved lane closure requirements are required, a written request shall be submitted to the City Traffic Engineer at least 15 days before the proposed date of the closure. The City Traffic Engineer may approve the deviations if there is no increase in the cost to the City and if the work can be expedited and better serve the public traffic.
- G. Designated legal holidays are:

**Holidays**

Holiday	Date observed
New Year's Day	January 1 <sup>st</sup>
Martin Luther King Jr. Day	3 <sup>rd</sup> Monday in January
Lincoln's Birthday	February 12 <sup>th</sup>
Washington's Birthday	3 <sup>rd</sup> Monday in February
Cesar Chavez Day	March 31 <sup>st</sup>
Memorial Day	Last Monday in May
Independence Day	July 4 <sup>th</sup>
Labor Day	1 <sup>st</sup> Monday in September
Columbus Day	2 <sup>nd</sup> Monday in October
Veterans Day	November 11 <sup>th</sup>
Thanksgiving Holidays	4 <sup>th</sup> Thursday and Friday in November
Christmas Day	December 25 <sup>th</sup>

If a designated holiday falls on a Sunday, the following Monday is a designated holiday. If November 11th falls on a Saturday, the preceding Friday is a designated holiday.

- H. Pedestrian and Bicycle access facilities shall be provided through construction areas within the public right of way as shown on the Contractor's approved Temporary Traffic control, Pedestrian and Bicycle Access plans and as specified herein. Pedestrian walkway shall be surfaced with asphalt concrete, Portland cement concrete or timber. The surface shall be skid resistant and free of irregularities. Hand railings shall be provided on each side of pedestrian walkways as necessary to protect pedestrian traffic from hazards due to construction operations or adjacent vehicular traffic. Protective overhead covering shall be provided as necessary to insure protection from falling objects and drip from overhead structures. If the Contractor's operations require the closure of one walkway, then another walkway shall be provided nearby, off the traveled roadway.
- 3.10 CONTINGENCY PLAN: A detailed contingency plan shall be prepared for reopening closures to public traffic. The contingency plan shall be submitted to the Project Manager within one (1) business day of the Project Manager's request.
- 3.11 LATE REOPENING OF CLOSURES
- A. If a closure is not reopened to traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.06, "Suspensions" of the State Standard Specifications. No further closures are to be made until the City Traffic Engineer has accepted a work plan, submitted by the Contractor that will insure that future closures will be reopened to traffic at the specified time. The City Traffic Engineer will have two (2) business days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.
- B. For each 10-minute interval, or fraction thereof past the time specified to reopen the closure, City will deduct payments per interval from moneys due or that may become due the Contractor under the contract. See deductible schedule below:
1. Residential Streets - \$50 per 10 minutes
  2. Collector Streets - \$100 per 10 minutes
  3. Arterial Streets - \$400 per 10 minutes.
- 3.12 TEMPORARY RAILING (TYPE K)
- A. Temporary railing (Type K) shall be placed as shown on the Contractor's approved Temporary Traffic Control, Pedestrian and Bicycle Access plans, as specified in the Drawings or where ordered by the Project Manager and shall conform to CA MUTCD, the provisions in Section 12, "Temporary Traffic Control" of the State Standard Specifications and the City Standard Specifications.

- B. Temporary railing (Type K) shall consist of interconnected new or undamaged used precast concrete barrier units as shown on the Contractor's approved Temporary Traffic Control, Pedestrian and Bicycle Access plans. Exposed surfaces of new and used units shall be freshly coated with a white color paint prior to their first use on the project. The paint shall conform to the provisions in Section 91-4.02B, "Acrylic Emulsion Paint for Exterior Masonry" of the State Standard Specification.
- C. Concrete shall conform to the provisions in Section 90-2, "Minor Concrete" of the State Standard Specifications. Load tickets and a Certificate of Compliance will not be required.
- D. Reinforcing steel shall conform to the provisions in Section 52, "Reinforcement" of the State Standard Specifications.
- E. Steel bars to receive bolts at ends of concrete panels shall conform to the requirements in ASTM Designation: A 36. The bolts shall conform to the requirements in ASTM Designation: A 307.
- F. The final surface finish of temporary railings (Type K) shall conform to the provisions in Section 51-1.03F(2), "Ordinary Surface Finish" of the State Standard Specifications. Exposed surfaces of concrete elements shall be cured by the water method, the forms in place method, or the pigmented curing compound method. The pigmented curing compound shall be curing compound (1) as specified in Section 90-1.03B(3), "Curing Compound Method" of the State Standard Specifications. The Contractor shall furnish a Certificate of Compliance to the Project Manager in conformance with the provisions in Section 6-2.03C "Certificates of Compliance" of the State Standard Specification, for all new or used temporary railing (Type K) that is not cast on the project.
- G. Temporary railing (Type K) shall be set on firm, stable foundation. The foundation shall be graded to provide a uniform bearing throughout the entire length of the railing. Any excavation and backfill shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill" of the State Standard Specification except that compaction of earth fill placed behind the temporary railing (Type K) in a curved layout will not be required.
- H. Abutting ends of precast concrete units shall be placed and maintained in alignment without substantial offset to each other. The precast concrete units shall be positioned straight on tangent alignment and on a true arc on curved alignment.
- I. At the locations required on the plans, threaded rods or dowels shall be bonded in holes drilled in the existing concrete. Drilling of holes and bonding of threaded rods or dowels shall conform to the provisions for bonding dowels in Section 83-3.01A, "Summary" of the State Standard Specifications. After removal of the temporary railing (Type K), all threaded rods or dowels shall be removed to a

depth of at least one inch below the surface of the concrete. The resulting holes shall be filled with mortar in conformance with the provisions in Section 51-1.02F, "Mortar" of the State Standard Specification, except that the mortar shall be cured by either the water method or by the curing compound method. If the curing compound method is used, the curing shall conform to the provisions for curing concrete barrier in Section 83-3.03A(8), "Curing" of the State Standard Specifications.

- J. Each rail unit shall have a reflector installed on top of the rail. Reflectors shall be as specified in the special provisions, and adhesive shall conform to the reflector manufacturer's recommendations. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Signs and Markers" of the State Standard Specifications, except that the Contractor shall furnish the marker panels.
- K. When temporary railings (Type K) are removed, any area where temporary excavation or embankment was used to accommodate the temporary railing shall be restored to its previous condition or constructed to its planned condition.
- L. Prior to each stage of construction Contractor will provide a layout of the proposed temporary railing, crash cushion locations, and temporary striping/signing for the railing.
- M. Water filled barriers will be considered in lieu of temporary railings (Type K), upon a written request from the contractor along with proposed details, layout plan, temporary signing & striping and installation.

### 3.13 TEMPORARY CRASH CUSHION MODULE

- A. This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the Contractor's approved traffic control plans, as specified in the special provisions or where designated by the Project Manager. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and the special provisions.
- B. Temporary crash cushions shall be secured in place prior to commencing work for which the temporary crash cushions are required.
- C. Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

- D. Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. When no longer required, as determined by the Project Manager, sand filled temporary crash cushions shall be removed from the site of the work.
- E. Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized.
- F. Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in pounds for each module shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain no more than 7 percent water as determined by California Test 226.
- G. Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Project Manager, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.
- H. A Type R or P marker panel shall be attached to the front of the crash cushion. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Project Manager.
- I. At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.
- J. Repairing modules damaged by public traffic and modules damaged beyond repair by public traffic, when ordered by the Project Manager, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be not be measured and paid for and shall be considered as included in the lump sum price paid for Temporary Traffic Control.
- K. Include allowance for Project Manager to order a lateral move of the sand filled temporary crash cushions where the repositioning is not shown on the Contractor's approved traffic control plans. Moving the sand filled temporary crash cushion will be considered as included in the lump sum price paid for Temporary Traffic Control and no additional compensation will be allowed therefore and these temporary crash cushion modules will not be counted for payment in the new position.

3.14 CONSTRUCTION AREA SIGNS

- A. Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with CA MUTCD, the provisions in Section 12-3.11, "Construction Area Signs," of the State Standard Specifications, the contract drawings, and the Special Provisions. The base material of construction area signs shall not be plywood. This includes but not limited to furnishing and installation of Pedestrian and Bicycle Signs.

**END OF SECTION 01 55 26**



**SECTION 01 56 10 – PROTECTION OF PROPERTY****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Existing Utilities and Improvements
2. Safeguarding of Existing Facilities
3. Restoration of Pavement
4. Emergency Work
5. Preconstruction Site Documentation

## B. Related Sections:

1. [Section 01 50 00 – Temporary Facilities and Controls](#)
2. [Section 01 32 00 – Construction Progress Documentation](#)

## 1.2 EXISTING UTILITIES AND IMPROVEMENTS

## A. Underground Facilities: Notify Underground Service Alert (U.S.A.) prior to excavating at the site so that utility companies and other City departments having underground facilities in the area may be advised of the work and may field mark or otherwise protect and warn Contractor of their existing utility lines.

1. Provide reasonable access and do not hinder or otherwise interfere with any company or agency having underground facilities in removing, relocating, or protecting such facilities.

## B. Excavations: Verify the actual locations and depths of all utilities indicated or field marked. Make a sufficient number of exploratory excavations of all utilities that may interfere with the Work sufficiently in advance of construction to avoid possible delays to Contractor's work.

1. Notify the City when such exploratory excavations show the utility location as shown or as marked to be in error.
2. When utility lines are encountered within the area of Contractor's operations, notify the Project Manager and the Owner(s) of the utility lines sufficiently in advance for the necessary protection measures to be taken to prevent interruption of service or delay to Contractor's operations.

## 1.3 SAFEGUARDING OF EXISTING FACILITIES

## A. Damage: Perform all work, including dewatering operations, in such a manner as to avoid damage to existing sewer and water systems, fire hydrants, power poles, lighting standards, and all other existing utilities, facilities, trees and vegetation, and structures. The Contractor will be held responsible for any damage due to its failure to exercise due care, and at no cost to the City.

- B. Removal and Disposal: Broken concrete, debris, and the like, shall be immediately removed from the property site as the Contractor's property and disposed of in a legal manner.
- C. Existing Facilities: Exercise due care to avoid damage to existing pipe and coating, wrapping, sewers, conduit, or other existing facilities and structures. Should the Contractor damage or displace any of the above, repair same to the satisfaction of the Project Manager; all expenses in connection therewith shall be borne solely by the Contractor.
- D. Sewer System: Do not allow debris to enter the sewer system.

#### 1.4 RESTORATION OF PAVEMENT

- A. General: All paved areas cut or damaged during construction shall be replaced with materials of equal thickness to match the existing undisturbed areas, except where specific resurfacing requirements are called for in the Contract Documents or in the permit requirements of the agency issuing the permit. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.
- B. Temporary Resurfacing: Place temporary surfacing promptly after backfilling and maintain such surfacing in a satisfactory condition for the period of time before proceeding with the final restoration.
- C. Permanent Resurfacing: Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in neat straight lines. All pavement restoration shall be constructed to finished grades compatible with undisturbed adjacent pavement.
- D. Restoration of Sidewalks or Driveways: Wherever sidewalks, curbs and gutters, or driveways have been removed for construction purposes, place suitable temporary sidewalks, curbs and gutters, or driveways promptly after backfilling and maintain them in satisfactory condition for the period of time before the final restoration has been made.

#### 1.5 EMERGENCY WORK

- A. General: At all times have adequate personnel, materials, and equipment available at short notice to protect adjoining property, maintain, or make emergency repairs. If during the progress of the Contract, the Contractor's construction crews should be absent from the location of the work at a time when any failure or faulty condition of the Contractor's work requires emergency action in the public interest, the City shall have the right to make repairs and corrections as required with its own forces at the Contractor's expense.
- B. Contact Information: Furnish the Project Manager with names and telephone numbers of at least three (3) persons to contact in case of emergencies; these

persons shall be authorized to perform such work as deemed necessary by the Project Manager.

1.6 PRECONSTRUCTION SITE DOCUMENTATION

- A. Prevention of Damage: Use such methods and take adequate precautions to prevent damage to existing buildings, structures, and other improvements during the prosecution of the work.
- B. Joint Examination: After the Contract is awarded and before the commencement of work, the Project Manager will arrange for a joint examination of the work, as applicable, which might be damaged by the Contractor's operations
- C. Scope of Examination: The examination will include the exterior of existing buildings, structures, and other improvements located within twenty-five (25) feet of the construction excavation. Examination will be made jointly by authorized representatives of the Contractor, the City, and property owners under the supervision of the Project Manager. The scope of each examination will include, but is not limited to, written and photographic recording of cracks in structures, settlement, leakage, and the like.
- D. Photos and Videos: Take photos and videos during the joint examination review. Provide digital photos and videos to the Project Manager within thirty (30) consecutive days of the date taken.
- E. Use of Records and Photographs: Any and all records and photographs are intended for use as indisputable evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations. They are for the protection of the adjacent property owners, the Contractor, and the City and will be a means of determining whether and to what extent damage, resulting from the Contractor operations, occurred during the Contract Work.
- F. Requirements for Photographs and Videos: Refer to [Section 01 32 00 – Construction Progress Documentation](#).

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 56 10**

**SECTION 01 57 23 – STORM WATER POLLUTION PREVENTION****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Section Includes: requirements for temporary utilities, support facilities, storm water pollution prevention, erosion control, traffic control, support, and security and protection facilities.
- B. Projects that have a soil disturbance of one acre or greater are subject to the State Water Resources Control Board's (SWRCBs) Construction General Permit. The appropriate Legally Responsible Person (LRP), or approved representative must obtain coverage by filing the Permit Registration Documents (PRDs) prior to commencement of any construction activity. A Stormwater Pollution Prevention Plan (SWPPP) shall be prepared by a Qualified SWPPP Developer (QSD) and submitted to the City prior to issuance of a grading permit. Contractor shall comply with all requirements of SWRCBs Construction General Permit Order No. 2009-0009-DWQ, and amended Orders 2010-0014-DWQ, and 2012-0006-DWQ.
- C. Projects that are less than one acre and are Caltrans related (State Highway Projects) are required to have a Water Pollution Control Plan (WPCP) prepared in accordance with Caltrans' standard WPCP template.
- D. Projects that are less than one acre and are not Caltrans related are required to have an Erosion and Sedimentation Control Plan prepared and submitted to the City for approval prior to issuance of a grading permit.

## 1.2 PRICE AND PAYMENT PROCEDURES

- A. [Section 01 29 00 - Payment Procedures](#)
- B. Notice of Intent (NOI) and Annual Permit Fees for Capital Improvement Projects shall be paid by the City.
- C. The Developers shall pay all associated Construction General Permit (CGP) fees for all new development/redevelopment projects requiring a permit from the City.

### 1.3 REFERENCES:

- A. California Stormwater Quality Association (CASQA) has developed a standard SWPPP template for traditional Risk 1,2, and 3 projects that is prevalent in California and can be downloaded from [www.CASQA.org](http://www.CASQA.org). (Note: An annual subscription is required to access to access the CASQA construction portal.)
- B. SWPPP: The Stormwater Pollution Prevention Plan (SWPPP) shall be designed to comply with California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ as amended by Order No. 2010-0014-DWQ (NPDES No. CAS000002) and 2012-0006-DWQ, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity (herein after referred to as General Permit) issued by the State Water Resources Control Board (State Water Board). In accordance with the General Permit, Section XIV, designed to address the following:
  - 1. Pollutants and their sources, including sources of sediment associated with construction, construction site erosion and other activities associated with construction activity are controlled.
  - 2. Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated.
  - 3. Site Best Management Practices (BMPs) are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard.
  - 4. Calculations and design details as well as BMP controls are complete and correct.
  - 5. Stabilization BMPs will be installed to reduce or eliminate pollutants after construction is completed.

### 1.4 SUBMITTALS

- A. Notice of Intent (NOI): The Legally Responsible Person shall file the Notice of Intent (NOI) and submit all PRDs to the SWRCB prior issuance of a grading permit. For City Capital Improvement Projects, the Contractor shall file the NOI and submit all PRDs to the SWQRB on behalf of the City. Contractor to obtain the Waste Discharge Identification Number (WDID #) on behalf of the City, or as otherwise directed by the City Engineer.
- B. SWPPP:
  - 1. Contractor shall submit SWPPP for Project Manager's review within ten (10) calendar days after award of project.
  - 2. The Contractor shall submit a site-specific Storm Water Pollution Prevention Plan (SWPPP) prepared by a Qualified SWPPP Developer (QSD) the Contractor shall amend the SWPPP when required, prepare a Construction

- Site Monitoring Plan (CSMP), and perform water pollution control work under the oversight of a Qualified SWPPP Practitioner (QSP), as specified in the General Permit. The Contractor shall identify an individual to be a Data Submitter (DS) for this contract. All reports and data that must be submitted to the State Water Resources Control Board will be uploaded by the Contractor's DS to the Stormwater Multi-Application and Report Tracking System (SMARTS) website for certification to the state by the City Legally Responsible Person (LRP) or their Approved Signatory (A/S).
3. The QSD, QSP, and DS designated by the Contractor may be different individuals.
  4. Storm Water Pollution Prevention Plan (SWPPP):  
The Contractor shall prepare and submit a site-specific Storm Water Pollution Prevention Plan (SWPPP) to the City Engineer for approval. The SWPPP shall be prepared and certified by a Qualified SWPPP Developer (QSD) holding one of the certifications or registrations listed in Section VII of the Construction General Permit. Within seven (7) working days after contract award, the Contractor shall submit two (2) printed copies of the SWPPP and Site Map and one electronic copy in electronic file (.pdf) format to the Project Manager for review. The Contractor shall allow five (5) working days for the Project Manager's review. If revisions are required, the Project Manager will provide comments, and the Contractor shall revise and resubmit the SWPPP and Site Map in printed and electronic form within five (5) working days of receipt of the Project Manager's comments. Within three (3) working days of receipt of the City Engineer's approved SWPPP, the Contractor shall submit three (3) paper copies of the approved SWPPP to the City Engineer. Once the City Engineer has approved the SWPPP for the project, the Contractor may proceed with construction activities requiring coverage under the General Permit.
  5. WDID Number: The Contractor shall not perform work that may cause water pollution until the state has issued a WDID number for the project. The City Engineer's review and approval of the SWPPP shall not waive any contract requirements and shall not relieve the Contractor from complying with Federal, State and local laws, regulations, and requirements. Working days shall not be counted if the controlling item of work cannot be performed during the initial preparation and review of the SWPPP and Site Map and between the date that the approved SWPPP has been received by the City Engineer, and the date the City Engineer has notified the Contractor that a WDID number has been assigned to the project.
  6. Approved SWPPP: The Contractor shall keep a copy of the approved SWPPP at the job site at all times during construction. The SWPPP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Project Manager.

C. WPCP

1. General: Contractor shall submit WPCP for City review within ten (10) calendar days after award of project.
2. Water Pollution Control Plan:  
The Contractor shall prepare and submit a site-specific Water Pollution Control Plan (WPCP) to the Project Manager and Construction for approval. Within seven (7) working days after contract award, the Contractor shall submit two (2) printed copies of the WPCP and Site Map and one electronic copy in electronic file (.pdf) format to the Project Manager for review. The Contractor shall allow five (5) working days for the Project Manager's review. If revisions are required, the Project Manager will provide comments, and the Contractor shall revise and resubmit the WPCP and Site Map in printed and electronic form within five (5) working days of receipt of the Project Manager's comments. Within three (3) working days of receipt of the Project Manager's approved WPCP, the Contractor shall submit three (3) paper copies of the approved WPCP to the Project Manager. Once the Project Manager has approved the WPCP for the project, the Contractor may proceed with construction activities.

The Contractor shall keep a copy of the approved WPCP at the job site. The WPCP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Project Manager.

1.5 WATER POLLUTION CONTROL DRAWING/EROSION CONTROL PLAN

- A. General: Contractor shall include a Water Pollution Control Drawing (WPCD) / Erosion and Sediment Control Plan (ESCP) as a part of the SWPPP/WPCP. Revisions and Amendments to the WPCDs shall be prepared and uploaded to SMARTS by Contractor's QSP and/or QSD.
- B. For any State Highway projects, Contractor shall provide a Water Pollution Control Drawing as required by Caltrans. Contractor to provide an Erosion and Sedimentation Control Plan to the Engineering Division for review and approval prior to issuance of a grading permit.
- C. Deficiencies: The Contractor shall construct, inspect, maintain, remove, and dispose of the water pollution control measures. If the Contractor, the Contractor's QSP, or the City Engineer and/or his representative identifies a deficiency in the implementation of the approved SWPPP/WPCP, the deficiency shall be corrected immediately, and at a minimum of 72 Hours. The deficiency shall be corrected before the onset of precipitation. If the Contractor fails to

correct the deficiency by the 72-hour timeframe or before the onset of precipitation, the Project Manager may correct the deficiency and deduct the cost of correcting deficiencies from payments. If the Contractor fails to conform to the provisions of this section, the Project Manager may order the suspension of work until the project complies with the requirements of the Construction General Permit and this section.

- D. Weather Forecasts: The Contractor shall monitor the National Oceanic and Atmospheric Administration (NOAA) weather forecast on a daily basis during the contract. The Contractor shall perform SWPPP/WPCP Inspections according to the Risk Level. The Contractor will provide soil stabilization and sediment control practices whenever there is a 50% probability of rain within 48 hours as predicted by the NOAA. The Contractor shall maintain soil stabilization and sediment control materials on site to protect disturbed soil areas throughout the life of construction project.

## 1.6 IMPLEMENTATION REQUIREMENTS

- A. QSP: The Contractor shall designate in writing a Qualified SWPPP Practitioner (QSP) who shall be responsible for non-storm water and storm water visual observations and inspections, and for ensuring that all BMP required by the SWPPP/WPCP and General Construction Permit are properly implemented and maintained. The QSP shall meet the training and certification requirements in the Construction General Permit.
- B. SWPPP Requirements: All measures required by the SWPPP/WPCP shall be implemented concurrent with the commencement of construction. No construction may start without all BMPs in place. Pollution practices and devices shall be followed or installed as early in the construction schedule as possible with frequent upgrading of devices as needed as construction progresses to protect water quality at all times.
- C. Inspection and Maintenance: The Contractor's Qualified SWPPP Developer (QSD) shall develop and implement a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of the General Permit and the Special Provisions, and Contractor's QSP shall monitor the water pollution control practices identified in the General Permit and SWPPP as follows:
  - 1. Visual Inspections, Quarterly Non-storm water discharge
  - 2. Minimum of Weekly Visual Inspections of all Best Management Practices (BMP) that need maintenance to operate effectively, that have failed or that could fail to operate as intended.
  - 3. BMP Inspections, Baseline Pre-storm event
  - 4. Rain Event Action Plan (REAP)
  - 5. BMP Inspections, 24-Hours during extended rain events
  - 6. BMP Inspections, Post-storm event.



- D. The QSP shall oversee the maintenance of the water pollution control practices. The QSP shall document all visual inspection activities with written reports according to the requirements of the Construction General Permit. The format of the reports shall be approved by the Project Manager.
- E. A copy of all written reports documenting implementation of the CSMP shall be submitted to the Project Manager within 48 hours of finishing the inspection and shall remain on site during construction.
- F. Reporting Requirements: If the Contractor identifies discharges into surface waters or drainage systems causing or potentially causing pollution, or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Project Manager. The Contractor shall submit a written report to the Project Manager within 24 hours of the discharge, notice or order. The report shall include the following information:
  - 1. The date, time, location, nature of the operation, type of discharge; and the cause of the notice or order.
  - 2. The water pollution control practices used before the discharge, or before receiving the notice or order.
  - 3. The date of placement and type of additional or altered water pollution control practices placed after the discharge, or after receiving the notice or order.
  - 4. A maintenance schedule for affected water pollution control practices.
- G. Annual Report: The Contractor shall complete and submit to the City Engineer an Annual Report, as required by the current State Water Board Industrial General Permit. The Contractor shall submit the Annual Report prior to acceptance of the project. Contractor shall submit the annual report to the SWRCB directly on SMARTS.

#### 1.7 COMPLETION OF WORK

- A. Maintenance: Clean-up shall be performed as each portion of the work progresses. All refuse, excess material, and possible pollutants shall be disposed of in a legal manner off-site and all temporary and permanent BMP devices shall be in place and maintained in good condition.
- B. Records: At completion of work, inspect installed BMP devices, and present the currently implemented SWPPP/WPCP with all backup records to the Project Manager.
- C. BMPs: Contractor must remove all construction materials, temporary facilities, temporary BMPs, equipment and construction related materials from the site.
- D. NOTICE OF TERMINATION (NOT): A Notice of Termination (NOT) must be submitted by the Contractor to the City Engineer for electronic submittal by the LRP via SMARTS to terminate coverage under the General Permit. The NOT

must include a final Site Map and representative photographs of the project site that demonstrate final stabilization has been achieved. The NOT shall be submitted to the City Engineer within 10 days of completion of construction. The NOT will be reviewed and submitted to SMARTS by the City Engineer within 90 days of completion of construction. The Regional Water Board will consider a construction site complete when the conditions of the General Permit, Section II.D have been met. Notice of Termination should be filed by the Contractor via the SMARTS system. The City will allow the Contractor to enter data in SMARTS on the City's behalf.

## 1.8 QUALITY ASSURANCE

- A. Performance: Perform work in accordance with SWPPP/WPCP. Maintain one copy of document on jobsite.
- B. Quality Control and Assurance: Train all employees and subcontractors in these subjects:
  - 1. Material pollution prevention and control
  - 2. Waste management
  - 3. Non-storm water management
  - 4. Identifying and handling hazardous substances
  - 5. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances
- C. Training Requirements: Training must take place before starting work on this job. New employees must receive the complete training before starting work on this job. Conduct weekly meetings to discuss and reinforce spill prevention and control; material delivery, storage, use, and disposal; waste management; and non-storm water management procedures.

## 1.9 PRE-INSTALLATION CONFERENCE

- A. Timing: Convene a conference one week prior to commencing work at the site
- B. Attendance: Require attendance of parties directly affecting the work of this Section.
- C. Agenda: Review requirements of the SWPPP/WPCP.

## 1.10 PERFORMANCE REQUIREMENTS

- A. General: The SWPPP/WPCP is a minimum requirement. Revisions and modifications to the SWPPP/WPCP are acceptable only if they maintain levels of protection equal to or greater than originally specified.

- B. Requirements: Read and be thoroughly familiar with all of the requirements of the SWPPP/WPCP.
- C. Compliance: Inspect and monitor all work and storage areas for compliance with the SWPPP/WPCP prior to any anticipated rain.
- D. Corrective Measures: Complete any and all corrective measures as may be directed by the regulatory agency.
- E. Penalties: Contractor to pay any fees and be liable for any other penalties that may be imposed by the regulatory agency for non-compliance with SWPPP during the course of work.
- F. Costs: Contractor to pay all costs associated with the implementation of the requirements of the SWPPP/WPCP in order to maintain compliance with the Permit. This includes installation of all Housekeeping BMPs, General Site and Material Management BMPs, Inspection requirements, maintenance requirements, sampling, monitoring, reporting and all other requirements specified in the SWPPP/WPCP and as required by the General Permit, local, state and federal regulations.

#### 1.11 MATERIALS:

- A. General: All temporary and permanent storm water pollution prevention facilities, equipment, and materials as required by or as necessary to comply with the SWPPP/WPCP as described in the current California Stormwater Quality Association (CASQA) BMP Handbook.

#### 1.12 STORM WATER POLLUTION PREVENTION PLAN

- A. Plan Preparation and Compliance
  1. The Contractor shall conform to Section 13, Water Pollution Control, of the State Standard Specifications and the Special Provisions.
  2. The Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) and the necessary Project Registration Documents to be digitally filed with the California State Water Resources Control Board (SWRCB) through the Stormwater Multi-Application and Report Tracking System (SMARTS database). The Contractor will be responsible to provide the Permit Registration Documents (PRDs) to the City; the QSD will submit the PRDs for the WDID number through SMARTS. The SWPPP shall be prepared based upon the most current California Stormwater Quality Association (CASQA) standard SWPPP Template. The Contractor shall perform the role of "Qualified SWPPP Developer" (QSD) and shall be responsible for all formal amendments to the SWPPP. The Contractor shall also perform the role of "Qualified SWPPP Practitioner" (QSP) and shall be responsible for all field SWPPP implementation, monitoring, sampling, and

- reporting. The completed SWPPP shall be created by the Contractor as necessary to reflect the necessary sequence and staging of field operations.
3. The SWPPP shall conform to SWRCB Order 2009-0009-DWQ (“The Construction General Permit” or “CGP”), San Francisco Bay Regional Water Quality Control Board Order R2-2009-0074 (“Municipal Regional Stormwater NPDES Permit” or “MRP”), Provisions in Section 13, Water Pollution Control, of the State Standard Specifications, the details, operating procedures, and maintenance guidelines of the California Regional Water Quality Control Board San Francisco Bay Region’s Guidelines for Construction Projects (Guidelines), the California Regional Water Control Board San Francisco Bay Region’s Erosion and Sediment Control Field Manual (Manual), the project plans and the Special Provisions. The SWPPP shall be deemed to fulfill the requirements set forth in Section 13 of the State Standard Specifications for development and submittal of a Water Pollution Control Program.
  4. Prior to the Notice to Proceed (with field activities), the State Project Registration Documents (PRDs) will have been filed digitally through SMARTS, and confirmation from the SWRCB will have been received authorizing coverage of this project under the CGP. Construction cannot commence until a WDID has been received.
- B. Risk Based Contractor Requirements and City Responsibilities (Applicable for all project risk levels/types) – The following minimum items shall be included within the SWPPP, as prepared by the Contractor
1. Risk Level Determination (to be performed by Contractor)
  2. WDID Number (to be obtained by Contractor through coordination with City)
  3. Certification by City “Legally Responsible Party” (LRP) (to be provided by City)
  4. Placeholder for Contractor SWPPP training throughout construction
  5. Name and contact information of Contractor QSD (to be provided by Contractor)
  6. Name and contact information of Contractor QSP (to be provided by Contractor)
  7. Schedule of Construction and Deployment of BMPs for each phase of work (to be provided by Contractor)
  8. Description of minimum year round sediment control measures per Order 2009-009- DWQ
  9. Dates and description of all formal SWPPP amendments (to be prepared by Contractor)
  10. Description of Construction Site Monitoring Plan (CSMP) per Order 2009-009-DWQ (to be done by Contractor) including, but not limited to the following:
    - a. Sampling preparation,
    - b. Collection,
    - c. Quality assurance and quality control,
    - d. Sample labeling,
    - e. Collection documentation,

- f. Sample shipping,
  - g. Chain of custody,
  - h. Sample numbering,
  - i. Precautions from the construction site health and safety plan, and
  - j. Providing and maintaining a function rain gauge at all times.
11. Minimum required monitoring activities:
    - a. Post storm event (0.5" or greater) visual discharge inspection (within 48 hours).
    - b. Sampling for non-visible pollutants:
      - Take one or more sample during any breach, spill, malfunction, or leakage that could discharge non visible pollutants into storm-water.
      - Samples taken must be large enough to accurately categorize site conditions.
      - Samples taken must be within the first 2 hours of rain events that occur during scheduled business hours that produce runoff.
      - Samples shall be analyzed for pollutants in accordance with warrant as necessary for protection of surface waters.
      - An uncontaminated (control) sample must be taken as a basis of comparison.
      - Samples must be received by the laboratory within 48 hours of physical sampling. The Contractor must use containers provided by the laboratory.
    - c. Quarterly inspections for non-stormwater discharges.
  12. Minimum scheduled BMP inspections with appropriate documentation:
    - a. Weekly, on a year round basis, throughout the duration of construction.
    - b. Daily (once every 24 hours) BMP inspection during extended storm events.
    - c. Inspect drainage areas and BMPs within 48 hours of predicted rainfall event (0.5" or greater).
  13. Intent of compliance with the following analytical methods and sampling protocol:
    - a. Standard Methods for the Examination of Water and Wastewater (American Public Health Association).
    - b. 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants."
    - c. Surface Water Ambient Monitoring Program's (SWAMP) 2008 Quality Assurance Program Plan.
  14. Potential sources of non-visible pollutants
  15. Description of all minimum source control measures, "good housekeeping", and non stormwater management per Order 2009-009-DWQ
  16. Other measures as necessary for Order 2009-009-DWQ

- C. Risk Based Contractor Requirements and City Responsibilities (Applicable to Risk Level 2/LUP Type 2 or higher)
1. All requirements for Risk Level 1/Type 1 above
  2. Description of applicable Numeric Action Levels for pH and turbidity (to be included in SWPPP by Contractor)
    - a. pH –levels must be maintained within a range of 6.5-8.5.
    - b. Turbidity – 250 NTU maximum.
  3. Description of additional provisions within the CSMP for stormwater effluent monitoring and reporting and non-stormwater discharges (to be included within SWPPP by Contractor):
    - a. Numeric Action Level (NAL) sampling:
      - Water quality grab samples shall be taken at a minimum 3 times a day during each rain event of ½ an inch or more, where runoff occurs. The grab samples shall be representative of the flow and characteristic of the discharges. The contractor shall forward grab sampling results to the City within 24 hours of when they are taken.
      - All discharge points must be sampled, including the one considered to be the “worst case.” Discharge from a silt fence or sheet flow area shall be considered one discharge point.
      - All points of run on. A sheet flow area shall be considered one point of run on.
      - Sampling to comply with analytical methods and protocol described in EPA Test Method 180.1.or Standard Method 2130 for turbidity sampling, ASTM D1293- 99(2005) for pH sampling, and Standard Methods for the Examination of Water and Wastewater (American Public Health Association).
    - c. Sampling for non-stormwater discharges.
  4. Description of requirement to create and implement of “Rain Event Action Plans” for each of the following phases of construction (REAPs to be prepared by Contractor’s QSP):
    - a. Grading and Land Development,
    - b. Streets and Utilities,
    - c. Vertical Construction,
    - d. Final Landscaping and Stabilization,
    - e. Inactive Construction Status.
    - f. The Contractor shall create and implement Rainfall Event Action Plans for inclusion within approved SWPPP at least 48 hours prior to any likely (forecast by National Weather Service as 50% or greater chance) precipitation event.
  5. Description of year round effective erosion control measures to supplement minimum sediment control measures within active, inactive, and completed areas. Erosion control measures shall be provided to the extent necessary for compliance with Order 2009-009- DWQ.

6. Description of additional Annual Reporting Requirements (Annual reporting information to be prepared by Contractor for review and approval of City prior to submittal):
  - a. Creation and submittal of NAL exceedance reports, if applicable,
  - b. Creation and submittal of sampling logs for pH and turbidity.
  
- D. Risk Based Contractor Requirements and City Responsibilities (Applicable to Risk Level 3/LUP Type 3 only)
  1. All requirements for Risk Level 2 projects described above.
  2. Description of Required Compliance with State Board criteria for technology-based numeric effluent limitations for discharge of pH and turbidity (Description of requirements and physical achievement provided by Contractor):
    - a. For Projects that employ Advanced Treatment Systems (ATS) - Maximum 10 NTU Daily Weighted Average & Maximum 20 NTU for any single sample, applicable for events up to 24 hour events of ½ inches<sup>1</sup>. The ATS system must be able to treat this volume within a maximum 72-hour period.
    - b. For Projects that do not employ ATS - Maximum 500 NTU for any single sample, applicable for events up to 24 hour events up to ½ inches<sup>2</sup>.
    - c. Project discharges must maintain pH within a range of 6.0 to 9.0.
  3. Description of additional provisions within the CSMP (description of monitoring provided by Contractor, additional monitoring performed by Contractor):
    - a. Receiving water monitoring, if applicable, based upon the standards of Order 2009- 009-DWQ.
    - b. Bioassessment, if applicable, based upon the standards of Order 2009-009-DWQ.
    - c. Sampling for Suspended Sediment Concentration, if applicable, based upon the standards of Order 2009-009-DWQ. Sampling to comply with analytical methods and protocol described within ASTM Designation: D 3977 for suspended sediment concentration (SSC).
    - d. Inspection of ATS facilities, if applicable. Sampling of ATS discharge points.
  4. Placeholder for Creation of ATS Plan, if applicable, consisting of the following (to be provided by Contractor):
    - a. ATS Operation and Maintenance Manual for All Equipment.
    - b. ATS Monitoring, Sampling & Reporting Plan, including Quality Assurance/Quality Control (QA/QC).
    - c. ATS Health and Safety Plan.
    - d. ATS Spill Prevention Plan.

5. Description of Additional annual reporting requirements (Description provided by Contractor, Annual Reporting information to be prepared by Contractor for review and approval of City)
  - a. Creation and submittal of NEL violation reports, if applicable within 6 hours of occurrence. Reports and related corrective action measures to be reviewed and approved by City prior to submittal to Regional Board
  - b. Completed ATS records, if applicable.

## **PART 2 - PRODUCTS**

### **2.1 BEST MANAGEMENT PRACTICE (BMP) PRODUCTS**

- A. Shall be as specified in the most current CASQA BMP Handbook.
- B. SWPPP as prepared by Qualified SWPPP Developer (QSD)
- C. Risk Level Determination
- D. Notice of Intent/Notice of Substantial Completion
- E. Shall include but is not limited to sampling, reports and other miscellaneous items as determined by the State of California and all pertaining regional and local permits.

## **PART 3 - EXECUTION**

### **3.1 EROSION AND SEDIMENTATION CONTROL**

- A. Temporary erosion and sediment control work shall consist of applying erosion control materials to embankment slopes, excavation slopes and other areas designated on the plans, installing silt fence, inlet protection, gravel bags, headwall protection and stabilized construction entrance ways, or other measures as specified in the project SWPPP/WPCP or necessary for compliance with the CGP.
- B. All temporary erosion and sediment control for the project shall conform to the provisions in Section 13, Water Pollution Control, of the State Standard Specifications and the Special Provisions. All permanent erosion and sediment control for the project shall conform to the provision in Section 21, Erosion Control, of the State Standard Specifications and the Special Provisions.

### **3.2 INSTALLATION**

- A. Construction Requirements



1. The Contractor shall design, implement and maintain the SWPPP/WPCP for the project in full compliance with the SWRCB Order 2009-009-DWQ to control the discharge of storm water pollutants. The Contractor shall perform the monitoring and reporting required to comply with all the state regulations regarding the SWPPP/WPCP for the project. All monitoring, sampling, and reporting information collected by the Contractor shall be subject to the review of the City prior to uploading through the SMARTS database.
- B. Storm Water Pollution Prevention Plan and Water Pollution Control Plan
1. The SWPPP/WPCP shall identify construction activities that may adversely affect the quality of storm water discharges associated with the project and shall identify water pollution control measures, hereinafter referred to as control measures, to be constructed, implemented, and maintained in order to reduce, to the maximum extent feasible, storm water discharges from the construction site both during and after construction is completed under this contract.
  2. The Contractor's "QSD" shall amend the SWPPP/WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, whenever there is a change in disturbed area, and/or or when deemed necessary by the City. The SWPPP/WPCP shall be amended if, at any time, the implementation of the SWPPP/WPCP is not effectively achieving the objective of compliance with the CGP. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initial SWPPP/WPCP, which are required on the project to control water pollution effectively. Amendments to the SWPPP/WPCP shall be closely coordinated with the Contractor's Qualified SWPPP Practitioner (QSP) within five (5) working days. In emergency situations that require immediate changes at the project site, the Contractor's QSP shall implement the necessary measures and notify the Project Manager and Contractor's QSD of the changes.
  3. The Contractor shall give immediate notice to the Project Manager of any planned changes in construction activity that may result in non-compliance with the Special Provisions or the CGP.
  4. By the last day of each month, the Contractor shall submit an affidavit to the Project Manager certifying conformance with the SWPPP/WPCP. The monthly partial payment may be withheld if the affidavit is not received and accepted by the Project Manager. If at any time the project is in non-compliance with the SWPPP/WPCP or the CGP, the Contractor shall submit a written report to the Project Manager immediately upon identifying the non-compliance. The report shall specify the time and nature of the non-compliance and include a course of action to correct the deficiency.
  5. The Contractor shall keep a copy of the State of California Construction Activity General Permit (SWRCB Order No. 2009-009-DWQ), the SWPPP/WPCP, and any approved amendments at the project site. The

SWPPP/WPCP shall be made available upon request of any representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or any City representative. Public requests for copies of the SWPPP/WPCP shall be directed to the Project Manager.

C. Erosion and Sediment Control

1. The facilities shown on the SWPPP/WPCP are designed to effectively control erosion and sediment on a year-round basis.
  - a. Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. Contractor shall comply with state and local laws concerning pollution abatement.
  - b. Contractor shall be responsible for monitoring erosion and sediment control measures prior, during, and after storm events. Monitoring and sampling (as applicable) shall follow the protocol described in the CGP and Project SWPPP/WPCP.
  - a. Extreme care shall be taken when hauling any earth, sand, gravel, stone, debris, paper, or any other substance over any public street, alley or other public place. Occurrences of material blown, spilled, or tracked over and upon said public or adjacent private property are prohibited and shall be immediately remedied. Discharge of debris is prohibited. Non-stormwater discharge is prohibited, except as specified in SWRCB Order 2009-009-DWQ. Discharge of hazardous substances is prohibited.
  - b. Inlet protection shall be installed at open inlets to prevent sediment from entering the storm drain system. Inlets not used in conjunction with erosion control are to be blocked to prevent entry of sediment.
  - c. All paved areas shall be kept clear of earth material and debris. The site shall be maintained so as to prevent sediment-laden runoff to any storm drainage system, including existing drainage swales and watercourse, to the extent necessary for compliance with applicable numeric action or effluent levels specified in the CGP and Project SWPPP/WPCP.
  - d. Contractor shall install and maintain construction entrances prior to commencement of grading. All construction vehicle traffic entering onto the paved roads must cross stabilized construction entrance ways. Entrance ways may be constructed of two inch to six-inch drain rock, metal grating, or metal cattle-guard, or equivalent material, or may include vehicle wash stations as needed, in sufficient quantity and size to prevent tracking of mud and debris from the construction site. Tracking of mud or debris onto public streets, or onto adjacent public or private property, is prohibited and shall be removed immediately as required by the City.
  - e. Grading operations which leave denuded slopes shall be protected with erosion control measures within 14 days of completion or suspension of activity. If hydroseeding is not used or is not effective

within this 14-day period, then other immediate methods shall be implemented, such as erosion control blankets, blown straw, or a three step application of 1) seed, mulch, fertilizer, 2) blown straw, and 3) tackifier and mulch.

- f. Sanitary facilities shall be maintained on the site in a manner to prevent inadvertent discharge or leakage of sanitary wastes into the storm drain system either by placing sanitary facilities in locations that do not drain to the storm drain system or by providing secondary containment systems to capture leaked wastes.
  - g. Contractor shall provide dust control as required by the appropriate federal, state and City requirements and the City Standard Specifications.
  - h. The erosion and sediment control plan may not cover all the situations that may arise during construction due to unanticipated field conditions. Variations and additions may be made to the plan in the field. That Contractor's QSP shall notify the Contractor's QSD of any field changes.
- D. Maintenance: The SWPPP/WPCP shall include a plan for maintenance that shall include at a minimum.
- 1. Immediate repair of damage caused by soil erosion or construction.
  - 2. Inspection of sediment traps, berms, rills, gullies, and swales before, during, and after each storm event or predicted rainfall in accordance with the CGP and project SWPPP/WPCP. This also includes repair or cleaning as needed.
  - 3. Removal of sediment from sediment traps and restoration to original dimensions when sediment has accumulated to a depth of one foot. Sediment removed from trap shall be deposited in a suitable area and in such a manner that it will not erode.
  - 4. Regular cleaning of gravel bag inlet protection so that sediment depth never exceeds a maximum of three inches.
- E. Risk Based Contractor Requirements and City Responsibilities (Applicable for all project risk levels/types) – The following minimum items shall be performed by the Contractor during field implementation of the Project SWPPP/WPCP throughout the duration of construction until final Notice of Termination
- 1. Coordinate and conduct periodic SWPPP/WPCP and Erosion and Sediment Control training throughout construction
  - 2. Update schedule of construction and deployment of BMPs for each phase of work on an as-needed basis
  - 3. Physically install and maintain minimum year-round sediment control measures per Order 2009-009-DWQ
  - 4. Perform and file all formal SWPPP/WPCP amendments. All SWPPP/WPCP amendments to be reviewed and approved by the City and the Contractor's QSD prior to submittal.

5. Physically perform and implement all measures found within the SWPPP/WPCP Construction Site Monitoring Plan (CSMP) per Order 2009-009-DWQ including, but not limited to the following:
  - a. Sampling preparation,
  - b. Collection,
  - c. Quality assurance and quality control,
  - d. Sample labeling,
  - e. Collection documentation,
  - f. Sample shipping,
  - g. Chain of custody,
  - h. Sample numbering,
  - i. Precautions from the construction site health and safety plan, and
  - j. Providing and maintaining a function rain gauge at all times.
6. Minimum required monitoring activities:
  - a. Post storm event (0.5" or greater) visual discharge inspection (within 48 hours).
7. Sampling for non-visible pollutants:
  - a. Take one or more sample during any breach, spill, malfunction, or leakage that could discharge nonvisible pollutants into stormwater.
    - Samples taken must be large enough to accurately categorize site conditions.
    - Samples taken must be within the first 2 hours of rain events that occur during scheduled business hours that produce runoff.
    - Samples shall be analyzed for pollutants in accordance with an appropriate pollutant source assessment, or as conditions warrant as necessary for protection of surface waters.
    - An uncontaminated (control) sample must be taken as a basis of comparison.
    - Samples must be received by the laboratory within 48 hours of physical sampling. The Contractor must use containers provided by the laboratory.
  - b. Quarterly inspections for non-stormwater discharges.
8. Minimum scheduled BMP inspections with appropriate documentation:
  - a. Weekly, on a year-round basis, throughout the duration of construction.
  - b. Daily (once every 24 hours) BMP inspection during extended storm events.
  - c. Inspect drainage areas and BMPs within 48 hours of predicted rainfall event (0.5" or greater).
9. Compliance with the following analytical methods and sampling protocol:
  - a. Standard Methods for the Examination of Water and Wastewater (American Public Health Association).
  - b. 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants."

- c. Surface Water Ambient Monitoring Program's (SWAMP) 2008 Quality Assurance Program Plan.
  10. Identify and eliminate potential sources of non-visible pollutants
  11. Implementation of all minimum source control measures, "good housekeeping", and non-stormwater management per Order 2009-009-DWQ
  12. Other measures as necessary for Order 2009-009-DWQ
- F. Risk Based Contractor Requirements and City Responsibilities (Applicable to Risk Level 2/LUP Type 2 or higher)
1. All requirements for Risk Level 1/Type 1 above
  2. Maintain tolerance of site discharge within applicable Numeric Action Levels for pH and turbidity
    - a. pH –levels must be maintained within a range of 6.5-8.5.
    - b. Turbidity – 250 NTU maximum.
  3. Numeric Action Level (NAL) sampling:
    - a. Water quality grab samples shall be taken at a minimum 3 times a day during each rain event of ½ an inch or more, where runoff occurs. The grab samples shall be representative of the flow and characteristic of the discharges. The contractor shall forward grab sampling results to the City within 24 hours of when they are taken.
    - b. All discharge points must be sampled, including the one considered to be the "worst case." Discharge from a silt fence or sheet flow area shall be considered one discharge point.
    - c. All points of run on. A sheet flow area shall be considered one point of run on.
    - d. Sampling to comply with analytical methods and protocol described in EPA Test Method 180.1 or Standard Method 2130 for turbidity sampling, ASTM D1293- 99(2005) for pH sampling, and Standard Methods for the Examination of Water and Wastewater (American Public Health Association).
  4. Sampling for non-stormwater discharges
  5. Create and physically implement of "Rain Event Action Plans" for each of the following phases of construction:
    - a. Grading and Land Development,
    - b. Streets and Utilities,
    - c. Vertical Construction,
    - d. Final Landscaping and Stabilization,
    - e. Inactive Construction Status.
  6. The Contractor shall create and implement Rainfall Event Action Plans for inclusion within approved SWPPP/WPCP at least 48 hours prior to any

- likely (forecast by National Weather Service as 50% or greater chance) precipitation event.
7. Physically implement and maintain year-round effective erosion control measures to supplement minimum sediment control measures within active, inactive, and completed areas. Erosion control measures shall be provided to the extent necessary for compliance with Order 2009-009-DWQ.
  8. Maintain and compile documents to meet Annual Reporting Requirements (Annual reporting information to be prepared by Contractor for review and approval of City prior to submittal):
    - a. Creation and submittal of NAL exceedance reports within 48 hours, if applicable, based upon review and approval of City.
    - b. Creation and submittal of sampling logs for pH and turbidity.
- G. Risk Based Contractor Requirements and City Responsibilities (Applicable to Risk Level 3/LUP Type 3 only)
1. All requirements for Risk Level 2 projects described above.
  2. Maintain physical compliance with State Board criteria for technology-based numeric effluent limitations for discharge of pH and turbidity
  3. For Projects that employ Advanced Treatment Systems (ATS) - Maximum 10 NTU Daily Weighted Average & Maximum 20 NTU for any single sample, applicable for events up to 24-hour events of ½ inches<sup>3</sup>. The ATS system must be able to treat this volume within a maximum 72-hour period.
  4. For Projects that do not employ ATS - Maximum 500 NTU for any single sample, applicable for events up to 24-hour events up to ½ inches<sup>4</sup>.
  5. Project discharges must maintain pH within a range of 6.0 to 9.0.
  6. Perform additional provisions within the CSMP:
    - a. Receiving water monitoring, if applicable, based upon the standards of Order 2009- 009-DWQ.
    - b. Bioassessment, if applicable, based upon the standards of Order 2009-009-DWQ.
    - c. Sampling for Suspended Sediment Concentration, if applicable, based upon the standards of Order 2009-009-DWQ. Sampling to comply with analytical methods and protocol described within ASTM Designation: D 3977 for suspended sediment concentration
    - d. Inspection of ATS facilities, if applicable. Sampling of ATS discharge points.
  7. Creation and implementation of ATS Plan, if applicable, consisting of the following:
    - a. ATS Operation and Maintenance Manual for All Equipment.
    - b. ATS Monitoring, Sampling & Reporting Plan, including Quality Assurance/Quality Control (QA/QC).
    - c. ATS Health and Safety Plan.
    - d. ATS Spill Prevention Plan.

8. Maintain and compile additional annual reporting requirements (Annual Reporting information to be prepared by Contractor for review and approval of City prior to submittal)
  - a. Creation and submittal of NEL violation reports, if applicable within 6 hours of occurrence. Reports and related corrective action measures to be reviewed and approved by City prior to submittal to Regional Board
  - b. Completed ATS records, if applicable.

### 3.3 STREET SWEEPING

- A. Street sweeping: Street sweeping will be implemented everywhere where sediment is tracked from the project site onto public roads. Sweeping will be done during all construction activities to control tracking of sediments as required as per the guidelines provided in the SWPPP document and as directed in this section.

### 3.4 DUST CONTROL

- A. Contractor's Responsibility: Use equipment that will generate the least amount of dust. Provide dust control at all times including Saturdays, Sundays, and holidays as ordered by the Project Manager. Whenever the Contractor, in the opinion of the Project Manager, is negligent in controlling dust, the Project Manager may direct attention to the existence of a dust hazard and instruct the Contractor to immediately alleviate the dust hazard. The Contractor shall be responsible for any damage cause by dust generated as a result of its operations.
- B. Street Vacuum/Sweeper: Have a commercial standard street vacuum/sweeper operational and in operation during each working day. The street vacuum/sweeper shall be able to pick up sand, gravel, dust, and debris, and other things, shall minimize dust generation, and shall also be available during the day and shall sweep as outlined below and as directed by the Project Manager.
- C. Sweeping: If the Contractor is performing work that generates dust and debris then during the day (including weekends and holidays) the sweeper shall sweep the project area (full length, width, and all lanes) twice a day sometime between 9:00a.m. and 11:00a.m. and also between 2:00p.m. and 4:00p.m. Hardscape surfaces (including pavers, sidewalks, and areas inaccessible by a mechanical sweeper) shall have dirt, dust, and debris removed by hand sweeping. If the Contractor fails to fulfill the responsibilities of this Section the City will perform or contract with others to perform the work and all costs incurred to the City shall be withheld from future payments to the Contractor.
- D. Additional Sweeping: Clean the sidewalk and gutter as many times as needed to make sure the sidewalk and gutter are out of dirt, debris and small rocks at all times. Be prepared to sweep surfaces immediately at the request of the Project

Manager should it be deemed necessary for public safety and to avoid damage to properties. If streets are not satisfactorily cleaned within 12 hours from verbal or written notice by City personnel, the City will hire an independent sweeping company and deduct the cost for such work from payments due to the Contractor.

- E. Payment for Dust Control and Clean Up: Shall be included in the prices paid for Storm Water Pollution Prevention Plan (SWPPP) or Water Pollution Control Plan (WCPC) as shown in the Bid Schedule or considered incidental to the items most closely related to when there is no bid item. This Item shall be considered as full compensation for all labor, materials, tools, equipment and incidentals and for doing the work of Dust Control and Clean Up and no additional compensation shall be made therefor.

### 3.5 EMERGENCY EROSION AND SEDIMENT CONTROL

- A. Shall consist of any measures not addressed in the SWPPP/WPCP that the Project Manager or QSD deems necessary for compliance with the CGP including, but not limited to all erosion control measures necessary to prevent degradation to water quality.
- B. Sediment Control including unforeseen measures not addressed in the Storm Water Pollution Plan pay item in accordance with the National Pollution Discharge Elimination System (NPDES), the City of Pittsburg and the Plans and Specifications and to the satisfaction of the Project Manager. Work under this item shall be considered as extra work paid for on a force account basis.

**END OF SECTION 01 57 23**



**SECTION 01 60 00 – PRODUCT REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

**1.2 DEFINITIONS**

- A. Products:
  - 1. General: Items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 2. Named Products: Items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
  - 3. Materials: Components shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  - 4. Equipment: Product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

**1.3 QUALITY ASSURANCE**

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

**1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. General: Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
  - 1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to [Section 01 25 00 - Substitution Procedures](#).

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION OF PRODUCTS:**

- A. General: Refer to [Section 01 70 00 – Execution](#).
- B. Product Handling: Assure that Work is manufactured and/or fabricated in ample time to not delay construction progress. Transport, handle, store and protect products in accordance with manufacturer's instructions.

**END OF SECTION 01 60 00**

**SECTION 01 70 00 – EXECUTION****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes requirements for field engineering, examination, preparation, execution, cleaning, and protecting installed construction.
- B. Field Engineering: Provide such field engineering services as are required for proper completion of the Work including, but not limited to:
  - 1. Establishing and maintaining lines and levels.
  - 2. Structural design of shores, forms, and similar items provided by the Contractor as part of the means and methods of construction.

**1.2 QUALITY ASSURANCE**

- A. Workers: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specific requirements and the methods needed for proper performance of the work of this Section.

**1.3 SUBMITTALS**

- A. Comply with [Section 01 33 00 - Submittal Procedures](#).
- B. Upon request of the Project Manager, submit the following:
  - 1. Engineering qualifications of persons proposed to be engaged for field engineering services.
  - 2. Documentation verifying accuracy of field engineering work.
  - 3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents. Documentation shall require surveyor's certification stamp.

**1.4 REFERENCE POINTS**

- A. In addition to the procedures directed by the Contractor for proper performance of the Contractor's responsibilities:
  - 1. Locate and protect control points before starting work on the site.
  - 2. Preserve permanent reference points during progress of the Work.
  - 3. Do not change or relocate reference points or items of the Work without specific approval from the Project Manager.

4. Notify and advise the Project Manager within twenty-four (24) hours when a reference point is lost or destroyed, or requires relocation because of other changes in the Work:
  - a. Upon direction of the Project Manager, require the field engineer to replace reference stakes and/or markers.
  - b. Locate such replacements according to the original survey control.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

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

### **3.2 PREPARATION**

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

### **3.3 EXECUTION**

- A. Comply with manufacturer's installation instructions, performing each step-in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Project Manager before proceeding.

- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
  - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
  - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
  - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Project Manager for final decision.
- E. Allow for expansion of materials and/or movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
  - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
  - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
  - 1. Refer questionable mounting heights choices to Project Manager for final decision.
  - 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

### 3.4 CLEANING

- A. Maintain Project Site, surrounding areas and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave Project Site clean and ready for occupancy.
- C. Hazards Control:
  - 1. Conduct cleaning and disposal operation in accord with legal requirements.

2. Do not burn or bury rubbish and waste materials on Project Site.
3. Do not dispose of volatile wastes in storm or sanitary drains.
4. Store volatile wastes in covered metal containers, and remove from premises daily.
5. Prevent accumulation of wastes which create hazardous conditions.
6. Provide adequate ventilation during use of volatile or noxious substances. Ventilation shall be other than ventilation system.

D. Materials:

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
2. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

E. During Construction:

1. Execute cleaning daily to ensure Project Site, Owner's premises, adjacent and public properties are maintained free from accumulations of waste materials and rubbish.
2. Wet down dry materials and rubbish to control dust.
3. At reasonable intervals during progress of Work, clean Project Site and public properties, and dispose of waste materials, debris and rubbish.
4. Provide on Project Site dump containers for collection of waste materials, debris and rubbish. Waste containers shall not be used for construction waste.
5. Remove waste materials, debris and rubbish from Owner's premises and legally dispose of off Owner's property.
6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials.

### 3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

**END OF SECTION 01 70 00**

## SECTION 01 71 13 – MOBILIZATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes but not limited to:
1. mobilization and demobilization;
  2. preparatory work and activities those necessary for the movement of personnel, equipment, supplies, and incidentals to the job site;
  3. for the establishment of all offices, building, trailers, and other facilities necessary for work on the project;
  4. submittals, bonding and insurance requirements;
  5. public notifications in English and Spanish;
  6. contacting and notifying the utility companies;
  7. fabricating and installing project identification signs;
  8. private property owner agreement for storage facilities;
  9. and for all other work and activities which must be performed or costs incurred prior to beginning work on the various contract items on the project site.

#### 1.2 REFERENCES

- A. Cal/OSHA – California Division of Occupation Safety and Health
- B. Underground Services Alert (USA)

#### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Measurement and Payment:
1. When mobilization is included as a bid item, measurement will be made as a percentage of the costs incurred according to the list submitted except that not more than 75% of the bid price shall be paid prior to the final estimate for payment being due, said remaining 25% paid upon completion of cleanup and removal and demobilization with final payment.
  2. When the contract does not include a contract pay item for mobilization, full compensation for any necessary mobilization required shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

3. The contract price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in mobilization and demobilization including the items listed in Part 1.1 of this Section as specified herein, and no additional compensation shall be made therefor.
4. Mobilization shall be considered as a non-adjustable contract item. Any contract change orders shall be considered as including full compensation for mobilization.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

### **3.1 MOBILIZATION**

- A. Mobilization shall consist of preparatory work and activities listed in Part 1.1 above.
- B. The Contractor shall insure that adequate existing sanitation facilities are available or the Contractor shall provide and maintain adequate sanitation facilities. All wastes and refuse from sanitary facilities provided by the Contractor's operations shall be disposed of away from the site in accordance with all laws and regulations pertaining thereto.
- C. Mobilization shall also include demobilization upon completion of work and cleanup of the site.
- D. The contractor shall provide all labor, materials, equipment and incidentals to prepare the site for the timely start and efficient completion of all work. This includes obtaining all necessary licenses and permits, providing required submittals including but not limited to a detailed project schedule.
- E. Mobilization shall also include notifications to all existing utility companies as shown on the Drawings as first order of work.

**END OF SECTION 01 71 13**



## SECTION 01 71 23 – CONSTRUCTION SURVEYING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes but not limited to:
  - 1. Control Line Survey
  - 2. Pothole Survey
  - 3. Survey Monument Referencing
  - 4. Construction Staking
  - 5. Quality Control Survey
  - 6. As-built GPS Survey
- B. All surveying work shall be performed under the responsible charge of a land surveyor licensed in the State of California.

#### 1.2 REFERENCES

- A. Cal/OSHA – California Division of Occupation Safety and Health
- B. Underground Services Alert (USA)

#### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. [Section 02 21 13 - Survey Monuments](#).

#### 1.4 MEASUREMENT AND PAYMENT

- A. The contract price paid for Construction Surveying shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in control line survey, survey monument referencing, pothole survey, construction staking, quality control survey and as-built GPS Surveys specified herein, and no additional compensation shall be made therefor.

### PART 2 - PRODUCTS

NOT USED

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. All work shall be done in accordance with Chapter 12 of the Caltrans Surveys Manual, these Special Provisions, the Contract Plans, and as directed by the Engineer.
- B. Contractor shall provide all the project construction surveying and all costs related to establishing a control line, pothole surveying, construction staking, documenting all changes to plans, providing quality control surveying, performing an as-built survey and submitting AutoCAD files of the as-built information. All construction surveying shall be performed under the direction of a Professional Land Surveyor licensed in the State of California. The Contractor shall be responsible for all land surveying and shall be responsible for replacing control points or survey monuments lost or damaged during the course of construction

### 3.2 CONTROL LINE SURVEY

- A. Prior to any construction surveying contractor will allow for field surveying and office surveying to check the field control shown on the Drawings, and to set construction control points. This survey will be a stand-alone move-in specifically to verify control points. Work includes: collect CAD files from City, submit signed CAD release forms, go to field and tie-in control points, compare the x,y,z of the field data with the x,y,z on the CAD files, establish additional new field control points for construction, and submit CAD file of the existing and new control analysis to engineer for review. All project construction surveying shall be based on this established control line.

### 3.3 POTHOLE SURVEY

- A. For Projects requiring pothole survey by a Licensed Land Surveyor, during the potholing excavation and exposure of the existing utility, the Contractor's licensed Land Surveyor shall perform a topographic survey of the existing grade, top of pipe of the existing utilities, location of the utility on the project coordinate system. Contractor shall document the outside diameter of the pipe and the pipe material. Contractor shall submit the pothole survey with the above specified information in an AutoCAD Drawing file to the City engineer. CAD point descriptions to include the type of exposed pipe and diameter (example: "12" water")

### 3.4 SURVEY MONUMENT REFERENCING

- A. For Survey Monument Referencing, refer to [Section 02 21 13 - Survey Monuments](#).

### 3.5 CONSTRUCTION STAKING

- A. The Contractor shall submit a AutoCAD files to the engineer three (3) working days prior to any staking operation. AutoCAD files will show the calculated survey points with CAD elevations and CAD descriptions as part of the calculated topographic

shots. Cut sheets in-lieu of this requirement will not be accepted. CAD points must include the elevations in CAD.

- B. Construction staking shall be defined as: "Markings set in the field by a CA Licensed Land Surveyor, prior to construction, with horizontal coordinates and vertical dimensions to the items identified below. All field markings shall be completed under the direction of Land Surveyor licensed by the State of California." The Contractor shall be responsible for replacing established survey points lost or damaged during the course of construction.
- C. The list below includes some but not limited to items to be surveyed/staked.
1. Curb/Curb & Gutter - Top of curb, flow line and lip of gutter at begin of curve, end of curve, every 25' and at all changes in direction.
  2. Flushed concrete curb at begin of curve, end of curve, every 25' and at all changes in direction.
  3. Concrete pavers borders
  4. Concrete paving parking
  5. Concrete paving intersection
  6. Curb ramps (beginning, end, mid-point, back corners)
  7. Truncated dome pavers
  8. Concrete Expansion Joints
  9. Trees
  10. Irrigation Meter and Boxes
  11. Traffic Signal Poles and Boxes
  12. Storm Drainage Inlets and other drainage structures
  13. Trench drains
  14. Curb drains
  15. Storm Drainage Piping Inverts every 25' and at all changes in direction
  16. Storm Drainage Manhole Inverts
  17. Sanitary Sewer Piping Inverts every 25' and at all changes in direction
  18. Sanitary Sewer Manhole Inverts
  19. Sanitary Sewer Cleanout
  20. Sanitary Sewer Laterals
  21. Water Main Piping Inverts every 25' and at all changes in direction
  22. Water Main offsets
  23. Water Valves
  24. Air Release Valves
  25. Blow off
  26. Water Meters
  27. Fire Hydrants
  28. Joint Trench every 25' and at all changes in direction
  29. Utility Vaults
  30. Street light pull boxes
  31. Pedestrian Lighting
  32. Street Lighting
  33. Edges of bands a planter curbs

34. Concrete band
35. Corners of Concrete at AC paving limits
36. Bottom and top of concrete speed table slopes
37. Parking strip ticks (one stake each)
38. Parking meter (one stake each)
39. Handicap parking (8 Stakes)
40. Bench
41. News rack & corral (3 stakes each)
42. Midblock arbor, park road arbor (12 stakes each)
43. Bike rack
44. Trash receptacle
45. Fixed bollard, retractable bollard
46. Downspout storm lateral connection. Staking calculations to be adjusted based on field verified building drain locations exposed during demolition.
47. Other staking requirements as described in the Special Provisions.

### 3.6 QUALITY CONTROL SURVEY

- A. These survey verifications shall occur one (1) working days prior to pouring concrete. Submit AutoCAD file of the quality control survey to the Engineer one (1) working days prior to pouring concrete curbs and foundations. AutoCAD survey files will show the topographic survey points with elevations and descriptions. Descriptions and elevations will be on the CAD points and not on a separate cut sheet. Contractor will replace any curbs, street lights and pole foundations not checked prior to pouring concrete.
- B. No concrete shall be poured until each quality control survey item described below has been approved by the Engineer, based on survey CAD file provided by contractor's surveyor. Prior to pouring concrete or proceeding beyond subgrade.
- C. Listed below are the project elements which require quality control survey and CAD submittal reviews prior to concrete pouring.
  1. Curbs and Curb & Gutter: After the curb forms are set, the contractor's licensed land surveyor shall survey the top of curb form every 25' and at key conforms.
  2. Subgrade for Street Paving: Field survey and certify the top of aggregate base design grades every 50 feet along the centerline of each lane or on corners of a 12'x50' grid in a parking lot for projects greater than or equal to 5,000 square feet of asphalt concrete. Submit certification signed by a Licensed Land Surveyor.

### 3.7 AS-BUILT SURVEY

- A. After the trench excavation and pipe installation, the Contractor's licensed land surveyor shall perform a topographic survey of the top of pipes for the utility lines and invert of pipe for all gravity pipes every 25', and at all changes in direction both horizontal and vertical, water valves, tees, water services, fire hydrants and at all manhole. This survey verification shall occur 3 days prior to backfilling trench. AutoCAD files will show the calculated survey points with elevations and descriptions.
- B. Contractor shall be responsible for documenting all changes to the plans. The Contractor/Developer shall provide the as-built survey in .dwg file (tied to NAD83 California State Planes, Zone III) format in AutoCAD 2017 or later version electronically and stored in a USB flash drive. The Contractor/Developer shall deliver one full set (22x34) of hard copy certified by the License Land Surveyor.
- C. A CAD drawing and coordinates data sheet shall be submitted to the Project Manager for approval. This task must be performed by a registered professional land surveyor licensed in the state of California. Data shall be tied to NAD83 California State Planes, Zone III, US Foot. The elevations shall be based on NAVD88 datum. This survey shall be delivered to the City's Engineer of Record. This survey shall be used for final as-built record drawings and calculations of the final quantity.
- D. The topographic survey for the as-built information shall be performed by a Professional Land Surveyor licensed in the State of California. After the trench excavation, pipe installation and approval from the inspector, the Contractor's licensed Land Surveyor shall perform a topographic/As-Built survey of all items described above in Submittals. Surveying will be of the actual pipe, conduit and/or finished facility. As-Built survey shall indicate the actual pipe material installed.

### 3.8 AS-BUILT GPS SURVEY

- A. Contractor shall be responsible for the GPS "As-Built" Survey, following the completion of construction, for the location and depth of installed underground utility lines, coordinates of manholes, manhole rim elevations, manhole invert elevations, manhole depths, utility boxes, manhole covers and similar appurtenances. A CAD drawing and coordinates data sheet shall be submitted to the project manager for approval. This task must be performed by a registered professional land surveyor licensed in the state of California. Data shall be tied to California State Plan Coordinate System.

**END OF SECTION 01 71 23**

## SECTION 01 73 29 – CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. General: This section includes requirements for cutting and patching.

#### 1.2 QUALITY ASSURANCE

- A. Installers: Employ skilled and experienced installers to perform cutting and patching.

#### 1.3 SUBMITTALS

- A. Written Request: Submit written request in advance of cutting or altering elements affecting:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.
  - 3. Efficiency, maintenance, or safety of element.
  - 4. Visual qualities of sight-exposed elements.
  - 5. Work of Owner or separate contractor.
- B. Request Requirements: Project name and location; description of all affected work; explanation of necessity for cutting, alteration or excavation; impact on the work of the Owner or any separate contractor, or on the structural or weatherproof integrity of the building; description of proposed work, including scope of cutting, patching, alteration, or excavation, products proposed to be used, trades who will complete the work, and extent of refinishing to be done; alternatives to cutting and patching; cost proposal, when applicable; written permission from any separate contractor whose work will be affected.
- C. Product Substitutions: Should conditions of Work or schedule indicate change of products from original installation, submit request for substitution as specified in [Section 01 25 00 - Substitution Procedures](#).
- D. Field Observation: Submit written notice to Project Manager designating date and time work will be uncovered.

### PART 2 - PRODUCTS

NOT USED

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. General: Inspect existing conditions; include elements subject to damage or movement during cutting and patching.
- B. After Uncovering Work: Inspect conditions affecting the installation of products, or performance of Work.
- C. Unsatisfactory Conditions: Report unsatisfactory or questionable conditions to the Project Manager in writing; do not proceed with work until Project Manager has provided further instructions.

**3.2 PREPARATION**

- A. Temporary Support: Provide as necessary to assure structural value or integrity of affected portion of Work.
- B. Protection:
  - 1. Provide devices and methods to protect other portions of the Project from damage.
  - 2. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching, and maintain excavations free from water.

**3.3 PERFORMANCE**

- A. Cutting and Patching: Execute cutting, fitting, and patching, including excavation and fill if required, to complete Work and to:
  - 1. Fit the several parts together, to integrate with other Work.
  - 2. Uncover Work to install or correct ill-timed Work.
  - 3. Remove and replace defective and nonconforming Work.
  - 4. Remove samples of installed Work for testing.
  - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- B. Methods: Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing. Cut masonry and concrete materials using masonry saw or core drill.
- C. Restoration: Restore Work with new products according to requirements of Contract Documents. In the case of failure to protect existing or new work, Contractor shall be responsible for costs to repair damage and for restoring the work.

- D. Penetrations: Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- E. Refinishing: Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- F. Hazardous Conditions: Identify hazardous substances or conditions exposed during the Work to Project Manager for decision or remedy.

**END OF SECTION 01 73 29**



**SECTION 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. Description: Provide Construction Waste Management including salvaging, recycling, and disposing of nonhazardous construction waste, as shown and specified per Contract Documents.

**PART 2 - PRODUCTS**

## 2.1 WASTE MANAGEMENT PLAN

- A. General: Develop plan, consisting of waste identification and construction methods employed to reduce the amount of waste generated, including separate sections for demolition and construction waste, to re-use and recycle minimum 75% of construction waste materials generated by the Work. Indicate quantities by weight or volume; use same units of measure throughout waste management plan.
- B. Quality Requirements: Refer to [Section 01 42 00 - References](#) for reference standards, applicable codes and definitions, and to the following:
1. American National Standards Institute (ANSI): ANSI 10.2 - Safety Code for Building Construction.
  2. American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers' standard specifications.
  3. California Building Code (CBC): California Green Building Standards Code (CALGreen), latest edition: Title 24, Part 11.
  4. California Department of Resources Recycling and Recovery (CalRecycle):
    - a. General: Sustainable Building Guidelines.
    - b. Recycling and Recovery: Construction and Demolition Debris Recycling guidelines.
  5. California Occupational Safety and Health Administration (CalOSHA): Construction Safety Orders; 29 CFR, PART 1926 Safety and Health Regulations for Construction.
  6. Construction & Demolition Recycling Association (CDRA): Standards and guidelines.
  7. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

**PART 3 - EXECUTION****3.1 PREPARATION**

- A. General: Review Waste Management Plan procedures and identify locations established for salvage, recycling, and disposal. Designate and label specific areas on the site for separating materials to be salvaged, recycled, reused, donated, and sold.

**3.2 IMPLEMENTATION**

- A. City of Pittsburg Construction & Demolition (C&D) Recycling and Waste Management requires at least 65% job-site waste materials diverted from the landfill.
- B. For newly constructed buildings, demolition projects and all locally permitted additions and alterations to non-residential buildings or structures, Contractor shall submit the C&D Debris Waste Management Plan (WMP) showing diverting from landfills at least 65% of the construction materials generated by the project.
- C. Contractor may deliver all approved recycling materials such as wood, metal, plastics, concrete, roofing, cardboard, dirt, sheetrock, tires, appliances, mattresses, box springs, propane tanks, and electronic waste to Contra Costa Waste Service also known as Recycling Center & Transfer Station (RCTS), located at 1300 Loveridge Road, Pittsburg, California. All materials shall be weighed at the RCTS. For any material code of "CD" (Construction & Demolition Material Processing), 100% diversion rate will be applied to receipts indicating the material code "CW" (Clean Wood), "CG" (Clean Green), or "CR" (Clean Roofing).
- D. Recycled Materials: Separate recyclable waste from other waste materials, trash, and debris. Provide properly marked containers or bins for controlling recyclable waste until they are removed from Project site. Store materials away from construction area, off the ground and protect from the weather; do not store within drip line of remaining trees. Transport recyclable waste off Owner's property to recycling receiver or processor.
- E. Disposal: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. Burning and burying of materials is not allowed.
- F. Contractor shall submit the following WMP and Water Assessment table forms.



CITY OF PITTSBURG  
65 Civic Avenue  
Pittsburg, CA 94565

**CONSTRUCTION AND DEMOLITION DEBRIS  
WASTE MANAGEMENT PLAN (WMP)**

For City Use Only	
Project No.	_____
Date	_____ Fee \$ _____
Deposit Amount \$	_____
<input type="checkbox"/>	Approved WMP
<input type="checkbox"/>	Approved Infeasibility Exemption
<input type="checkbox"/>	Denied _____
<input type="checkbox"/>	Further information required _____
Staff Initials	_____

The City of Pittsburg C&D Recycling and Waste Management requirement states that at least 75% diversion of job-site waste materials from the landfill. In order to process the application request, the following form must be completed, signed and submitted with an application fee.

- WMP Application Approval Request       WMP Infeasibility Exemption Request

Property Owner Name/Ph.# \_\_\_\_\_  
 Job-site Address: \_\_\_\_\_  
 Contractor/Project Manager: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Cellular Phone Number: \_\_\_\_\_  
 Fax Number: \_\_\_\_\_

\_\_\_\_\_  
Property Owner's Signature / Date

\_\_\_\_\_  
Contractor/Project Manager's Signature / Date

1. Briefly state how materials will be sorted for recycling and/or salvage on the job site. See *Waste Assessment Table on back page*. Attach additional pages if necessary. \*If no materials are targeted for recycling or salvage, please state why.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

2. Will this project require the use of sub-contractors?  Yes  No If yes, briefly state how you plan to inform and ensure participation by the sub-contractors of your job-site recycling and waste management responsibility.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Complete Other Side →**

**WASTE ASSESSMENT TABLE**

- I. BEFORE START OF PROJECT: Identify the type of materials to be recycled, salvaged or disposed from the job-site in **Section I** of the Waste Assessment table. Identify the handling procedure, hauler and/or destination of each material type.
- II. UPON COMPLETION OF PROJECT: **Section II** is to be filled out with supporting documentation upon completion of project. Indicate the material **types and quantities** recycled, salvaged or disposed from this job-site. Official weight tags must be submitted with this completed report identifying 1) job site address, 2) weight of load(s), 3) material type(s) and 4) if materials were recycled, salvaged or disposed.

Material Type ↓	Section I Identify materials (✓)			Handling procedure, hauler or final destination of materials* (See #1)	Section II Quantity of each material (lbs)			City Use Only Acceptable weight tag(s) (staff initials)
	Recycle	Salvage	Landfill		Recycled	Salvaged	Landfilled	
Asphalt & Concrete								
Brick, Tile								
Building materials-doors, windows, fixtures, cabinets								
Cardboard								
Dirt/Clean Fill								
Drywall								
Carpet padding/ Foam								
Plate/window Glass								
Scrap Metals (steel, aluminum, brass, copper, etc.)								
Unpainted Wood & Pallets								
Yard Trimmings (brush, trees, stumps, etc.)								
Other:								
Garbage								
<b>TOTALS</b>								% Recycled

FOR CITY USE ONLY – PROJECT COMPLETION (version 11-08)

Full Compliance   
  Good Faith Effort to Comply   
  Non-Compliance  
 Return of Deposit   
  Yes   
  No   
 Amount \$ \_\_\_\_\_   
 Staff Signature \_\_\_\_\_ / \_\_\_\_\_   
 Date \_\_\_\_\_

**END OF SECTION 01 74 19**

## SECTION 01 77 00 – CLOSEOUT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section describes contract closeout procedures including:
  1. Removal of temporary construction facilities
  2. Substantial completion
  3. Final completion
  4. Final cleaning
  5. Miscellaneous Project Record Submittals
  6. Release of claims

#### 1.2 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Restore permanent facilities used during construction to specified condition.

#### 1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
  1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
  2. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
  3. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
- B. Advise the Project Manager of pending insurance changeover requirements.
- C. Submit warranty bonds, final certifications, and similar documents.
- D. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

- E. Submit record drawings in PDF or hard copies in addition to CAD files, maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
- F. Deliver tools, spare parts, extra stock, and similar items.
- G. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
- H. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
- I. Complete final cleanup requirements, including touchup painting.
- J. Touch up and otherwise repair and restore marred, exposed finishes.
- K. Inspection Procedures: On receipt of a request for inspection, the Project Manager will either proceed with inspection or advise the Contractor of unfilled requirements. The Project Manager will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
- L. The Project Manager will repeat inspection when requested and assured that the Work is substantially complete.
- M. Results of the completed inspection will form the basis of requirements for final acceptance.

#### 1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
- B. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
- C. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
- D. Submit a certified copy of the Project Manager's final inspection list of items to be completed or corrected, endorsed and dated by the Project Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Project Manager.

- E. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - F. Submit consent of surety to final payment.
  - G. Submit a final liquidated damages settlement statement.
  - H. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - I. Re-inspection Procedure: The Project Manager will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Project Manager.
    - 1. Upon completion of re-inspection, the Project Manager will prepare a certificate of final acceptance. If the Work is incomplete, the Project Manager will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
    - 2. If necessary, re-inspection will be repeated.
  - J. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Provide two (2) paper copies and a PDF. Mark appropriate identification on front and spine of each binder. Include the following types of information:
    - 1. Emergency instructions.
    - 2. Spare parts list.
    - 3. Copies of warranties.
    - 4. Wiring diagrams.
    - 5. Recommended "turn-around" cycles.
    - 6. Inspection procedures.
    - 7. Shop Drawings and Product Data.
    - 8. Fixture lamping schedule.
- 1.5 FINAL CLEANING
- A. Execute final cleaning prior to final inspection.
  - B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
  - C. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.

- D. Employ skilled workers for final cleaning.
- E. Clean Site; mechanically sweep paved areas.
- F. Remove waste and surplus materials, rubbish, and construction facilities from Site.

#### 1.6 MISCELLANEOUS PROJECT RECORD SUBMITTALS

- A. Refer to Special Provisions or other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Project Manager for City's records.

#### 1.7 RELEASE OF CLAIMS

- A. Contract will not be closed out and final payment will not be made, subject to provisions of Section 7100 Public Contract Code until [Document 00 52 13 - Agreement Form](#) and [Document 00 52 14 - Agreement and Release of Any and All Claims](#) on undisputed/settled amounts is completed per requirements elsewhere in the Special Provisions and/or Specifications and executed by Contractor and City.
- B. Contractor shall submit the following Agreement and Release of Any and All Claims Form.





CITY OF PITTSBURG  
65 Civic Avenue  
Pittsburg, CA 94565

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS

This Agreement and Release of Claims ("Agreement and Release"), made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the City of Pittsburg ("City"), and \_\_\_\_\_ ("Contractor"), whose place of business is at \_\_\_\_\_.

RECITALS

1. City and Contractor entered into Contract No. \_\_\_\_\_ in the City of Pittsburg, County of Contra Costa, State of California.
2. The Work under Contract No. \_\_\_\_\_ has been completed.

Now, therefore, it is mutually agreed between City and Contractor as follows:

AGREEMENT

3. 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	\$ _____

4. Subject to the provisions of this Agreement and Release, City shall forthwith pay to Contractor the sum of \$ \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents under Contract No. \_\_\_\_\_, less any amounts withheld under the Contract or represented by any "Stop Notice" on file with City as of the date of such payment.
5. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against City arising from the performance of work under Contract No. \_\_\_\_\_. 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 , City of Pittsburg, and all their respective directors, agents, officers, volunteers, consultants (including, but not limited to, Project Construction Manager and Architect/Engineer), employees, inspectors, assignees and transferees except for the Disputed Claims set forth in Paragraph 6, and continuing obligations described in Paragraph 8, below.



**CITY OF PITTSBURG**  
 65 Civic Avenue  
 Pittsburg, CA 94565

6. The following claims are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release:

<u>Claim No.</u>	<u>Date Submitted</u>	<u>Description of Claim</u>	<u>Amount of Claim</u>
------------------	-----------------------	-----------------------------	------------------------

7. Consistent with California Public Contract Code, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 4, above, Contractor hereby releases and forever discharges City, all its respective directors, agents, officers, volunteers, employees, 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.
8. 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.
9. Contractor shall immediately defend, indemnify and hold harmless City of Pittsburg, and all its respective directors, agents, officers, volunteers, consultants, employees, 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 Contract No. \_\_\_\_\_, except for the Disputed Claims set forth in Paragraph 6, above.
10. Contractor hereby waives the provisions of California Civil Code, Section 1542, which provides as follows:
- A general release does not extend to claims which the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him, must have materially affected his settlement with the debtor.
11. 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, city, municipal or other law, ruling or regulations, 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.
12. All rights of City shall survive completion of the Work or termination of Contract, and execution of this Release.



**CITY OF PITTSBURG**  
65 Civic Avenue  
Pittsburg, CA 94565

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

CITY OF PITTSBURG

CONTRACTOR

BY: \_\_\_\_\_ BY: \_\_\_\_\_

Date: \_\_\_\_\_ Date: \_\_\_\_\_

**END OF SECTION 01 77 00**

## SECTION 01 78 00 – CLOSEOUT SUBMITTALS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This section describes contract closeout submittals including:
1. Project record documents
  2. Project guarantee
  3. Warranties

#### 1.2 PROJECT RECORD DOCUMENTS

- A. Project Record Documents required include:
1. Marked-up copies of Contract Drawings
  2. Marked-up copies of Shop Drawings
  3. Project Record Drawings
  4. Marked-up copies of Special Provisions, Specifications, Addenda and Change Orders
  5. Marked-up Project Data submittals
  6. Record Samples
  7. Field records for variable and concealed conditions
  8. Record information on Work that is recorded only schematically
  9. GPS As-built Survey
  10. Warranty Bonds
- B. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of Divisions 2 through 48 (when provided).
- C. General Project closeout requirements are included in [Section 01 77 00 - Closeout Requirements](#).
- D. Maintenance of Documents and Samples:
1. Store Project Record Documents and samples in the field office apart from Contract Documents used for construction.
  2. Do not permit Project Record Documents to be used for construction purposes.
  3. Maintain Project Record Documents in good order, and in a clean, dry, legible condition.
  4. Make documents and samples available at all times for inspection by Architect and Project Manager.

- E. City will provide one set of reproducibles and one set of the construction drawing prints and one project manual for the Contractor's use and copying during construction.
- F. Mark-up Procedure: During the construction period, maintain a set of Contract Drawings and Shop Drawings for Project Record Document purposes.
  - 1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
    - a. Dimensional changes to the Drawings
    - b. Revisions to details shown on the Drawings
    - c. Depths of foundations below the first floor
    - d. Locations and depths of underground utilities
    - e. Revisions to routing of piping and conduits
    - f. Revisions to electrical circuitry
    - g. Actual equipment locations
    - h. Duct size and routing
    - i. Locations of concealed internal utilities
    - j. Changes made by Change Order
    - k. Details not on original Contract Drawings
  - 2. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
  - 3. Mark Project Record Drawing sets with red ink; use other colors to distinguish between changes for different categories of the Work at the same location.
  - 4. Mark important additional information which was either shown schematically or omitted from original Drawings.
  - 5. Note construction change directive numbers; alternate numbers; Change Order numbers and similar identification.
  - 6. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.
    - a. Accurately record information in an understandable and legible drawing technique.
    - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
- G. Preparation of Transparencies: Prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with the Project Manager. When authorized, prepare a full set of correct reproductables of Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.
  2. Refer instances of uncertainty to the Project Manager for resolution.
  3. Review of Reproducible: Before copying and distributing, submit corrected reproducibles and the original marked-up prints to the Project Manager for review. When acceptable, the Project Manager will initial and date each transparency, indicating acceptance of general scope of changes and additional information recorded, and of the quality of drafting.
    - a. Reproducibles and the original marked-up prints will be returned to the Contractor for organizing into sets, printing, binding, and final submittal.
  4. Copies and Distribution: After completing the preparation of reproducible Project Record Drawings, print one hard copy and a PDF of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.
    - a. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
    - b. Organize Project Record Drawings reproducibles into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps.
- H. Distribution of Marked-Up Drawings and Transparencies: Submit the marked-up Project Record Drawings sets, reproducibles, and one copy to the Project Manager for City's records.
- I. Project Record Special Provisions and Specifications:
1. During the construction period, maintain one copy of the Project Manual, including addenda and modifications issued, for Project Record Document purposes.
  2. Mark the Project Record Manual to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installation that would be difficult to identify or measure and record later.
    - a. In each Special Provisions and Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
    - b. Record the name of the manufacturer, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.

- c. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.
  3. Upon completion of mark-up, submit Project Record Manual to the Project Manager for City's records.
- J. Project Record Product Data:
  1. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.
    - a. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.
    - b. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
    - c. Note related Change Orders and mark-ups of Project Record Drawings, where applicable.
    - d. Upon completion of mark-up, submit a complete set of Project Record Product Data to the Project Manager for City's records.
    - e. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.
- K. Material, Equipment and Finish Data:
  1. Provide data for primary materials, equipment and finishes as required under each Special Provisions/Specification section.
  2. Submit one set prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers and a PDF; provide typewritten table of contents for each volume.
  3. Arrange by Special Provisions/Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
    - a. Trade names.
    - b. Model or type numbers.
    - c. Assembly diagrams.
    - d. Operating instructions.
    - e. Cleaning instructions.
    - f. Maintenance instructions.
    - g. Recommended spare parts.
    - h. Product data.
- L. Miscellaneous Project Record Submittals:
  1. Refer to other Special Provisions/Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete

miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Project Manager for City's records. Field records documenting elevations and locations of completed improvements shall require Contractor-retained State of California Licensed surveyor's certification stamp. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

- a. Field records on excavations and foundations
- b. Field records on underground construction and similar work
- c. Survey showing locations and elevations of underground lines
- d. Invert elevations of drainage piping
- e. Surveys establishing building lines and levels
- f. Authorized measurements utilizing unit prices or allowances
- g. Records of plant treatment
- h. Ambient and substrate condition tests
- i. Certifications received in lieu of labels on bulk products
- j. Batch mixing and bulk delivery records
- k. Testing and qualification of tradespersons
- l. Documented qualification of installation firms
- m. Load and performance testing
- n. Inspections and certifications by governing authorities
- o. Leakage and water-penetration tests
- p. Fire resistance and flame spread test results
- q. Final inspection and correction procedures

M. GPS As-built Survey: Refer to [Section 01 71 23 - Construction Surveying](#) for As-Built GPS Survey.

N. Periodic Review:

1. Make additions to the Project Record Documents as they occur.
2. Make the Project Record Documents available to the Project Manager for periodic review. The Project Manager's review of the current status of Project Record Documents is a requisite to approval of requests for progress payment.
3. Prior to submitting each request for progress payment, secure the Project manager's approval of the current status of the Project Record Documents.
4. Prior to submitting request for final Payment, submit the final Project Record Documents to the Project Manager for approval.

O. Submittal: At the completion of Project, deliver record documents to Project Manager.

### 1.3 PROJECT GUARANTEE

A. Requirements for Contractor's guarantee of completed Work are included in [Document 00 72 00 - General Conditions](#), Article 10. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform



repair work or replacement required, at Contractor's sole expense, for period of one year, unless otherwise subject to any special warranty periods of longer duration, from date of Final Acceptance.

- B. 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.
- C. City may make repairs to defective Work as set forth in paragraph 10.C.3 of [Document 00 72 00 - General Conditions](#), if, within five (5) working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake repair with due diligence; provided, however, that in case of leak or emergency where, in opinion of City, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.
- D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Project Manager, City shall have right to operate and use materials or equipment until it 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.
- E. Nothing in this Section 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 equipment caused by negligence of suppliers' agents, employees or subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by City of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

#### 1.4 WARRANTIES

- A. Execute Contractor's submittals and assemble warranty documents executed or supplied by subcontractors, suppliers, and manufacturers.
  - 1. Provide table of contents and assemble in 8-1/2 inches by 11 inches three-ring binder with durable plastic cover.
  - 2. Assemble in Special Provisions/Specification Section order.
  - 3. Submit material prior to final application for payment.
  - 4. For equipment put into use with City's permission during construction, submit within ten (10) working days after first operation.

5. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.
  6. Warranties are intended to protect City against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
  7. Limitations: Warranties are not intended to cover failures which result from the following:
    - a. Unusual or abnormal phenomena of the elements
    - b. Vandalism after substantial completion
    - c. Insurrection or acts of aggression including war.
- B. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.
- C. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than ninety (90) days after corrected Work was done, whichever is later.
- D. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.
- E. Warranty Forms: Submit drafts to Project Manager for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.
- F. Warranty shall be countersigned by manufacturers.
- G. Where specified, warranty shall be countersigned by subcontractors and installers.
- H. Rejection of Warranties: City reserves right to reject unsolicited and coincidental product warranties which detract from or confuse requirements or interpretations of Contract Documents.
- I. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be one-year minimum from date of final completion of entire Work except where:
  1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.
  2. Materials, equipment or systems are put into beneficial use of City prior to Final Completion as agreed to in writing by Project Manager.
- J. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees

upon completion of all work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to City free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of City.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

NOT USED

**END OF SECTION 01 78 00**

## SECTION 02 21 13 – SURVEY MONUMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes furnish and install Cast-in-place Portland Cement Survey Monuments and all appurtenant work.
- B. Related Requirements:
  - 1. [Section 03 30 00 – Utility Cast-in-place Concrete](#)
  - 2. [Section 31 23 16 – Utility Trenching](#)

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. [Section 01 29 00 - Payment Procedures](#): Contract Sum/Price modification procedures.
- B. Survey Monuments
  - 1. Basis of Measurement: Measured on a per unit basis.
  - 2. Basis of Payment: Includes concrete, placement accessories, consolidating, leveling, troweling, and curing.

#### 1.3 REFERENCE STANDARDS

- A. ASTM International:
  - 1. ASTM A48 – Specifications for Gray Iron Castings
- B. Caltrans Standard Specifications
  - 1. Section 55 – Steel Structures
  - 2. Section 78-2 – Survey Monuments

#### 1.4 COORDINATION

- A. Coordinate placement of concrete formwork and placement of form accessories.

#### 1.5 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.

- B. Product Data: Submit data on bronze survey markers, frame and covers.

## 1.6 CLOSEOUT SUBMITTALS

- A. [Section 01 78 00 - Closeout Submittals](#): Requirements for submittals.

## PART 2 - PRODUCTS

### 2.1 FRAME AND COVER

- A. Monument frame and cover shall be gray iron castings conforming to ASTM A48, Class 30B, designed for a 15,000 lb. wheel load. Monument cover shall be marked "Monument". Cover shall be non-rocking and will fit in its frame.
- B. Monument Frame and Cover shall be Chrisp Company Casting Part No.9279 or 9277M, Phoenix Iron Works 2501or approved equal.

### 2.2 BRONZE SURVEY MARKER

- A. Bronze survey marker shall be 2-1/2 inch domes disk with stem and appropriate survey information as specified on the Drawings.
- B. Brass Survey markers are not acceptable unless they are lead-free.

### 2.3 FORMING TUBE

- A. Tubes for forming Portland cement concrete collar and monument shall be non-metallic type of the size and dimensions shown on the Drawings.

### 2.4 PORTLAND CEMENT CONCRETE

- A. Portland Cement Concrete for collars and footings shall conform with [Section 03 30 00 – Utility Cast-in Place Concrete](#).

### 2.5 HOT MIX ASPHALT

- A. Hot Mix Asphalt concrete around monuments shall be in conformance with [Section 32 12 16 – Asphalt Paving](#).

**PART 3 - EXECUTION****3.1 GENERAL**

- A. [Section 01 70 00 - Execution](#): Requirements for installation examination.
- B. Monuments shall not be installed until the asphalt paving has been completed.
- C. Concrete, form tube, bronze survey marker, frame and cover, and asphalt paving shall be installed as shown on the Drawings.
- D. Cast the monuments in place in neat holes using forming tubes.
- E. Thoroughly consolidate the concrete and cure it by the water method per Section 90-1.03B (2) Water Method of State Standard Specifications.
- F. Locate the monument such that the point being referenced falls within 1/2-inch from the center of the disk when the disk is placed in the center of the monument.
- G. Place the survey marker disk before the concrete reaches its initial set. Firmly embed the disk in the concrete.
- H. If base and surfacing are not shown around a monument, fill any space around it with earth. Water and tamp the earth into place.
- I. Surplus excavated material shall become the property of the Contractor and the Contractor shall be responsible for disposal of excess excavated material.
- J. The Concrete collar shall be circular – 8 inches in diameter around the frame and cover and shall be covered with a minimum of two (2) inches of asphalt concrete paving to level with the adjacent surfacing.

**3.2 EXISTING MONUMENT PROTECTION**

- A. All existing survey monuments and benchmarks shall be protected, unless otherwise shown on the Drawings. Upon discovery of a survey monument not identified and located by the City, immediately:
  - 1. Stop work near the monument
  - 2. Notify the Project Manager
- B. Do not resume work near the monument until authorized by the Project Manager.
- C. Monuments placed by Surveyors must be preserved, in accordance with State Business & Professions Code section 8771.
- D. The Contractor shall exercise caution when working around monuments so as not to disturb them. During milling, grinding, excavation or other operations, the

Contractor shall work around survey monuments unless specifically otherwise indicated on the Plans. If a monument is disturbed or damaged during adjusting, milling or other operations, the Contractor shall be responsible for all costs associated with the reestablishment of the monument including but not limited to surveying performed by a Licensed Surveyor and filing documents with County and constructing the new monument.

- E. The existing monument consisting of a concrete core and brass tack, nail or other marking device located inside of a survey monument cover with frame, shall not be disturbed until the contractor's Licensed Land Surveyor has established of reference points to preserve the location of the monument, in accordance with State Business & Professions Code section 8771.
- F. Any survey monument disturbed shall be replaced in accordance with the State Business & Professions Code section 8771 and Contra Costa County Standard Drawings CA40. The Contractor shall be responsible for all costs associated with the reestablishment of the monument including but not limited to surveying performed by a Licensed Surveyor and filing documents with County and constructing the new monument.
- G. Contractor shall prepare corner record, submit corner record to the County Surveyors and submit acceptance of monument to the Project Manager.

### 3.3 CONCRETE PROTECTION

- A. The Contractor shall protect all concrete against injury until final acceptance by the City.

**END OF SECTION 02 21 13**

## SECTION 02 32 19 – EXPLORATORY EXCAVATIONS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Exploratory excavation by potholing at all utility conflicts including the locations identified on the plans to determine the location, depth, width, pipe diameter or concrete ductbank thickness, type and condition of existing underground utilities.

#### 1.2 REFERENCES

- A. Cal/OSHA – California Division of Occupation Safety and Health
- B. Caltrans Standard Specifications
  - 1. Section 15 – Existing Facilities
  - 2. Section 19 - Earthwork
- C. Underground Services Alert (USA)

#### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Submittal Data:
  - 1. Contractor shall contact USA to verify the actual location of the pothole prior to beginning pothole. Submit letters or correspondences of advance notifications to the utility companies as listed below in Part 3.
  - 2. Contractor shall apply and pay for all permits connected with the Work.
  - 3. Contractor shall submit temporary traffic control plan for City's approval prior to beginning any exploratory excavation.
  - 4. Contractor shall submit potholing methodology.
  - 5. Contractor shall submit photographs in jpeg or PDF format of the pothole locations with the pothole number identified on the photograph as designated below.
  - 6. Pothole data shall also include the thickness of asphalt concrete/Portland cement concrete pavement and aggregate base.



7. At a minimum, pothole data shall be submitted in a tabular format. See sample potholing submittal format below:

#	Utility	Pipe diameter (inch)	Concrete ductbank Width x Depth	Depth to top of pipe or concrete ductbank	Material	AC/AB Depth (inch)	Northing or Distance from fixed object A	Easting or Distance from fixed object B
PH#1	Water	12	-	3'-6"	PVC	4/8	15 ft from FH	12 ft from SSMH
PH#2	Telecom Duct	-	2 ft x 3 ft	4'-2"	Concrete Ductbank	6/10	22 ft from SDMH	40 ft from WV

#### 1.4 MEASUREMENT & PAYMENT

- A. Measurement: For measurement of Exploratory excavations (potholing) performed by the Contractor, an exploratory excavation (potholing) will be counted as complete when the intended pipe is exposed, measured, the data has been submitted in the tabular format as specified above, reviewed and approved by the Project Manager, the pothole is backfilled and the surface restoration including any striping is restored. Empty potholes will not be counted as complete.
- B. Payment: The Contract unit price paid for Exploratory Excavations (potholing) shall include full compensation for furnishing all labor, tools, equipment's, incidentals for exploratory excavations by potholing to verify the location, depth, diameter, material and thickness of the existing underground utility, including contacting USA, utility companies, permits, traffic control, compliance with Cal/OSHA, saw cut, excavation, exposing the existing underground utility, measuring depths, diameter and distances as required, backfill, surface restoration, striping restoration, submitting the pothole data in a tabular format for review and approval by the Project Manager, as shown on the Drawings, as specified in the City Standard Specifications and as directed by the Project Manager.
- C. Full compensation pay clause for furnishing all labor, tools, equipment's, incidentals for exploratory excavations by potholing for any utility conflicts not identified on the Drawings including exploratory excavations by potholing to verify the location, depth, diameter, material and thickness of the existing underground utility, including contacting USA, utility companies, permits, traffic control, compliance with Cal/OSHA, saw cut, excavation, exposing the existing underground utility, measuring depths, diameter and distances as required, backfill, surface restoration, striping restoration, shall be considered as incidental

to the item most closely related to and no separate compensation will be allowed therefor.

## **PART 2 - PRODUCTS**

NOT USED

## **PART 3 - EXECUTION**

### **3.1 POTHOLING**

- A. Contractor shall be responsible for notifying the utility companies for any inspections prior to potholing.
- B. Contractor shall be responsible for locating utilities and providing utility markings of the underground utilities prior to potholing.
- C. Where gas distribution or gas transmission lines are present, Contractor shall have a PG&E representative present on site during potholing.
- D. Contractor shall be responsible for contacting and notifying the utility companies three (3) working days prior to beginning any potholing. Contractor shall be responsible for coordinating any inspections with the respective utility company.
- E. Two (2) weeks prior to any construction, potholing shall be performed at all utility conflicts and at all pothole locations shown on the Drawings in order to determine the location, depth, width, pipe diameter, thickness type and condition of existing underground utilities and shall conform to the Special Provisions.
- F. Potholing will be a separate move-in from the underground utility trenching and will be separate from the trenching operations; Exploratory excavations shall be performed with potholing equipment. Potholing as part of the trenching operations is not an acceptable method. Potholing will be shown as a separate line item in the project construction schedule.
- G. The methods such as vacuum potholing and other excavation methods used by the Contractor for potholing shall be approved by the Project Manager in advance of commencing any work, along with the required traffic controls.
- H. After the completion of the USA markings, but before the actual potholing, Contractor will host a field meeting with the City to review the locations of the potholes which will be painted in the field. During the meeting, the Project Manager may relocate the potholes based on the field conditions. The Contractor's price bid will include allowance for moving the locations of the

potholes during the pre-pothole site meeting. No guarantee is made as to the exact locations of the existing utilities.

- I. The Contractor shall provide the Project Manager in a tabular format the location, type, depth, diameter and condition of each utility found prior to commencing construction. The potholing table shall include a neatly redlined plan. No trenching work shall be performed until the Project Manager reviews the potholing information submitted by the Contractor.
- J. Contractor shall provide the potholing information to the Project Manager and allow one (1) week for any necessary revisions to the design plan and profiles prior to sawcutting and trenching of the proposed pipe alignment or as shown on the Drawings.
- K. The Contractor shall take care not to damage any existing facilities during potholing. Existing facilities damaged by the Contractor's operations shall be repaired or replaced to the satisfaction of the City Engineer and Utility companies, all at the Contractor's expense.
- L. Backfill with Controlled Low Strength Materials (CLSM) and complete surface restoration to match existing conditions in kind.
- M. When pothole locations are located in concrete pavement, Contractor shall remove and replace concrete pavement and base from the nearest joint to joint to match the existing concrete pavement thickness.

**END OF SECTION 02 32 19**

## SECTION 02 41 00 - DEMOLITION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes but not limited to:
  - 1. Demolition & Permits
  - 2. Removal and Disposal
  - 3. Recycling & Salvaging

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Demolition:
  - 1. Basis of Measurement: Not a measured item, unless specified otherwise on the Drawings.
  - 2. Basis of Payment: The Contract lump sum price paid for "Demolition" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all work involved in Demolition, including obtaining demolition permits, permit fees, sawcut, remove asphalt and concrete paving and base to design subgrade, remove foundation and base; terminating and removing utilities to be demolished and other items of work as specified in the plans, Standard Specification and the Special Provisions, and as directed by the Project Manager.

#### 1.3 REFERENCES & RELATED WORK SPECIFIED ELSEWHERE

- A. Bay Area Air Quality Management District (BAAQMD) – <http://www.baaqmd.gov/>
  - 1. Regulation 11 (Hazardous Pollutants) and Rule 2 (Asbestos Demolition, Renovation, and Manufacturing).
- B. CALGreen Construction Waste Management Requirements
  - 1. [https://www.calrecycle.ca.gov/lgcentral/library/canddmodel/instruction/new\\_structures](https://www.calrecycle.ca.gov/lgcentral/library/canddmodel/instruction/new_structures)
- C. California Occupational Safety and Health (Cal/OSHA)
  - 1. General Requirements
- D. Commercial
  - 1. USA Underground Service Alert
- E. Division 1
  - 1. General Requirements

#### 1.4 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. The Contractor shall submit to the City a haul route for approval, prior to commencing any work. Truck traffic movement is limited between the hours of 9am to 3pm, unless approved by the Project Manager.
- C. Before disposing of any demolished material prior to any work
  - 1. Submit a written agreement from the property owner
    - a. For the use of the property
    - b. absolving the City from responsibility in connection with the property.
  - 2. Obtain authorization to start
- D. Before Contract acceptance, submit a document signed by the owner of the material disposal site stating that the Contractor has complied with the Contractor-Owner agreement.
- E. Demolition Schedule: The Contractor shall submit a complete coordination schedule for demolition work including shut-off and continuation of utility services prior to start of the work. The schedule shall indicate proposed methods and operations of facility demolition, and provide a detailed sequence of demolition and removal work to ensure uninterrupted operation of occupied areas.
- F. All affected private properties will receive door hanger notices two (2) weeks prior to any utility shutoffs or frontage demolition and improvements.

#### 1.5 JOB SITE CONDITIONS

- A. The Contractor shall visit the site and inspect the existing facilities. The City assumes no responsibility for actual condition of facilities to be demolished.
- B. Contractor shall use all means necessary to prevent the spread of dust during performance of the work. Thoroughly moisten all surfaces as required to prevent the generation of dust. No washing of streets is permitted.
- C. All liquid, and slurry generated during pavement sawcutting shall be collected and removed from the site. These liquids shall not be washed into the area storm drainage system.
- D. Contractor shall remove hazardous materials as described per the Project Asbestos and Lead Inspection Report.
- E. The Contractor prior to the commencement of the demolition or renovation, thoroughly inspect the affected facility or part of the facility where the demolition or renovation operation will occur for the presence of asbestos, including Category I and Category II nonfriable Asbestos Containing Materials (ACM).

- F. The Contractor must also provide the Environmental Protection Agency (EPA) with a 10 working day advance notice for any disturbance of Regulated Asbestos-Containing Material (RACM) greater than 160 square feet or 260 lineal feet, and as specified in Code of Federal Regulations (CFR) Title 40, Chapter I, Subchapter C, Part 61, Subpart M, Section 61.145.

1.6 DELIVERY, STORAGE AND HANDLING

- A. [Section 01 60 00 - Product Requirements](#): Requirements for transporting, handling, storing, and protecting products.

**PART 2 - PRODUCTS**

NOT USED

**PART 3 - EXECUTION**

3.1 INSTALLATION

- A. Notify anyone to be affected by demolition and construction activities including but not limited to: all schools, residences, businesses, garbage collection (Pittsburg Disposal Service-a Garaventa company), utility companies (PG&E-Gas Distribution, PG&E Gas Transmission, PG&E-Electric, AT&T, Comcast, Verizon, Chevron Pipeline Co, Shell Pipeline Co, Kinder Morgan, Calpine etc.), Delta Diablo (Sewer District), BART, County Connection (bus transit agency), the Owner, etc. at least ten (10) working days prior to commencing the work of this section.
- B. Site Inspection:
  - 1. Prior to all work of this section, carefully inspect the site and all objects designated to be removed and to be preserved.
  - 2. Locate all existing active utility lines traversing the site and determine the requirements for their removal and/or protection.
- C. Clarification:
  - 1. The Drawings do not purport to show all objects existing on the site.
  - 2. Before commencing the work of this section, verify with the Owner all objects to be removed and all objects to be preserved
- D. Scheduling:
  - 1. Schedule all work in a careful manner with all necessary consideration for neighbors, operation of the existing facilities, and the public.
  - 2. Avoid interference with the use of, and passage to and from, residences and adjacent facilities.

- E. Protection of Utilities: Preserve in operating condition all active utilities traversing the site and designated to remain.

### 3.2 WATER POLLUTION CONTROL

- A. Water sprinkling, temporary enclosures, chutes and other suitable methods shall be used to limit dust and dirt rising and scattering in the air. The Contractor shall comply with all government regulations pertaining to environmental protection.
- B. The Contractor shall use equipment that will generate the least amount of dust. The Contractor shall provide dust control at all times including Saturdays, Sundays, and holidays unless directed otherwise by the Project Manager.
- C. Whenever the Contractor, in the opinion of the Project Manager, is negligent in controlling dust, the Project Manager may direct attention to the existence of a dust hazard and instruct the Contractor to immediately alleviate the dust hazard. The Contractor shall be responsible for any damage cause by dust generated as a result of the Contractor's operations.
- D. The Contractor shall have a commercial standard street vacuum/sweeper operational and in operation during each working day. The street vacuum/sweeper shall be able to pick up sand, gravel, dust, and debris, and other things, shall minimize dust generation, and shall also be available during the day and shall sweep as outlined below and as directed by the Project Manager.
- E. If the Contractor is performing work that generates dust and debris then during the day (including weekends and holidays) the sweeper shall sweep the project area (full length, width, and all lanes) twice a day sometime between 9:00a.m. and 11:00a.m. and also between 2:00p.m. and 4:00p.m. Hardscape surfaces (including pavers, sidewalks, and areas inaccessible by a mechanical sweeper) shall have dirt, dust, and debris removed by hand sweeping. If the Contractor fails to fulfill the responsibilities of this section, the City will perform or contract with others to perform the work and all costs incurred to the City shall be withheld from future payments to the Contractor.
- F. The Contractor shall clean the sidewalk and gutter as many times as needed to make sure the sidewalk and gutter are out of dirt, debris and small rocks at all times. The Contractor shall be prepared to sweep surfaces immediately at the request of the Project Manager, should the Project Manager deem it necessary for public safety and to avoid damage to properties. If streets are not satisfactorily cleaned within 12 hours from verbal or written notice by City personnel, the City will hire an independent sweeping company and deduct the cost for such work from payments due to the Contractor.
- G. Water shall not be used in a manner that creates hazardous or objectionable conditions such as ice, flooding, or pollution.

- H. The site shall be kept neat and orderly during the demolition to the maximum extent practical.
- I. Public right-of-way and private property shall be kept free of debris at all times.
- J. Stockpiles of demolished items or materials shall be removed from the site on a daily basis or stored in waste containers which shall be emptied on a weekly basis or as conditions require in order to manage the accumulation of waste.
- K. Accumulations of flammable materials shall not be permitted.

### 3.3 PROTECTION

- A. Safe passage of persons around area of demolition shall be provided in accordance with all safety and regulatory requirements. Operations shall be conducted to prevent damage to adjacent buildings, structures, other facilities, people and property. Safe passage provided by Contractor will be ADA complaint.
- B. Interior and exterior shoring, bracing, or supports shall be provided to prevent movement, settlement or collapse of structures to be demolished and to adjacent facilities to remain.
- C. Existing landscaping materials, structures, and appurtenances which are not to be demolished shall be protected and maintained as necessary.
- D. The Contractor shall protect and maintain conduits, drains, sewers, pipes and wires that are not to be demolished.
- E. Use all means necessary to protect existing objects designated to remain or to be preserved must remain operational during installation of the replacement pipeline. In the event of damage, immediately notify the Owner and make all repairs and replacements necessary for approval by the Owner at no additional cost to the Owner.

### 3.4 SURFACE DEMOLITION

- A. All asphalt concrete and all Portland cement concrete curbs, gutters, sidewalks, access ramps and driveways shall be saw-cut at the nearest scoreline or deep joint and removed entirely to the saw-cut limits.
- B. Where adjacent pavement or concrete is broken or damaged sufficiently to prohibit a sound replacement the entire damaged section shall be removed to the limits determined by the Project Manager.



- C. Asphalt concrete, sidewalk, concrete curb, and gutter materials to be demolished shall be broken up and removed from the site by the Contractor at no additional cost to the City.
- D. Where shown on the Drawings, the Contractor shall remove required pavement section including base material. Subsoil removal is also included where required to achieve design subgrade.

### 3.5 DEMOLITION BELOW THE SURFACE

- A. Existing structures, pavement slabs and structural sections to be abandoned shall be demolished to an elevation three feet below finished grade. Their bottoms (if any remain) shall be broken thoroughly to prevent entrapment of water and all voids backfilled with suitable backfill
- B. Demolition areas and voids resulting from demolition of structures below the surface shall be completely filled.
- C. All fill, compaction, and holes created by demolition work shall be backfilled with imported clean fill. Lay fill down in layers not exceeding 6" thickness and compact per the earthwork specifications. Grade the site to drain to the nearest storm drainage system without any low points.
- D. All fill and compaction surfaces shall be graded to meet adjacent contours and to provide flow to surface drainage structures, or as shown on the Drawings.
- E. Pipes to be demolished that require no future connection shall be removed to the extent required, sealed and capped. Pipe sections shall be removed either by sawcutting, removing a complete pipe section to an existing joint, or other adequate means which results in a clean joint.
- F. The Contractor shall demolish or dismantle and remove all items that are noted for demolition and removal in the Contract Documents and that will interfere with the planned construction, or as otherwise directed by the Project Manager.
- G. The Contractor shall demolish or dismantle and remove all abandoned conduits or structures that are encountered during the prosecution of the work and which interfere with the construction of the work upon the approval of the Project Manager.

### 3.6 REMOVAL OF EXISTING WATER AND SEWER-SERVICES

- A. The Contractor shall submit to the City for approval a detailed sequence and method of work for staking, abandonment of existing sewer services, water services, water meters, boxes, and cleanouts. The submittal shall include an

overview and general sequence of work; time and dates for each removal; and method and procedure for each removal.

B. ABANDONMENT OF SEWERS:

1. Contractor shall request an encroachment permit with Delta Diablo (District) for abandoning any existing sanitary sewer lateral pipes.

C. ABANDONMENT OF WATER LINES:

1. For service lines less than 4" diameter:
  - (a) Contractor shall pothole, cut out at the main, remove the corporation stop and saddle, and install a minimum 12" full circle 316 stainless steel repair clamp with 316 accessories around the pipe.
  - (b) Abandon unused existing water service lines in place, if at least 18" below grade to the Project Manager's satisfaction.
2. Contact City Water Department in writing 48 hours in advance of abandonment, to check the condition of the existing services prior to abandonment.

D. GENERAL ABANDONMENT:

1. When salvage materials are shown on the Drawings; salvage and arrange the existing facilities (i.e., meters, manhole covers, manhole frames, etc.) to be dropped off at the City's Corporation Yard by prior arrangement.
2. Properly remove or abandon in place unused existing City utility service lines discovered that were left in place by others.
3. Contact utility companies for removal, abandonment, adjustment or relocation of their facilities.
4. Contractor is responsible for verifying the location of any existing utilities.
5. Abandonment of pipes will include filling pipe with slurry as specified in Section 19-3.02G – Controlled Low-Strength Material of the State Standard Specification and capping the pipes at the ends.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. See [Section 01 74 19 – Construction Waste Management and Disposal](#) for disposal, salvaging and recycling of demolished materials.
- B. Demolition and removal of debris shall be conducted to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities which shall not be closed or obstructed without permission from the City. Alternate routes shall be provided to circumvent closed or obstructed traffic ways.
- C. The Contractor shall comply with all pertinent regulations of Cal/OSHA and local codes and practices.
- D. All existing materials that are designated to be salvaged shall be removed, cleaned and hauled to the City Corporation Yard, unloaded and stockpiled unless otherwise directed by the Project Manager.

- E. Site debris, rubbish and other materials resulting from demolition operations shall become the property of the Contractor and shall be removed by the Contractor at the Contractor's expense. The proper and legal disposal of demolished materials shall be the responsibility of the Contractor. All disposal sites and recycling facilities shall be approved by the City prior to initiation of the Work.
  - 1. Concrete debris shall be transported to a recycler of such materials.
  - 2. Hazardous materials shall be handled and disposed of in accordance with all applicable laws, codes, and regulations.

### 3.8 PATCHING AND REPAIRING

- A. The Contractor shall provide patching, replacing, repairing and refinishing of damaged areas or damaged adjacent facilities involved in the demolition.
- B. New concrete shall match the existing adjacent surfaces, in kind, or of better quality, to the satisfaction of the Project Manager, at no cost to the City or to the owners of the facilities.

### 3.9 CLEAN UP

- A. During and upon completion of work the Contractor shall promptly remove unused tools and equipment, surplus materials, rubbish, debris and dust and shall leave areas affected by work in a clean, approved condition.
- B. The Contractor shall clean adjacent structures and facilities of dust, dirt and debris caused by demolition, as directed by the Project Manager, and return adjacent areas to condition existing prior to start of work.
- C. The Contractor shall clean and sweep daily all street and roads affected by its operation.

**END OF SECTION 02 41 00**

**SECTION 03 30 00 – UTILITY CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes Utility Cast-in-Place Concrete for Following Items:**

1. Concrete pads around Utility facilities
2. Miscellaneous concrete footings for signs, street lighting, retaining walls, fence posts.
3. Thrust blocks.
4. Manhole Base.
5. Concrete aprons around water valves and manholes
6. Concrete Cap for shallow cover:
7. Retaining Walls
8. Survey Monuments
9. Electrical or Communications Duct Banks
10. Drainage Inlets
11. Concrete Headwalls

**B. Related Requirements:**

1. [Section 31 23 16 – Utility Trenching](#)
2. [Section 33 05 13 - Manholes and Structures](#)
3. [Section 33 12 13 - Water Service Connections](#)
4. [Section 33 11 13 – Water Distribution Piping](#)
5. [Section 33 12 16 - Water Distribution Valves](#)
6. [Section 33 12 19 - Water Distribution Fire Hydrants](#)
7. [Section 33 31 13 - Sanitary Sewer Piping](#)
8. [Section 33 41 13 - Storm Drainage Piping](#)

**1.2 UNIT PRICE - MEASUREMENT AND PAYMENT****A. [Section 01 29 00 - Payment Procedures](#): Contract Sum/Price modification procedures.****B. Concrete - Miscellaneous Locations:****1. Basis of Measurement:**

- a. Concrete Pads around Utility Facilities: Not a measured item and incidental to item most closely related to the utility facility. For example, concrete pad around backflow prevention assembly is incidental to the backflow prevention assembly.

- b. Miscellaneous Concrete Footings: Not a measured item and incidental to item most closely related to the facility. For example, footings for signs is incidental to the Sign and footings for Street Light pole is incidental to the bid item for Street lights or Electrical work as listed on the bid form.
  - c. Thrust Block: Not a measured item and incidental to item most closely related to the water facility – bends or pipes as listed on the bid form
  - d. Manhole Base: Not a measure item and incidental to the unit price paid for manhole.
  - e. Concrete aprons around water valves and manholes: Not a measured item and incidental to the unit price paid for water valve or water main pipe and manhole respectively as shown on the bid form.
  - f. Concrete Cap for shallow pipe cover: By cubic foot.
  - g. Retaining Walls: By linear foot measured along the top of wall, height and depth as shown on plans, including foundation, reinforcing steel, drain rock, drain pipe, and geotextile if applicable.
  - h. Survey Monuments: By unit price.
  - i. Electrical or Communications Duct Banks: Not a measured item and incidental to the duct bank installation.
  - j. Drainage Inlets: By unit price.
  - k. Concrete Headwalls: By unit price.
2. Basis of Payment: Includes concrete, placement accessories, consolidating, leveling, troweling, and curing.

### 1.3 REFERENCE STANDARDS

#### A. American Concrete Institute:

- 1. ACI 301 - Specifications for Structural Concrete.
- 2. ACI 305R - Guide to Hot Weather Concreting.
- 3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
- 4. ACI 308.1 - Specification for Curing Concrete.
- 5. ACI 318 - Building Code Requirements for Structural Concrete.

#### B. ASTM International:

- 1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- 2. ASTM C33 - Standard Specification for Concrete Aggregates.
- 3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- 4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- 5. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
- 6. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.

7. ASTM C150 - Standard Specification for Portland Cement.
8. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
13. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
14. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
16. ASTM C685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
17. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
18. ASTM C989 - Standard Specification for Slag Cement for Use in Concrete and Mortars.
19. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
20. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
21. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
22. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete.
23. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
24. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
25. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
26. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
27. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
28. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
29. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
30. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
31. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

32. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
33. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

C. California Department of Public Health:

1. Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1 (2010)

D. Caltrans Standard Specifications

1. Section 51 – Concrete Structures
2. Section 90 – Concrete

E. Bay Area Air Quality Management District:

1. BAAQMD Rule 8-51 - Adhesive and Sealant Applications.

#### 1.4 COORDINATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

#### 1.5 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data: Submit data on mix design, joint devices, attachment accessories, and admixtures.
- C. Design Data:
1. Submit concrete mix design for each concrete strength.
  2. Submit separate mix designs if admixtures are required for following:
    - a. Hot and cold weather concrete Work.
    - b. Air entrained concrete Work.
  3. Identify mix ingredients and proportions, including admixtures.
  4. Identify chloride content of admixtures and whether or not chlorides were added during manufacture.
- D. Delivery Tickets: Provide delivery tickets at the time of delivery of each load of concrete. Each delivery ticket shall be accompanied by batch tickets

automatically produced by the batching equipment, indicating quantities of each ingredient. Each delivery ticket shall, in addition, state the mix number, total yield in cubic yards, date and the time of day, to the nearest minute, corresponding to when the batch was loaded, when it was dispatched, when it arrived at the job, and the time that unloading began.

## 1.6 CLOSEOUT SUBMITTALS

- A. [Section 01 78 00 – Closeout Submittals](#): Requirements for submittals.

## 1.7 QUALITY ASSURANCE

- A. Comply with ACI 305R when pouring concrete during hot weather in [Section 32 13 13 - Concrete Surface Improvements](#) of the City Standard Specifications.
- B. Comply with ACI 306.1 when pouring concrete during cold weather and as specified in [Section 32 13 13 - Concrete Surface Improvements](#) of the City Standard Specifications.
- C. Acquire cement and aggregate from one source for Work.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Concrete:
  - 1. Cement:
    - a. Comply with ASTM C150, Type II - Moderate Sulfate Resistant.
    - b. Type: Portland.
  - 2. Fine and Coarse Aggregates:
    - a. Conform to the requirements of Section 90-1.02C, “Aggregates”, of the State Standard Specifications.
  - 3. Water:
    - a. Conform to Section 90-1.02D, “Water” of the State Standard Specifications.
    - b. Potable
- B. Admixtures:



1. Air Entrainment: Conform to the requirements of Section 90-1.02E(2), "Air-Entraining Admixtures" of the State Standard Specifications.
2. Chemical: Conform to the requirements of Section 90-1.02E(2), "Chemical Admixtures" of the State Standard Specifications.
3. Supplementary Cementitious Materials – Fly Ash: Conform to the requirements of Section 90-1.02B(3), "Supplementary Cementitious Materials" of the State Standard Specifications.
4. Supplementary Cementitious Materials – Slag: Conform to the requirements of Section 90-1.02B(3), "Supplementary Cementitious Materials" of the State Standard Specifications

## 2.2 CONCRETE MIX

- A. Concrete shall conform to Section 90, "Concrete" of the State Standard Specifications.
- B. Minimum 28-day compressive strength is **4,000 psi**.
- C. Concrete shall contain not less than 564 pounds of cementitious material per cubic yard, except for Cast-in-place Pipe.
- D. Ready-Mixed Concrete: Mix and deliver concrete according to ASTM C94.

## 2.7 CONSISTENCY

- A. The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. Unless otherwise specified the slump for all concrete shall be in 4 inches maximum.
- B. Retempering of concrete will not be permitted

## 2.8 MIXING AND TRANSPORTING

- A. All concrete shall be mixed in mechanically operated mixers.
- B. Ready-mix concrete shall meet the requirements as to materials, batching, mixing, transporting and placing as specified herein and in accordance with ASTM C94.
- C. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one and one-half hours after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. If the completion of delivery and discharge exceeds the above requirements, concrete shall be rejected and shall not be used for the project.

- D. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counters shall be actuated at the time of starting mixers at mixing speeds.
- E. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolution of mixing.
- F. Each batch of ready-mixed concrete delivered at the job site shall be accompanied by a delivery ticket furnished to the Project Manager.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, bolts, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

#### **3.2 PREPARATION**

- A. [Section 01 70 00 - Execution](#): Requirements for installation preparation.
- B. Previously Placed Concrete:
  - 1. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.
  - 2. Remove laitance, coatings, and unsound materials.
- C. In locations where new concrete is doweled to existing work, scan for existing rebar locations, drill the holes 1/4-inch larger than the nominal dowel diameter in existing concrete to avoid existing rebar, clean and prepare the holes in accordance with the anchoring system manufacturer's instructions and thoroughly saturate with water, have all free water removed, and be dried to a saturated surface dry condition, coat the surface of the dowel, place epoxy inside the holes and insert steel dowels as specified per Section 51-1.03E(4) of the State Standard Specification. Cure epoxy at least three (3) days or until the

dowels are completely encased in epoxy. Replace dowels that fail to bond or are damaged.

- D. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- E. Remove water from areas receiving concrete before concrete is placed.
- F. Thoroughly moisten forms, subgrade and earth surfaces with water immediately before placing concrete. An approved form release agent may be used in lieu of water for the forms. These surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud and debris at the time of placing concrete.
- G. Hardened concrete surfaces upon or against which concrete is to be placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface to a minimum 1/4-inch amplitude for good bond. Before new concrete is placed, the joint surfaces shall be cleaned of all laitance, loose or defective concrete and foreign material. Any water shall be removed from the surface of construction joints before the new concrete is placed.
- H. Interruptions in placing concrete will not be allowed without the written approval of the City. The Contractor shall submit its proposed method of joint construction to the City for review and approval. When interruption of concrete placement operations has been approved the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent work.
- I. All reinforcement, anchor bolts, sleeves, inserts and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the City before any concrete is placed. Accuracy of placement is the responsibility of the Contractor.
- J. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited underwater nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, shall be the responsibility of Contractor.
- K. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

### 3.3 PLACING

- A. Placing of concrete shall conform to the requirements of Section 51-1.03D, "Placing Concrete", of the State Standard Specification and the requirements of this Section. All concrete which does not conform to the requirements of this Section shall be removed from the work.
- B. Concrete shall not be dropped through reinforcement steel into any form deeper than three (3) feet. In such cases, hoppers and, if necessary, vertical ducts of canvas, rubber or metal shall be used for placing concrete. In no case shall the free fall of concrete exceed three (3) feet below the ends of ducts, chutes or buggies.
- C. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet and care shall be taken to avoid inclined layers. Each layer shall be placed while the previous layer is still soft. The surface of the concrete shall be level whenever a run of concrete is stopped. The temperature of concrete when it is being placed shall be in conformance with [Section 32 13 13 - Concrete Surface Improvements](#) of the City Standard Specifications.

### 3.4 PUMPING OF CONCRETE

- A. If the pumped concrete does not produce satisfactory end results as determined by the Project Manager, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

### 3.5 CONSOLIDATION

- A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted in general conformance with Section 51-1.03D, "Placing Concrete," of the Caltrans Standard Specifications.

### 3.6 FINISHING CONCRETE SURFACES

- A. Exposed surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface.
- B. No treatment is required after form removal except for curing, repair of defective concrete and treatment of surface defects.
- C. After proper and adequate vibration and tamping, all exposed un-formed surfaces of pads and slabs, shall be brought to a uniform surface with suitable tools. The finish for all unformed concrete surfaces shall be a soft broom finish.

### 3.7 CURING

- A. All exposed concrete top surfaces of pads, shall be cured in conformance with [Section 32 13 13 - Concrete Surface Improvements](#) of the City Standard Specifications.

### 3.8 PROTECTION

- A. The Contractor shall protect all concrete against injury until final acceptance by the City. Holes left by form-tying and other minor imperfections as defined herein shall be repaired in an approved manner with cement grout in conformance with [Section 03 60 00 - Grouting](#).

### 3.9 FIELD QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Requirements for inspecting and testing.
- B. Patching:
  - 1. Allow Project Manager to inspect concrete surfaces immediately upon removal of forms.
  - 2. Honeycombing or Embedded Debris in Concrete:
    - a. Not acceptable.
    - b. Notify the Project Manger upon discovery.
  - 3. Patch imperfections according to ACI 301 when directed by the Project Manager.
- C. Defective Concrete:
  - 1. Description: Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.
  - 2. Repair or replacement of defective concrete will be determined by the Project Manager.
  - 3. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of the Project Manager for each individual area.

**END OF SECTION 03 30 00**

**SECTION 03 60 00 - GROUTING****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Portland cement grout.
2. Rapid-curing epoxy grout.
3. Non-shrink cementitious grout.

## B. Related Requirements:

1. [Section 03 30 00 – Utility Cast-in-Place Concrete](#): Cast-in-place or in-situ concrete for concrete structures and other concrete components.
2. [Section 32 13 13 – Concrete Surface Improvements](#): Form materials, accessories as required to form cast in place concrete and maintain structural integrity until stripping.

## 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. [Section 01 29 00 - Payment Procedures](#): Contract Sum/Price modification procedures.

## B. Grout:

1. Basis of Measurement: Not measured.
2. Basis of Payment: Incidental to item most closely related to and includes preparation of substrate and grout, forming, mixing, placement, consolidation, troweling, curing, repairing and finishing grout.

## 1.3 REFERENCE STANDARDS

## A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete for Buildings.
2. ACI 318 - Building Code Requirements for Structural Concrete.

## B. ASTM International:

1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.

3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C191 - Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle.
5. ASTM C307 - Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
6. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
7. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
8. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
9. ASTM C1107 – Standard Specification for Packaged Dry Hydraulic-Cement Grout (Nonshrink).

C. U. S. Army Corps of Engineers Concrete Research Division (CRD):

1. CRD-C621 - Non-Shrink Grout.

#### 1.4 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data: Submit manufacturer information regarding grout.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer Instructions: Submit instructions for mixing, handling, surface preparation, and placing epoxy-type and non-shrink grouts.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. [Section 01 60 00 - Product Requirements](#): Requirements for transporting, handling, storing, and protecting products. Total storage time from date of manufacture to date of installation shall be limited to 12 months or the manufacturer's recommended storage time, whichever is less.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage. Materials which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material.

- C. Store materials according to manufacturer instructions.
- D. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

## **PART 2 - PRODUCTS**

### **2.1 PORTLAND CEMENT GROUT**

- A. Portland Cement: Comply with ASTM C150, Type II and per Section 90-1.02B(2) of the State Standard Specifications.
- B. Water:
  - 1. Potable and shall be per section 90-1.02D of the State Standard Specification.
  - 2. No impurities, suspended particles, algae, or dissolved natural salts in quantities capable of causing:
    - a. Corrosion of steel.
    - b. Volume change increasing shrinkage cracking.
    - c. Efflorescence.
    - d. Excess air entraining.
- C. Fine Aggregate:
  - 1. Washed natural sand.
  - 2. Gradation:
    - a. Comply with Section 90, "Concrete" of the State Standard Specifications.
    - b. Represented by smooth granulometric curve within required limits.
  - 3. Free from injurious amounts of organic impurities according to ASTM C40.
- D. Mix:
  - 1. Portland cement, sand, and water.
  - 2. Do not use ferrous aggregate or staining ingredients in grout mixes.

### **2.2 RAPID-CURING EPOXY GROUT**

- A. Manufacturers:



1. Sika Corporation
2. W.R. Meadows, Inc.
3. Euclid Chemical
4. Or approved equal.

B. Description:

1. High-strength, three-component epoxy grout formulated with thermosetting resins and inert fillers.
2. Rapid-curing, high adhesion, and resistant to ordinary chemicals, acids, and alkalis.
3. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable.

C. Performance and Design Criteria:

1. Minimum Compressive Strength:
  - a. 11,000 psi at seven days.
  - b. Comply with ASTM C579.
2. Minimum Tensile Strength:
  - a. 2,000 psi.
  - b. Comply with ASTM C307.
3. Coefficient of Expansion:
  - a.  $30 \times 10^{-6}$  inch per degree F.
  - b. Comply with ASTM C531.
4. Shrinkage:
  - a. None.
  - b. Comply with ASTM C827.
5. Application: Epoxy grout shall be used to embed all anchor bolts and reinforcing steel required to be set in grout, and for all other specified applications.

### 2.3 NON-SHRINK CEMENTITIOUS GROUT

A. Manufacturers:

1. Sika Corporation
2. W.R. Meadows
3. Euclid Chemical

4. Or approved equal.

B. Description:

1. Pre-mixed and ready-for-use formulation requiring only addition of water.
2. Noshrink grouts shall meet or exceed the requirements of ASTM C1107 Grades B or C and CRD-C621.
3. Non-shrink, non-corrosive, non-metallic, non-gas forming, and no chlorides.
4. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged.

C. Performance and Design Criteria:

1. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.
2. Certified to maintain initial placement volume or expand after set, and to meet following minimum properties when tested according to CRD-C621 for Type D non-shrink grout:
  - a. Setting Time:
    - 1) Initial: Approximately two hours.
    - 2) Final: Approximately three hours.
    - 3) Comply with ASTM C191.
  - b. Maximum Expansion: 0.10 to 0.40 percent.
  - c. Minimum Compressive Strength:
    - 1) One-Day: 4,000 psi.
    - 2) Seven-Day: 6,000 psi.
    - 3) 28-Day: 7,500 psi.
    - 4) Comply with CRD-C621.

## 2.4 FORMWORK

- A. As specified in [Section 32 13 13 – Concrete Surface Improvements](#).

## 2.5 CONSISTENCY

- A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is specified, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Verify areas to receive grout. Reinforcing steel shall be inspected prior to placing grout.

## 3.2 PREPARATION

- A. [Section 01 70 00 - Execution](#): Requirements for installation preparation.
- B. Remove defective concrete, laitance, dirt, oil, grease, and other foreign material from concrete surfaces by brushing, hammering, chipping, or other similar means until sound and clean concrete surface is achieved.
- C. Roughen concrete lightly, but not to interfere with placement of grout.
- D. Remove foreign materials from metal surfaces in contact with grout.
- E. Align, level, and maintain final positioning of components to be grouted.
- F. Saturate concrete surfaces with clean water, and then remove excess water.

## 3.3 INSTALLATION

- A. Formwork:
  1. Construct leakproof forms anchored and shored to withstand grout pressures.
  2. Install formwork with clearances to permit proper placement of grout.
  3. As specified in [Section 32 13 13 – Concrete Surface Improvements](#).
- B. Mixing:
  1. Portland Cement Grout:
    - a. Use proportions of two parts sand and one-part cement, measured by volume.
    - b. Prepare grout with water to obtain consistency to permit placing and packing.
    - c. Mix water and grout in two steps:
      - 1) Premix using approximately 2/3 of water.
      - 2) After partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing two to three minutes.

- d. Mix only quantities of grout capable of being placed within 30 minutes after mixing.
  2. Rapid-Curing Epoxy Grout:
    - a. Mix and prepare according to manufacturer instructions.
    - b. Minimum Compressive Strength: 10,000 psi in 72 hours and 13,000 psi in 28 days.
  3. Non-shrink Cementitious Grout:
    - a. Mix and prepare according to manufacturer instructions.
    - b. Minimum Compressive Strength: 4,500psi in 72 hours and 7,500 psi in 28 days.
  4. Mix grout components in proximity to Work area and transport mixture quickly and in manner not permitting segregation of materials.
- C. Placing of Grout:
1. Place grout material quickly and continuously to avoid cold joints.
  2. Do not place cement grout in layers.
  3. Do not add additional water to the mix (retemper) after initial stiffening.
  4. Do not use pneumatic-pressure or dry-packing methods.
  5. Apply grout from one side only to avoid entrapping air.
  6. Do not vibrate placed grout mixture or permit placement if area is being vibrated by nearby equipment.
  7. Thoroughly compact final installation and eliminate air pockets.
  8. Do not remove leveling shims for at least 48 hours after grout has been placed.
- D. Curing:
1. Prevent rapid loss of water from grout during first 48 hours by use of approved membrane curing compound or by using wet burlap method.
  2. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.
  3. After grout has attained its initial set, keep damp for minimum three days. Saturate the grout surface by use of wet burlap, ponding or other approved means.
  4. Epoxy grouts are self-curing and do not require the application of water.
- E. Upon completion of the jacking operations, all voids around the outside face of the conduit shall be filled by grouting.
- F. Grouting equipment and material shall be on the job site before jacking operations and drilling of grout holes are completed in order that grouting around

the jacked conduit may be started immediately after the jacking operations have finished.

### 3.4 FIELD QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Requirements for inspecting and testing.
- B. Inspection and Testing:
  - 1. Comply with ACI 301, ACI 318.
  - 2. Submit proposed mix design of each class of grout to the Project Manager for review prior to commencement of Work.
  - 3. Tests of grout components may be performed to ensure compliance with specified requirements.

**END OF SECTION 03 60 00**

**SECTION 09 90 00 - PAINTING AND COATING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Surface preparation and field application of paints, including pretreatment, coating application, touch-up of factory-coated surfaces, protection of surfaces not to be coated, cleanup and other coatings.
- B. Glass, stainless steel, and equipment nameplates shall not be protective coated unless shown otherwise on the Drawings.

**1.2 DEFINITIONS**

- A. Refer to ASTM D16 for definitions of terms used in this Section.
- B. The term "paint," "coatings," "linings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.

**1.3 REFERENCE STANDARDS**

- A. ASTM International:
  - 1. ASTM C309 – Standard for Liquid Membrane – Forming Compounds for Curing Concrete.
  - 2. ASTM D16 – Standard Terminology for Paint, Related Coatings, Materials, and Applications.
  - 3. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
  - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. AWWA
  - 1. AWWA C105 – Standard for Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
  - 2. AWWA C205 - Standard for Cement-Mortar Protective lining and Coating for Steel Water Pipe – 4-inch and larger – Shop applied.
  - 3. AWWA C550 - Standard for Protective Epoxy Interior coatings for Valves and Hydrants.

- C. California Department of Public Health:
  - 1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- D. Caltrans Standard Specifications
  - 1. Section 59 – Structural Steel Coatings
  - 2. Section 91 – Paint
- E. Green Seal:
  - 1. GS-03 - Anti-Corrosive Paints.
  - 2. GS-11 - Paints and Coatings.
- F. Master Painters Institute:
  - 1. MPI - Approved Products List.
  - 2. MPI - Architectural Painting Manual.
- G. NACE National Association of Corrosion Engineers
- H. NSF National Sanitation Foundation
- I. SSPC Steel Structures Painting Council

#### 1.4 SEQUENCING

- A. Do not apply finish coats until paintable sealant is applied.
- B. Back prime wood trim before installation of trim.

#### 1.5 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data:
  - 1. Submit manufacturer data on finishing products, special coatings and paint.
  - 2. Include MPI - Approved Products Lists with proposed products highlighted.
- C. Samples:
  - 1. Submit two (2) paper chip samples, 4 inches by 4 inches in size, illustrating range of colors and textures available for each surface finishing product as scheduled.
  - 2. Painted Samples:

- a. Submit two (2) painted samples, illustrating selected colors and textures for each selected color and system with specified coats cascaded.
  - D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
  - E. Manufacturer Instructions: Submit special surface preparation procedures, substrate conditions requiring special attention.
  - F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- 1.6 CLOSEOUT SUBMITTALS
- A. [Section 01 78 00 - Closeout Submittals](#): Requirements for submittals.
  - B. Operation and Maintenance Data: Submit information on cleaning, touchup, and repair of painted and coated surfaces.
- 1.7 QUALITY ASSURANCE
- A. MPI Standards:
    - 1. Comply with indicated MPI standards.
    - 2. Products: Listed in MPI - Approved Products List.
  - B. Surface Burning Characteristics:
    - 1. Fire-Retardant Finishes: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E84.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. [Section 01 60 00 - Product Requirements](#): Requirements for transporting, handling, storing, and protecting products.
  - B. Container Labeling: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
  - C. Inspection:
    - 1. Accept materials on Site in manufacturer's sealed and labeled containers.
    - 2. Inspect for damage and to verify acceptability.



- D. Store materials in ventilated area and otherwise according to manufacturer instructions.
- E. Protection:
  - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
  - 2. Provide additional protection according to manufacturer instructions.

#### 1.9 AMBIENT CONDITIONS

- A. [Section 01 50 00 - Temporary Facilities and Controls](#): Requirements for ambient condition control facilities for product storage and installation.
- B. Storage Conditions:
  - 1. Minimum Ambient Temperature: 45 degrees F.
  - 2. Maximum Ambient Temperature: 85 degrees F.
- C. Application Conditions:
  - 1. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint manufacturer.
  - 2. Do not apply exterior coatings during rain, when relative humidity is outside humidity ranges, or when moisture content of surfaces exceeds those required by paint manufacturer.
  - 3. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors and 50 degrees F for exteriors, unless otherwise indicated by manufacturer instructions.
  - 4. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interiors and exteriors, unless otherwise indicated by manufacturer instructions.
  - 5. Lighting Level: 80 fc, measured mid-height at substrate surface.

#### 1.10 WARRANTY

- A. [Section 01 70 00 - Execution](#) and [Section 01 77 00 - Closeout Requirements](#): Requirements for warranties.
- B. Furnish five (5) year manufacturer's warranty for paint and coatings.

## **PART 2 - PRODUCTS**

### **2.1 PAINTS AND COATINGS**

#### **A. Manufacturers:**

1. Kelly-Moore Paint Company, Inc.
2. Sherwin-Williams Company
3. Vista Paint
4. Dunn-Edwards Corporation
5. Rust-Oleum
6. Glidden Company
7. Behr Process Corporation
8. Or approved equal
9. Substitutions: As specified in [Section 01 60 00 - Product Requirements](#).

#### **B. Materials:**

1. Coatings:
  - a. Ready mixed, except field-catalyzed coatings.
  - b. Capable of drying or curing free of streaks or sags.
2. Patching Materials: Latex filler.
3. Fastener Head Cover Materials: Latex filler.
4. Accessories:
  - a. Grade: Commercial.
  - b. Linseed oil.
  - c. Shellac.
  - d. Turpentine.
  - e. Paint thinners.
  - f. Other materials not specifically indicated but required to achieve specified finishes.

## **PART 3 - EXECUTION**

### **3.1 SURFACE PREPARATION STANDARDS**

- A. The following referenced surface preparation specifications of the Steel Structures Painting Council's "Steel Structure Painting Manual, Volume 2, Systems and Specification" shall form a part of this specification:
  1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale, and loose paint to degree specified, by hand chipping, scraping, sanding, and wire brushing.
3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, and loose paint to degree specified by power tool chipping, descaling, sanding, wire brushing, and grinding.
4. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry or wet) using sand, grit, or shot.
5. Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.
6. Brush-Off Blast Cleaning (SSPC-SP7): Blast cleaning of all except tightly adhering residues of mill scale, rust, and coatings, exposing numerous evenly distributed flecks of underlying metal.

### 3.2 EXAMINATION

- A. Verify that surfaces and substrate conditions are ready to receive Work as recommended by product manufacturer.
- B. Evaluate blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the definitions and standard visual samples available from SSPC, using SSPC-V1S1 Standards.
- C. Examine surfaces scheduled to be finished prior to commencement of Work, and report conditions capable of affecting proper application to City's Project Manager. The Project Manager shall be sole judge as to whether the quality of blast cleaning conforms to visual comparison standards, and the Project Manager's decision as to allowability shall be final.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Moisture Content:
  1. Measure moisture content of surfaces using electronic moisture meter.
  2. Do not apply finishes unless moisture content of surfaces are below following maximums:
    - a. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
    - b. Exterior Wood: 15 percent, measured according to ASTM D4442.

### 3.3 PREPARATION

- A. [Section 01 70 00 - Execution](#): Requirements for application preparation.
- B. Prepare coatings as follows:
  - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
  - 2. For smooth flow and brushing properties.
- C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.
- E. Defects:
  - 1. Correct defects and clean surfaces capable of affecting Work of this Section.
  - 2. Remove or repair existing coatings exhibiting surface defects.
- F. Cleaning and coating shall be done such that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.
- G. Marks: Seal marks that may bleed through surface finishes with shellac.
- H. Impervious Surfaces:
  - 1. Remove mildew by scrubbing with solution of tetra-sodium or tri-sodium phosphate and bleach.
  - 2. Rinse with clean water and allow surface to dry.
- I. Aluminum Surfaces Scheduled for Paint Finish:
  - 1. Remove surface contamination by steam or high-pressure water.
  - 2. Remove oxidation with acid etch and solvent washing.
  - 3. Apply etching primer immediately following cleaning.
- J. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish:
  - 1. Remove foreign particles to permit adhesion of finishing materials.
  - 2. Apply latex-based or compatible sealer or primer.
- K. Copper Surfaces Scheduled for Paint Finish:
  - 1. Remove contamination by steam, high-pressure water, or solvent washing.

2. Apply vinyl-etch primer immediately following cleaning.
- L. Copper Surfaces Scheduled for Natural Oxidized Finish:
1. Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid.
  2. Rub on repeatedly for required effect, and, once attained, rinse surfaces with clear water and allow to dry.
- M. Galvanized Surfaces:
1. Remove surface contamination and oils, and wash with solvent.
  2. Apply coat of etching primer.
- N. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish:
1. Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter.
  2. Remove oil and grease with solution of tri-sodium phosphate, rinse well, and allow to dry.
  3. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water, and allow to dry.
- O. Uncoated Steel and Iron Surfaces:
1. Remove grease, mill scale, weld splatter, dirt, and rust.
  2. If heavy coatings of scale are evident, remove by power tool wire brushing or by sandblasting.
  3. Clean by washing with solvent.
  4. Apply treatment of phosphoric acid solution, ensuring that weld joints, bolts, and nuts are similarly cleaned.
  5. Spot-prime paint after repairs.
- P. Shop-Primed Steel Surfaces:
1. Sand and scrape to remove loose primer and rust.
  2. Feather edges to make touch-up patches inconspicuous.
  3. Clean surfaces with solvent.
- Q. Exterior Wood Scheduled to Receive Paint Finish:
1. Remove dust, grit, and foreign matter.
  2. Seal knots, pitch streaks, and sappy sections.
  3. Fill nail holes with tinted exterior paintable calking compound after prime coat has been applied.
- R. Exterior Wood Scheduled to Receive Transparent Finish:

1. Remove dust, grit, and foreign matter.
2. Seal knots, pitch streaks, and sappy sections with sealer.
3. Fill nail holes with tinted exterior calking compound after sealer has been applied.

S. Existing Work:

1. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

### 3.4 APPLICATION

- A. Comply with MPI - Architectural Painting Manual.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform appearance.
- D. Apply each coat of paint slightly darker than preceding coat, unless specified otherwise.
- E. Prime Coat DFT = 3 mils each
- F. Finish Coats (2 or more) DFT = 3 mils each
- G. Total System DFT = 6 mils, minimum.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Cleaning:
  1. Vacuum surfaces to remove loose particles.
  2. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Fillers:
  1. If clear finishes are required, tint fillers to match wood.
  2. Work fillers into grain before set, and wipe excess from surface.
- K. Concealed Surfaces:
  1. Prime concealed surfaces of interior and exterior woodwork with primer paint.
  2. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

### 3.5 FIELD QUALITY CONTROL

- A. Inspecting and Testing: Comply with MPI - Architectural Painting Manual.

### 3.6 CLEANING

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for cleaning.
- B. Collect waste material that may constitute fire hazards, place in closed metal containers, and remove daily from Site.
- C. Improper disposal for hazardous materials will not be allowed.

### 3.7 COATING SYSTEM

- A. **Alkyd Enamel:** High quality, gloss or semi-gloss, medium long oil alkyd finish shall have a minimum solids content of 49 percent by volume. Primer shall be as recommended by manufacturer.
- B. **Fusion Bonded Epoxy:** The coating material shall be 100 percent powder epoxy applied in conformance with AWWA C550, except that the surface preparation shall be as specified in the Coating System Schedule of this Section.
  - 1. **Liquid Epoxy:** For field repairs, the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a total DFT of 12 mils. The liquid epoxy shall be 100 percent solids epoxy recommended by the powder epoxy manufacturer.
  - 2. **Field Repair coatings (DFT = 12 mils),** Scotchkote 306 or 312, PCI Augsburg DURA-POX 646 or equal.
- C. **Polyethylene Encasement:** Application of polyethylene encasement shall be in conformance with AWWA C 105 using Method A.
- D. **Cement Mortar Coating:** Unless otherwise shown on the Drawings, mortar coating and reinforcement shall be in conformance with AWWA C205.
- E. **Factory Applied Coating:** The coating material shall be a liquid epoxy applied in conformance with AWWA C550.
- F. **Coal Tar Paint:** High Solids content coal tar paint for use on buried pipeline and fittings.
  - 1. **Prime Coat and finish coats (2 or more, total DFT = 24 mils),** Protecto Wrap CA-1200, Polyguard No. CA-14, Kop-Coat Bituminastic Super Service Black, or equal.

3.8 SCHEDULE

A. See below Coating System Schedule A for Ferrous Metal and not galvanized.

Item	Surface Preparation	Coating System
All surfaces, indoors and outdoors, exposed or covered, except those surfaces included below	Commercial Blast Cleaning SSPC-SP6	Alkyd Enamel
Exposed Fire Hydrant, valve lids, marker posts, backflow preventor lettering, exposed pipe, fittings and vent pipe	Solvent Cleaning SSPC-SP1	Alkyd Enamel
Buried pipe with a nominal diameter of less than 6 inches and greater than 2 inches, excluding ductile iron pipe	Solvent Cleaning SSPC-SP1	Coal Tar Paint
Fittings and flanged joints, where the piping is plastic. Buried fittings on ductile iron pipe used for FH laterals, fire service laterals, and Backflow Prevention Assemblies. Joints, and fittings on ductile iron pipe with coal tar coating.	Commercial Blast Cleaning SSPC-SP6	Coal Tar Paint
Buried pipe couplings; fittings; and flanged joints, including epoxy coated surfaces, except valves; where the piping is polyethylene encased ductile iron	As specified in Specifications for appropriate fittings	Polyethylene Encasement
Buried pipe couplings, fittings, and flanged joints, where piping is cement mortar coated and lined steel pipe, excluding epoxy coated surfaces.	Solvent Cleaning SSPC-SP1	Cement Mortar Coating



Buried cast couplings, buried sleeve-type tapping sleeves, welded tapping outlets. Ferrous surfaces of gate valves.	White Metal Blast Cleaning SSPC-SP5	Fusion Bonded Epoxy
External ferrous surfaces of check valves and ferrous internal surfaces of fire hydrants.	White Metal Blast Cleaning SSPC-SP5	Fusion Bonded Epoxy
Internal/External Ferrous Surfaces of butterfly valves	White Metal Blast Cleaning SSPC-SP5	Factory Applied Epoxy

B. See below Coating System Schedule B for Ferrous Metal and Galvanized.

<b>Item</b>	<b>Surface Preparation</b>	<b>Coating System</b>
All exposed surfaces, indoors or outdoors, including exposed galvanized pipe, except those surfaces included below.	Alkaline Cleaning per SSPC-SP1	Alkyd Enamel
Buried pipe with a nominal diameter of 2 inches and less, including valves, fittings	Alkaline Cleaning per SSPC-SP1	Coal Tar Paint

**END OF SECTION 09 90 00**

**SECTION 26 05 00****COMMON WORK RESULTS FOR ELECTRICAL****PART 1 - GENERAL**

## 1.1 DESCRIPTION

- A. Division 26, Electrical covers the work necessary for the complete electrical systems for the Genius I/O Bus Replacement Project (Project) at the Pittsburgh Water Treatment Plant including demolition, raceways, cables, installation, fiber optic cable terminations, and testing as specified herein. Furnish all materials, labor, and equipment as specified herein, in other Division 26 Specification Sections as listed below, and the Drawings for a complete, operational, tested, and commissioned electrical system.
- B. The requirements of Division 26, Electrical in their entirety apply to all electrical work and equipment furnished on this project whether furnished or specified under this or other Divisions of these Specifications.
- C. The work shall include furnishing, installing, and testing the equipment and materials detailed in the following Sections. Where differences exist between the specific equipment Specification Sections of Division 26 and this Section, the specific equipment Specifications shall govern.
  - 1. 26 05 00 Common Work Results for Electrical
  - 2. 26 05 23 Low Voltage Conductors and Cables
- D. The work shall include the following:
  - 1. Demo existing Genius Bus communication cabling and connected communication and I/O modules.
  - 2. Furnish and install complete operational systems functionally in accordance with the intent of these Contract Documents including but not limited to:
    - a. Installation of Ethernet based remote I/O cables, including both category-6 and fiber optic cables.
    - b. Testing and commissioning of the network cables and fiber optic system and components.
  - 3. Coordinate the details of equipment layouts and construction for all Specification Divisions which affect the work covered under Division 26, ELECTRICAL.
  - 4. Furnish and install all incidental items not specifically shown or specified, but which are required by good practice and standards of the industry to provide complete functional systems.
  - 5. Coordination and work associated with Division 40 – Process and Instrumentation, for installation of the plant control system including but not limited to: control networks and media converters, conduit, wire, and terminations as required.
  - 6. Document the existing raceway system for the network cables, fiber optic, and specialty cable systems. Install the network cables, fiber optic, and other specialty

cable systems furnished under Division 40 in accordance with the system manufacturers' installation instructions. Review the raceway layout, prior to installation to ensure raceway compatibility with the systems and materials being furnished.

7. Coordinate the sequence of demolition with the sequence of construction to maintain plant operation in accordance with Section 40 61 00. Remove and demolish equipment and materials in such a sequence that the existing plant will function properly with no disruption of treatment and as specified.

- E. Each bidder shall, before preparing their proposal, visit all areas of the existing buildings and structures in which work is to be performed and carefully inspect the present installation. The submission of a proposal by a bidder shall be considered evidence that the bidder has visited the facility, buildings, and structures; noted the locations and conditions under which the work will be performed; and incorporated these locations and conditions into their proposal with respect to the factors governing the work.

## 1.2 RELATED WORK

- A. Instrumentation and Controls are included in Division 40.

## 1.3 SUBMITTALS

- A. General

1. Submit manufacturers' descriptive information and shop drawings for all material, and devices furnished under Division 26 Sections as specified here and in Section 01 33 00. Submit electronic copies of submittals in Adobe format (.pdf), organized with bookmarks and annotated to indicate the specific materials and options being submitted.
2. Mark submittals to clearly identify proposed equipment including accessories, options, and features and to exclude information, products, options, or parts not applicable to the Project.
3. If the material installed during construction does not match the material that was approved by the Engineer during submittal review, the Contractor shall resubmit all documentation related to the installed equipment as specified. Should the unapproved equipment be found not to be in conformance with the Contract Documents, it shall be removed and replaced with suitable equipment at the Contractor's expense.
4. Review of submittal information by the Engineer shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless he has in writing at time of submission requested and received written approval from the Owner for specific deviations. Review of submittal information shall not relieve the Contractor from responsibility for errors and omissions in shop drawings or literature.
5. The Engineer's review of the submittal information shall only be for general conformance with the design concept and the information given in the Contract Documents. The Engineer's review does not relieve the Contractor from responsibility for errors or omissions in their submittal; Contractor's compliance with the Plans and Specifications, applicable laws, codes and regulations; or the

Contractor's responsibility of addressing any deviations from the Contract Documents.

6. Review of a specific item in a submittal shall not constitute review of an assembly of which the item is a component.
7. The Contractor is responsible for: confirming and correlating all quantities, dimensions, details, tolerances, and clearances; for all information that pertains to the fabrication processes or to the means, methods, techniques, sequences, and procedures of construction; coordination of the Work with that of all other trades and for performing the Work in a safe and satisfactory manner. All dimensions shall be field verified at the job site and coordinated with the work of all other trades performing work under this Contract.
8. Material shall not be ordered or shipped until the submittal information or shop drawings have been approved. No material shall be ordered, or shop work started if shop drawings are marked "APPROVED AS NOTED - CONFIRM," "APPROVED AS NOTED - RESUBMIT" or "NOT APPROVED."

B. Operation and Maintenance Data

1. Submit operations and maintenance data for equipment furnished under this Division. Provide six bound copies of O&M manuals and as-built drawings. The manuals shall be prepared specifically for this Project. Include catalog data sheets, layout drawings, and bills of materials or parts lists with replacement part numbers.
2. The manual provided under this Section shall consist of the individual O&M information provided under the other technical sections of Division 26. Coordinate and organize this information into a single, comprehensive, electrical system O&M manual subject to the specified requirements.
3. Manuals shall include the following as a minimum:
  - a. Detailed service, maintenance and operation instructions for each item supplied.
  - b. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.
  - c. Complete parts list with stock numbers, including spare parts.

1.4 STANDARDS, CODES, PERMITS, AND REGULATIONS

- A. Electrical equipment, materials and installation shall comply with NFPA 70<sup>®</sup>, the National Electrical Code<sup>®</sup> (NEC<sup>®</sup>), 2020 edition, and the 2016 California Electrical Code (CEC). All references to the NEC included in the Contract Documents shall be interpreted to be referenced to this edition with the California Amendments as specified.
- B. Perform work; furnish, install, and test materials and equipment in full accordance with applicable rules, regulations, requirements, and specifications of the following. Where reference is made to one of the standards, the revision in effect at the time of bid opening shall apply.

1. Local Laws and Ordinances
2. State and Federal Laws
3. State Building Codes
4. State Fire Marshal
5. Cal/OSHA – the California Division of Occupational Safety and Health (DOSH)
6. Institute of Electrical and Electronics Engineers (IEEE)
  - a. IEEE C2 - National Electrical Safety Code (NESEC)
7. National Electrical Contractors Association (NECA)
  - a. National Electrical Installation Standards (NEIS)
8. National Electrical Manufacturers Association (NEMA)
  - a. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

C. Where conflicts may occur between the above items, the more stringent applicable requirements shall apply. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with applicable codes and standards.

D. Underwriters Laboratories Inc. (UL) listing is required for all equipment and materials where such listing is offered by the Underwriters Laboratories Inc. Safety labeling and listing by other organizations such as Intertek's ETL Listed Mark, FM Approvals certification, or other nationally recognized entity may be substituted for UL labeling and listing if approved by the Engineer. Provide UL service entrance labels for all equipment required by the NEC to have such labels.

E. Equipment, materials, and installation shall comply with the requirements of the local Authority Having Jurisdiction (AHJ). Obtain all permits and pay all fees required by any governmental agency or utility having jurisdiction over the work. Coordinate and arrange all inspections required by these agencies. On completion of the work, submit satisfactory evidence to the Engineer that the work is acceptable to the regulatory authorities having jurisdiction.

#### 1.5 INTERPRETATION OF CONTRACT DOCUMENTS

A. The Contract Drawings indicate the extent, general location, and arrangement of equipment. Duct bank and conduit runs are diagrammatic and may not show the exact locations for installation. Verify locations of conduit stub-ups based upon conduit entry space of equipment furnished from the manufacturer's certified shop drawings, by inspection of the actual equipment to be installed, and coordinated with other trades. Stub up conduits as near as possible to equipment terminal enclosures.

B. Except where dimensions are shown, the locations of equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the Contractor and approved by the Engineer. Obtain information relevant to the placing of electrical work including final equipment dimensions and installation criteria. In case of any interference with other work, proceed as directed

by the Engineer and furnish all labor and materials necessary to complete the work in an approved manner.

- C. Standard details are typical for all locations to which they apply regardless of whether a specific reference callout is shown on the Drawings.

#### 1.6 PROJECT/SITE REQUIREMENTS

- A. Elevation: Equipment shall be designed to operate at a ground elevation of approximately 300 feet above mean sea level.

- B. Temperature:

- 1. Equipment located in exterior locations shall be suitable for operation at temperatures from  $-10^{\circ}$  to  $+40^{\circ}\text{C}$  ambient.
- 2. Equipment located in internal areas shall be suitable for operation:
  - a. In conditioned spaces from  $+10^{\circ}$  to  $+35^{\circ}\text{C}$  ambient.
  - b. In unconditioned spaces from  $-10^{\circ}$  to  $+40^{\circ}\text{C}$  ambient
- 3. Where applicable, equipment shall be rated for extended storage temperatures ranges from  $-10^{\circ}$  to  $40^{\circ}\text{C}$  ambient.

- C. Relative Humidity: Equipment located in air-conditioned spaces shall be suitable for 5 to 75 percent relative, non-condensing humidity. All other equipment shall be suitable for 0 to 100 percent relative, condensing humidity.

- D. Provide equipment and devices suitable for continuous operation at the temperatures and elevations at the site and at the facility installation locations shown on the Drawings.

- 1. Provide equipment capable of continuous operation at the required rated output shown on the Contract Documents at the specified site conditions.
- 2. Provide any additional equipment such as passive thermal cooling, insulation, sunshades, heating, cooling equipment, or other means so that the rated performance requirements can be met. Such equipment shall be provided at no additional cost to the Owner.
- 3. Provide suitability derated equipment if required based on the site conditions. Derated equipment shall be provided with revised manufacturer's nameplates stating the equipment rating for continuous duty and the environmental conditions upon which the continuous rating applies. Deration of equipment shall only be allowed if the derated equipment rating conforms to the required equipment ratings as shown on the Contract Documents.
- 4. Provide supplementary equipment deration, if required, for both ambient temperature extremes and elevation as required by the manufacturer.

#### 1.7 ENCLOSURE TYPES

- A. Unless otherwise indicated in the Contract Documents, electrical enclosures, conduit systems, and electrical installations shall conform to the following ratings:

1. NEMA 1: indoor, above grade locations subject to clean, dry, and non-process conditions including but not limited to:
  - a. Administration areas
  - b. Office areas
  - c. Dedicated conditioned electrical rooms
  - d. Laboratories
  - e. Control rooms
2. NEMA 12: indoor, above grade locations subject to non-corrosive, dry or damp process areas, or dusty conditions including but not limited to:
  - a. Dedicated non-conditioned electrical rooms
  - b. HVAC equipment rooms
  - c. Process mechanical equipment rooms
  - d. Maintenance shops
3. Type 3R: indoor or outdoor locations used to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects and water, and that will be undamaged by the external formation of ice on the enclosure.
4. NEMA 4: outdoor locations, below grade structures, and indoor locations subject to non-corrosive, wet, or dirty conditions including but not limited to:
  - a. Outdoor facilities
  - b. Basements
  - c. Buried vaults
  - d. Below grade process facilities
  - e. Hose down areas
  - f. Non-corrosive process treatment basins, tanks, or vessels.
5. NEMA 4X: locations subject to corrosive or marine conditions including but not limited to:
  - a. Chemical feed or storage areas
  - b. Wastewater treatment areas
  - c. Wastewater or other corrosive process treatment areas (basins, tanks, or vessels)

1.8 MAINTENANCE

A. Spare Parts

1. All spare parts shall be individually packaged and labeled with the part designation and the associated end use equipment tag designation as shown on the Contract Documents.
2. The spares listed above shall be packed in a manner suitable for long-term storage and shall be adequately protected against corrosion, humidity, and temperature.

1.9 RECORD DRAWINGS

- A. As the work progresses, clearly and legibly record all field changes on a set of project contract drawings, hereinafter called the "record drawings set".
- B. The record drawing set shall be kept at the job site and readily available for review by the Owner or the Engineer.
- C. Record drawings shall be updated daily by the Contractor to provide an accurate record of the current condition of the work.
- D. The record drawing set shall accurately show the installed condition of the completed project. The record drawing set shall accurately document the final locations and conditions of the following items:
  1. Raceways and pull boxes.
  2. Conductor sizes and conduit fills.
  3. Underground electrical system raceway and duct bank routing shown on the plan drawings. Routing shall include final installation depths below finished grade. Final locations of handholes and manholes shall be documented using the project coordinate system.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer.
- B. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturers' latest standard design that conforms to these Specifications.

2.2 FASTENERS

- A. Fasteners and anchors for securing equipment to walls and floors shall be either hot dip galvanized after fabrication or stainless steel unless noted otherwise.



**PART 3 - EXECUTION****3.1 GENERAL**

- A. Install materials in a workmanlike manner utilizing craftsmen skilled in the particular trade and conforming to standards of the industry. Provide work which has a neat and finished appearance. Carry out work in accordance with NECA Standard of Installation unless otherwise shown in the Contract Documents.
- B. Coordinate electrical work with the Engineer and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.
- C. Follow manufacturers' installation instructions explicitly, unless otherwise indicated on the Contract Documents. Wherever any conflict arises between the manufacturers' instructions, codes and regulations, and these Contract Documents, follow Engineer's direction. Always keep a copy of manufacturers' installation instructions on the jobsite available for review.

**3.2 PROTECTION DURING CONSTRUCTION**

- A. Throughout this Contract, provide protection for materials against loss or damage. Throughout this Contract, follow manufacturers' recommendations for storage. Protect all equipment from the effects of weather.
- B. Prior to installation, store items in clean, dry, indoor or other locations suitably protected from the elements. Energize all integral equipment space heaters with temporary power as required. Provide temporary heating devices, sufficient to prevent condensation, for all other electrical equipment that does not have space heaters.
- C. Following installation, protect materials from corrosion, physical damage, and the effects of moisture on insulation. When equipment intended for indoor installation is installed at the Contractor's convenience in areas where it is subject to dampness, moisture, dirt, or other adverse atmosphere until completion of construction, ensure that adequate protection from these atmospheres is provided. Such protection methods shall be approved by the Engineer.
- D. Cap all conduit runs during construction with manufactured seals until installation of conductors is required. Keep openings in boxes or equipment closed during construction.

**3.3 INSPECTION**

- A. Allow materials and workmanship to be inspected at any time by the Engineer and District or their representatives. Correct work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a manner satisfactory to the Engineer.
- B. Before request for final inspection is made, the Contractor shall submit to the Construction Manager, in writing, a certificate stating that the Contractor has made his own thorough inspection of the entire project and that the installation is completed and in conformance with the applicable codes, and the contract plans and specifications.

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**END OF SECTION**

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**SECTION 26 05 23**

**LOW VOLTAGE CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Work Included: This section covers furnishing and installing low voltage cable systems as specified herein, complete, and in operating condition.
- B. Conduit Schedules indicating conductor number are shown on the Appendices herein. The Schedules are prepared as a guide to the Contractor and additional circuits from home runs, specialty manufactured cables, and supplier specific wiring may require additional conductors not specifically included in the schedule. Such omissions in the Schedules shall not relieve the Contractor of the responsibility of furnishing and installing the necessary cables and raceways as required by the remainder of the Contract Documents for a fully functioning and operational system.

1.2 RELATED SECTIONS:

- A. Section 26 05 00 – Common Work Results for Electrical.
- B. Appendix A – Conduit Schedule.
- C. Appendix B – Cable Schedule.

1.3 SUBMITTALS

- A. Submittals shall be made in accordance with Section 26 05 00.
- B. Submit catalog data indicating manufacturer, insulation designation, and ratings in sufficient detail to determine conformance with these specifications:
  - 1. Power, control, and instrumentation wire.
  - 2. Termination and splicing materials.
  - 3. Pulling lubrication compound.
  - 4. Circuit identification system.

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. B-3 - Standard Specification for Soft or Annealed Copper Wire.
  - 2. B-8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
  - 3. B-33 – Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes.
- B. International Cable Engineers Association (ICEA).

1. S-95-658 – Non-Shielded Power Cable Rated 2000V or less
2. S-61-402 – Thermoplastic Insulated Wire and Cable for Transmission and Distribution

C. National Fire Protection Association (NFPA):

1. NFPA 70 – National Electrical Code (NEC).

D. National Electrical Manufacturers Association (NEMA):

1. NEMA WC 3, Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
2. NEMA WC 5, Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
3. NEMA WC 7, Cross-Linked- Thermosetting- Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

E. Telecommunications Industry Association (TIA)

1. EIA-568-B.2-1 – Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components

F. Underwriters Laboratory (UL):

1. Standard 44 – Thermoset Insulated Wires and Cables.
2. Standard 83 – Thermoplastic Insulated Wires and Cables.
3. Standard 444 – Communications Cables
4. Standard 510 – Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.
5. Standard 1277 – Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members
6. Standard 1569 – Standard for Metal-Clad Cables
7. Standard 1581 – Reference Standard for Electrical Wires, Cables and Flexible Cords.
8. Standard 1666 – Standard for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts
9. Standard 1685 – Standard for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables

## 1.5 CONDUCTOR COLOR CODING

- A. Color coding of multiconductor control and instrumentation cable is specified in the individual cable type specification.

1.6 DELIVERY, STORAGE AND HANDLING

- A. The Contractor shall inspect the reels as they are unloaded from the delivery truck, any visible damage shall be reported by the Contractor and the reel returned to the factory.
- B. The Contractor shall provide a crane, special lift truck or forklift suitably rated to unload the cable reels.
- C. Cables shall be packaged on spools or reels. Each package shall contain only one continuous length of cable. The packaging shall be constructed so as to prevent damage to the cable during shipping and handling.

**PART 2 - PRODUCTS**

2.1 CONDUCTORS

A. General

- 1. All wire and cable conductors shall be annealed soft drawn copper with 98% conductivity. Aluminum conductors are not acceptable and shall not be used.
- 2. Provide Class B stranded conductors in all cases except that wiring for lighting and receptacle circuits may be solid.
- 3. Conductors shall be in accordance with applicable NEMA standard WC 70. All conductors shall be UL Listed.
- 4. All conductors installed in tray shall be tray rated (Type TC) and run without splices in and out of the cable trays.
- 5. All conductors shall have ampacity ratings at 90° C in dry locations and 75° C in wet location minimum in accordance with the NEC unless noted otherwise.
- 6. Conductor sizes shown on the schedules shall be the minimum size provided regardless of the type of conductor used.
- 7. Wire smaller than No. 12 AWG shall not be used for power feeders. Wire smaller than No. 12 AWG shall only be used for control, signal and instrumentation circuits,

B. Single Conductor Control, Status, and Alarm Wire

- 1. Single conductor wiring shall be 600V, No.14 AWG NEC type XHHW/XHHW-2 and type MTW inside control panels as manufactured by the Okonite Co.; Carol Cable Co. Inc; Pirelli Cable Corp. or equal.

C. Multi Conductor Power, Control, and Instrumentation Cable 600 Volts and Less:

- 1. General: Provide cable that is UL listed and conforms to the requirements of the NEC Type TC, or UL listed Power Limited Circuit Cable that conforms to the requirements of Article 725 of the National Electrical Code where applicable. Provide cables permanently and legibly marked with the manufacturer's name, the maximum voltage rating for which the cable was tested, the type of cable, and labeled UL (or submit evidence of UL listing).

D. Category 6 Shielded Twisted Pairs:

1. General: industrial grade Category 6A Shielded (Braid) with Foiled Twisted Pairs (S/FTP) Profinet Type A suitable for use in Profinet applications in harsh environments as industrial Ethernet cable, 600 MHz Enhanced Category 6, Gigabit Ethernet, 100BaseTX, RJ-45 compatible, suitable for installation in conduit and other approved raceways.
  2. Conductors: 4 pairs of conductors, 8 conductors total, 22 AWG solid bare copper conductors.
  3. Insulation and Jacket: polyethylene insulation, individual conductor twisted pairs colored white and green, white and orange, white and blue, and white and brown, braided outer shield 80% coverage, 100% inner shielding coverage, industrial grade oil resistant PVC jacket, 0.34 inch overall nominal diameter, -40 degrees C to +80 degrees C operating temperature.
  4. Applicable Standards: TIA 568-C.2 Category 6A, IEC 60332-1-2 Flammability, ISO/IEC 11801-1 Compliance.
  5. Acceptable Manufacturers:
    - a. Belden 74010E
    - b. Approved equal
- E. Industrial Ethernet Passive Components:
1. Provide connectors, sockets, and couplings suitable for use in industrial Ethernet applications for 10 Gigabit Ethernet data transmission.
  2. Use shielded connectors when mating to shielded cabling.
  3. Components shall be rated for IP20 class of protection in accordance with IEC 529.
  4. Equipment shall be designed to withstand harsh industrial environments including high temperatures and damp locations. Housings shall be resistant to dirt and liquids.
  5. Applicable Standards: TIA 568-C.2, Category 6A - ISO/IEC 11801, UL 2043, UL94V-0.
  6. Acceptable Manufacturers:
    - a. Belden REVConnect STP
    - b. Approved equal

F. Cable EMC Shield Clamps:

1. Provide EMC shielding cable clamps to secure and connect shielded copper communication cable's outer braided shield to common panel ground suitable for use in industrial Ethernet applications for 10 Gigabit Ethernet data transmission.
2. Shall be suitable for Profinet installation.
3. Shall include integrated strain relief for both sides of the cable connection point to secure the cable jacket using cable ties.
4. Equipment shall be designed to withstand harsh industrial environments including high temperatures and damp locations. Shall be resistant shock and vibration.
5. Applicable Standards: EN/IEC 62444
6. Acceptable Manufacturers:
  - a. Icotek
  - b. Approved equal

G. Electrical Tape for Color Coding:

1. Electrical tape shall be premium grade, not less than 7 mils thick, rated for 90 degree C minimum, flame-retardant, weather resistant, and available in suitable colors for color coding. The tape shall be resistant to abrasion, ultraviolet rays, moisture, alkalies, solvents, acids, and suitable for indoor and weather-protected outdoor use. The tape shall be suitable for use with PVC and polyethylene jacketed cables, and meet or exceed the requirements of UL 510.
2. Acceptable Manufactures:
  - a. 3M 35 Scotch Vinyl Electrical Tape for Color Coding
  - b. Plymouth Rubber Company Premium 37 Color Coding Tape
  - c. Approved equal

H. Wire and Cable Markers

1. Wire and cable markers shall be pre-printed, clip sleeve type as manufactured by the W.H. Brady Co.; Thomas & Betts Co.; 3M Co. or approved equal.
2. Wire and cables with diameters exceeding the capacity of the clip sleeve type shall be marked with pre-printed, self-adhesive vinyl tapes as manufactured by the W.H. Brady Co.; Panduit Corp. or approved equal.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Use lubrications to facilitate wire pulling. Lubricants shall be UL approved for use with the insulation specified.



- B. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii. Pulling of cable shall be performed in such a manner that the cable outer jacket does not scrape against the edge of the conduit, at both the inlet and outlet ends of the conduit. Cable shall be free of sandy or gritty material during pulling. If cable is laid on ground during pulling, cable shall be wiped free of sandy or gritty material prior to entry of cable into conduit and prior to application of any pulling compound.
- C. Tighten all screws and terminal bolts using torque type wrenches and/or drivers to tighten to the inch pound requirements of the NEC and UL.
- D. Where single conductors and cables enter manholes, handholes, vaults, and other indicated locations bundle the conductors from each conduit throughout their exposed length with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 18 inches on centers.
- E. Terminate no more than two control conductors per terminal point. Terminate all spare conductors on terminal blocks.
- F. Uniquely identify all wires, cables and each conductor of multi-conductor cables (except lighting and receptacle wiring) at each end with approved wire and cable marker systems as specified herein.
  - 1. For communication cables, use a marker system to provide a unique cable number and originating panel abbreviation on each end of each cable. Use the same number at both ends of the same cable for cable identification. Example cable marking: "MCP-001" (at the FCC1/3 end) and "FCC1/3-001" (at the MCP end).

### 3.2 CONDUCTOR 600 VOLTS AND BELOW

- A. Provide conductor sizes indicated herein with no splices except as approved in writing by the Engineer.
- B. Arrange wiring inside control panels neatly cut to proper length, remove surplus wire, and bridle and secure in an acceptable manner. Identify all circuits entering control panels, etc., in accordance with the cable schedules herein. Terminate cable conductors on the same side of the terminal blocks as shown on the drawings.
- C. Terminate control and instrumentation wiring with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions. Where terminals provided will accept such lugs, terminate all control and instrumentation wiring (except solid thermocouple leads) with insulated, locking fork compression lugs. Contractor shall adjust wireway sizes to meet NEC percentage fill requirements.
- D. For terminals designed to accept only bare wire compression terminations use only stranded wire and terminate only one wire per terminal. Tighten all terminal screws with torque screwdriver to recommended torque values.
- E. Attach compression lugs with a tool specifically designed for that purpose which provides a complete, controlled crimp where the tool will not release until the crimp is complete. Use of plier type crimpers is not acceptable.
- F. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer all edges, and install bushings and protective strips of insulating material to protect the conductors.

- G. For conductors that will have final terminations by Others, provide at least six feet spare conductor in freestanding panels and at least two feet spare in other assemblies. Provide sufficient spare conductor length in any particular assembly as required to reach the termination point plus an additional two feet of slack conductor.
  - H. Cables passing through manholes and handholes shall be trained along the walls on cable racks. Allow two feet of slack in each run in a "drip loop" at least once along a wall. Loops and cables shall be organized, trained, bundled, and neatly installed.
  - I. Do not strip cables more than eight inches from the nearest termination point of that cable.
  - J. Cap spare conductors and conductors not terminated with UL listed end caps.
  - K. All spare pairs shall be bundled and labeled with the cable designation. All individual pairs shall be tagged to enable identification of spare pairs when making future terminations.
  - L. Splices will not be permitted except as accepted in writing by the Engineer.
  - M. Ends of cable shall not be exposed to the ambient environment more than 24 hours after pulling or splicing. After 24 hours the cable shall be purged with nitrogen or sealed with tape.
- 3.3 INSTRUMENTATION CABLES 600 VOLTS AND LESS
- A. All circuits shall be installed as twisted pairs or triads. In no case shall a circuit be made up using conductors from different pairs or triads. Triads shall be used wherever three wire circuits are required.
  - B. Shields shall be grounded as recommended by the instrument manufacturer and isolated at all other locations. Terminal blocks shall be provided for inter-connecting shield drain wires at all junction boxes. Where individual circuit shielding is required, each shield circuit shall be provided with its own block.
- 3.4 LACING OF WIRES AND CABLES
- A. All wires and cables shall be laced in pull or junction boxes, manholes, handholes, wireways, and at each termination. Wires and cables shall be laced so that the wires of the individual circuits are laced together by circuit and the laced together circuit or cable shall be tagged with the cable number. All wiring entering and exiting the control panels or pull structure shall be bundled into groups. Power, lighting, control, alarm, and instrumentation wiring shall be bundled and laced as specified herein.
- 3.5 FIELD QUALITY CONTROL
- A. Coordinate system loop checking including point to point cable continuity checking and verification in conformance with the requirements of Section 40 61 00.
  - B. All network and special systems cabling shall be tested as required by the system manufacturer requirements. Testing shall be performed as specified in the individual Division 40 or Division 26 sections to verify satisfactory signal transmission and reception in conformance with manufacturer's published requirements.

3.6 SPARES

- A. Identify spare cables with source location and other identifiers as shown on the Drawings. Provide a minimum of 5-feet of extra conductors for each spare circuit. Wrap excess conductor lengths, provide with plastic tie-wrap, and coil up in last pullbox location of the run.

**END OF SECTION**

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**APPENDIX 26 05 23-A**

**CONDUIT SCHEDULE**

CONDUIT SCHEDULE							
NO. (NOTE 1)	CONDUIT SIZE (IN) (NOTE 2)	TYPE	LENGTH (FEET) (NOTE 3)	CABLE NUMBER	FROM	TO	REMARKS
K0001-D	-			D0001	MCP	RWPSCP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0002-D	-			D0002	MCP	RCP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0003-D	-			D0003	HLPS1CP	STCP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0004-D	-			D0004	MCP	CBCP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0005-D	-			D0005	MCP	CDTCP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0006-D	-			D0006	MCP	CECP	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0007-D	-			D0007	MCP	FCC 1/3	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0008-D	-			D0008	FCC 1/3	FCC 2/4	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0009-D	-			D0009	FCC 2/4	FCC 5/7	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW
K0010-D	-			D0010	FCC 5/7	FCC 6/8	EXISTING CONDUIT - CONFIRM ROUTING, REMOVE OLD CABLE AND INSTALL NEW

1. EXISTING LABELS MAY NOT MATCH THOSE LISTED HERE. INSTALLED LABEL DESIGNATIONS SHALL BE COMPLETED BY THE CONTRACTOR AS PART OF THE AS-BUILT INFORMATION PROVIDED FOR THE PROJECT.
2. EXISTING CONDUITS OF VARIOUS SIZES.
3. VERIFY LENGTH OF EXISTING CONDUITS TO DETERMINE APPROPRIATE CABLE LENGTHS.

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**APPENDIX 26 05 23-B**

**CABLE SCHEDULE**

CABLE SCHEDULE							
NO.	LENGTH (NOTE 12)	TYPE (NOTE 2)	NUMBER OF CONDUCTORS	FROM	TO	CONDUIT ROUTING	REMARKS
D0001		FIBER OPTIC CABLE	12 - FIBER MULTIMODE	MCP	RWPSCP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0002		FIBER OPTIC CABLE	12 - FIBER MULTIMODE	MCP	RCP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0003		ETHERNET CABLE	CATEGORY 6 UTP	HLPS1CP	STCP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0004		ETHERNET CABLE	CATEGORY 6 UTP	MCP	CBCP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0005		ETHERNET CABLE	CATEGORY 6 UTP	MCP	CDTCP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0006		ETHERNET CABLE	CATEGORY 6 UTP	MCP	CECP	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0007		ETHERNET CABLE	CATEGORY 6 UTP	MCP	FCC 1/3	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0008		ETHERNET CABLE	CATEGORY 6 UTP	FCC 1/3	FCC 2/4	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0009		ETHERNET CABLE	CATEGORY 6 UTP	FCC 2/4	FCC 5/7	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)
D0010		ETHERNET CABLE	CATEGORY 6 UTP	FCC 5/7	FCC 6/8	EXISTING	REPLACES EXISTING GENIUS BUS CABLE IN EXISTING CONDUIT(S)

1. INTERCONNECTING WIRING/CABLING WITHIN THE ELECTRICAL EQUIPMENT LINEUP (MSB, MCC, PLC CP, UPS/TELEMETRY CP) IS NOT INCLUDED IN CABLE SCHEDULE.
2. CONDUCTOR AND CABLE SPECIFICATION ARE DETAILED IN SECTIONS 16120 / 16122.
3. INSTALL ALL CONDUCTORS, CABLES AND CONDUITS AS INDICATED IN THE CONDUIT AND CABLE SCHEDULE, UNLESS NOTED OTHERWISE.
4. ALL CONDUITS, CONDUCTORS AND CABLES INSTALLED BY THE CONTRACTOR SHALL BE LABELED, AS IDENTIFIED, AT ALL POINTS OF TERMINATION.
5. INSTALL CONDUIT FREE FROM DENTS AND BURRS. PLUG ENDS TO PREVENT ENTRY OF DIRT OR MOISTURE DURING CONSTRUCTION. ROUTE CONDUIT TO AVOID STRUCTURAL OBSTRUCTIONS AND TO MINIMIZE CROSSOVERS.
6. ATTACH AND SUPPORT ABOVE GRADE CONDUITS ON SUPPORT STANDS WITH UNISTRUT & CONDUIT CLAMPS, UNLESS NOTED OTHERWISE.
7. TREAT ALL THREADED CONDUIT ENDS PRIOR TO ASSEMBLY WITH CORROSION INHIBITING COATINGS. APPLICATION SHALL FOLLOW MANUFACTURERS RECOMMENDATIONS.
8. UTILIZE WIRE ENDS, OR COMPRESSION LUGS TO TERMINATE CONDUCTORS. WIRE ENDS AND COMPRESSION LUGS SHALL BE FITTED UTILIZING A CONTROLLED CYCLE CRIMPING TOOL
9. ALL CONDUCTORS SHALL BE INSTALLED WITHOUT SPLICES. CONDUCTORS OF INSUFFICIENT LENGTH SHALL BE REMOVED AND REPLACED.
10. ONLY MAIN CONDUCTORS FOR LIGHTING AND RECEPTACLE CIRCUITS ARE SHOWN ON THE CABLE SCHEDULE. THE CONTRACTOR SHALL FURNISH AND INSTALL CONDUCTORS FOR LIGHTING AND RECEPTACLES AS SHOWN ON THE PLAN DRAWINGS.
11. THE CABLE LENGTHS SHALL BE COMPLETED BY THE CONTRACTOR AS PART OF THE AS-BUILT INFORMATION PROVIDED FOR THE PROJECT.

## **SECTION 31 05 13 – CLEARING & GRUBBING, EXCAVATION, AND EARTHWORK**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

**A. Section Includes:**

1. Clearing and Grubbing
2. Excavation
3. Earthwork
4. Grading and Compaction
5. Subsoil materials – Import Fill and Select Fill
6. Topsoil materials.

**B. Related Sections:**

1. [Section 01 74 00 – Construction Waste Management and Disposal](#)
2. [Section 31 23 16 – Utility Trenching.](#)
3. [Section 32 90 00 – Landscape Work.](#)
4. Project Geotechnical report; bore hole locations and findings of subsurface materials if applicable.

#### **1.2 UNIT PRICES - MEASUREMENT AND PAYMENT**

**A. Clearing and Grubbing:**

1. Basis of Measurement: Clearing and grubbing will be measured on a lump sum basis, unless specified otherwise.
2. Basis of Payment: Clearing and grubbing shall be paid for at the contract lump sum price, which includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in clearing and grubbing as shown on the plans, as specified and as directed by the Project Manager, including the removal and disposal of all the resulting material.
  - a. When the Contract does not include a pay item for Clearing and Grubbing and removal work, as specified above, and unless noted otherwise in the Special Provisions, full compensation for any necessary Clearing and Grubbing and removal work shall be considered as included in the unit price paid for the type of earthwork involved, and no additional compensation will be allowed therefor.

**B. Subsoil – Select Fill**

1. Basis of Measurement: By cubic yard of the compacted soil.



2. Basis of Payment: Includes excavating existing subsoil, verifying if existing subsoil meets the select fill requirements, supplying select fill, materials, stockpiling, maintaining, moving, placing and compacting of select fills.

C. Subsoil – Import Fill

1. Basis of Measurement: By cubic yard of the compacted soil.
2. Basis of Payment: Includes excavating, importing, supplying import fill subsoil materials, stockpiling, surveying stockpile location, maintaining, moving, placing and compacting of import fill.

D. Subsoil – Export Fill

1. Basis of Measurement: By cubic yard of the compacted soil.
2. Basis of Payment: Includes excavating, stockpiling, covering, maintaining, moving, exporting cut subsoil materials, compacting of cut soil at the export location, and all other work described in this section, and as shown on the Drawings.

### 1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. City of Pittsburg - Environmental Services Department

1. Refuse, Recycling & Organics Enclosure Design and Waste Management Standards.

C. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>).
3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. California Building Code – Appendix J - Grading

E. State Standard Specifications:

1. Section 14 – Environmental Stewardship
2. Section 17 - General

3. Section 19 – Earthwork

1.4 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Samples: Submit results of the soil samples by a certified testing laboratory prior to importing onto the site for approval by the Project Manager.
- C. Materials Source: Submit name of imported materials source.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Furnish each subsoil material from single source throughout the Work.

**PART 2 - PRODUCTS**

2.1 SUSTAINABILITY CHARACTERISTICS

- A. Materials and Resources Characteristics:
  - 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 250 miles of jobsite.

2.2 SUBSOIL MATERIALS

- A. Select Fill Material:
  - 1. Subsoil material is on-site excavated material meeting the requirements of the appurtenant Geotechnical Report.
  - 2. Graded
  - 3. Non-hazardous
  - 4. Free of lumps larger than three (3) inches, rocks larger than two (2) inches, organic matter, frozen or other deleterious materials and debris.
  - 5. Selected material encountered in excavation within the right of way shall be used for finishing the top portion of the roadbed, constructing shoulders, structure backfill; as shown on the Drawings; as specified in the Special Provisions, or as directed by the Project Manager.

- B. Import Fill Material:

1. Subsoil material imported from sources outside the project site meeting the requirements of the appurtenant Geotechnical Report.
2. Graded
3. Non-hazardous
4. Free of lumps larger than three (3) inches, rocks larger than two (2) inches, organic matter, frozen or other deleterious materials and debris.
5. Unless otherwise specified, the Contractor shall obtain from the owners the right to procure material, pay all royalties and other charges involved, and bear all expense of developing the sources, including rights of way for hauling.
6. No import fill material shall be delivered to the site until approved by the Project Manager. Approval of import fill material shall be based on the testing of representative samples submitted by the contractor meeting the appurtenant Geotechnical Report and approved by the Project Manager. Such representative samples shall be submitted to the Project Manager not less than 15 days prior to commencing the work.
7. Imported fill, delivered to the site, that significantly differs from the submitted samples shall be subject to rejection. Rejected materials shall be removed from the site at the Contractor's expense
8. Approval of a particular import fill material shall constitute approval of only that portion of the proposed borrow source represented by the submitted sample.
10. Except as otherwise permitted, borrow pits and other excavation areas shall be excavated in such manner as will afford adequate drainage. Overburden and other spoil material shall be transported to designated spoil areas or otherwise disposed of as directed, local borrow pits shall be neatly trimmed and left in such shape as will facilitate accurate measurement after the excavation is completed.

### 2.3 FILL MATERIALS:

The following import fill parameters may be used for small City sidewalk and pavement rehabilitation projects; or for site improvements less than 5,000 square feet excluding any buildings or structures and do not have a geotechnical report included:

- A. Fill material shall conform to the following as determined by ASTM C 117 and ASTM C 136:
  1. Maximum particle size 3 inches
  2. Percent passing 1-inch sieve 90-100 percent
  3. Percent passing No. 200 sieve less than 20 percent
- B. Imported non-expansive fill shall consist of a well-graded, slightly cohesive soil with relatively impervious characteristics when compacted.

- C. Plasticity Index for acceptable import fill materials shall be a maximum of 15 when determined by the procedure set forth in ASTM D 4318.
- D. The liquid limit shall not exceed 40 percent as determined by the procedures set forth in ASTM D 4318.
- E. Import fill material shall have an R-value of 25 or greater as determined by ASTM D 2844.

## 2.4 TOPSOIL MATERIALS

- A. Topsoil shall be imported top soil as specified in [Section 32 90 00 "Landscape Work"](#) and Project Specifications.
- B. Topsoil excavated within the limits of the project meeting the requirements shown in Section 32 90 00, "Landscape Work", and as shown in the Project Specifications will be considered as a material only for the purpose of backfilling areas to be planted.

## 2.5 SOURCE QUALITY CONTROL

- A. [Section 01 45 00 – Quality Control](#): Testing and Inspection Services Testing and analysis of soil material.
- B. Testing and Analysis of Subsoil and Topsoil Materials: Perform in accordance with ASTM D698, ASTM D1557, and AASHTO T180.
- C. When tests indicate materials do not meet specified requirements, provide alternate materials and retest.
- D. Furnish materials of each type from same source throughout the Work.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Call USA not less than three (3) working days before performing Work that can be marked by USA in a timely manner.
- B. Request underground utilities to be located and marked within and surrounding construction areas.
- C. Identify required lines, levels, contours and datum.

- D. Notify utility companies to remove and relocate utilities where shown on the Drawings.
- E. Protect utilities indicated to remain from damage.
- F. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- G. Protect benchmarks or monuments, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- H. The ground shall be prepared to received select fill by removing vegetation, topsoil and other unsuitable materials, scarifying the ground to provide a bond with the fill material, and compacting the fill at optimum moisture content.

### 3.2 CLEARING AND GRUBBING

- A. Clearing and grubbing shall be per Section 17-2, "Clearing and Grubbing", of the State Standard Specifications.
- B. Clear and grub before performing earthwork in an area.
- C. Do not injure standing trees, plants, and improvements shown to be protected.
- D. Clear and grub the entire length of the job site to the following widths:
  - 1. 5 feet outside of excavation and embankment slope lines where slopes are not rounded
  - 2. Outside limits of slopes where slopes are rounded
  - 3. 5 feet outside of structures
  - 4. 2 feet outside of slope lines for ditches and channels with a bottom width of less than 12 feet
  - 5. 5 feet outside of slope lines for ditches and channels with a bottom width of 12 feet or more
- E. Clearing and grubbing shall consist of removing all objectionable material from within the limits of the project. The limits of clearing and grubbing shall be of sufficient area and depth to complete the work shown on the Drawings or as described herein in.
- F. Clear all construction areas above original ground of the following to a minimum depth of eight (8) inches below subgrade or eight (8) inches below original ground, or as required by the appurtenant geotechnical report, whichever is lower:
  - 1. all vegetation such as trees, logs, upturned stumps, roots of downed trees, brush, grass, and weeds and
  - 2. other objectionable material including concrete, masonry, and debris.

- G. No burning of materials is allowed.
- H. The site shall be stripped and cleared of all vegetation, debris, and organic-laden top soil as required by the appurtenant Geotechnical Report.
- I. Trees within the limits of work including any traffic control work beyond the limits of work and within the area of influence shall be evaluated by the City or; a City approved Landscape Architect or certified Arborist to assess protection measures. No trees will be removed until they have been tagged, numbered and a written release for the tree has been issued by the City.
- J. Tree which are designated to be removed, shall be excavated and removed 30" down to remove the tree trunk, roots, and backfill with fill material and compact as required in this section, unless specified otherwise on the Drawings.
- K. Grub all construction areas to a depth of at least 0.50 feet, necessary to remove all existing tree stumps, roots, buried logs and other objectionable material, unless noted otherwise on the Plans. In embankment areas where the grading plane is 2 feet or more above original ground, cut off trees, stumps, and roots not more than 1 foot above original ground, except, remove trees, stumps, and roots completely where work includes any of the following:
  - 1. Structure construction
  - 2. Pile construction
  - 3. Subdrainage trench excavation
  - 4. Removal of unsuitable material
  - 5. Cutting into slopes of original hillsides, old or new fill
  - 6. Utility line construction

### 3.3 EXCAVATION

- A. Work under this section shall consist of performing all operations necessary to excavate earth and rock, regardless of character and subsurface conditions, from the roadway prism or adjacent thereto, to excavate all materials, of whatever nature, necessary for the construction of foundations for structures and other facilities; to excavate drainage and irrigation ditches; to excavate drainage channels; to excavate selected material and import material for use as specified; to construct embankments including the placing of selected fill or import fill material in connection therewith as specified; to place backfill for structures, and other facilities; to backfill trenches and depressions resulting from the removal of obstructions; to backfill holes, pits and other depressions; to remove and replace unsuitable material; to excavate and grade road approaches, driveways, sidewalks, curb ramps, curb and gutters, plazas, parking lots, and connections; to construct protection dikes; to remove unstable material, slide material which has come into the graded area, and material which has slipped from embankments; all as shown on the plans and as specified in these Specifications and the Special Provisions and as directed by the Project Manager; and

furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work that may be required to construct and maintain the project facilities, except excavation, trenching and backfilling for pipe, culverts, utility systems, and other subsurface pipes. Excavation, trenching and backfilling for pipe, culverts, utility systems, and other subsurface pipes is specified in [Section 31 23 16 – Utility Trenching](#) of the City Standard Specifications.

- B. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- C. Stockpile excavated material meeting requirements for subsoil fill materials and topsoil materials approved by the Project Manager.
- D. If practicable and unless processing of material is required, haul selected material directly from the excavation to its final position in the roadway prism and compact it in place.
- E. Excavate to the described or authorized grade. If the Contractor over excavates, backfill with an authorized material and compact it at the Contractor's own expense.
- F. Do not excavate wet subsoil unless directed by the Project Manager.
- G. The temporary slope of cut surfaces shall be no steeper than is safe for the intended use, and shall not be more than one-unit vertical in two units horizontal (50-percent slope) unless approved by the Project Manager or appurtenant geotechnical report.
- H. Archaeological Resources: Contractor shall conform to Section 14, "Environmental Stewardship", of the State Standard Specifications. If archaeological resources are discovered within or near construction limits, do not disturb the resources and immediately:
  - 1. Stop all work within a 60-foot radius of the discovery
  - 2. Secure the area
  - 3. Notify the Project Manager.
- I. City will investigate the discovery. Do not move archaeological resources or take them from the job site. Do not resume work within the radius of discovery until authorized.
- J. Environmentally Sensitive Areas (ESA): If an ESA is shown on the Drawings, the boundaries are approximate. Do not enter an ESA unless authorized. If an ESA is breached, immediately:
  - 1. Stop all the work within 60 feet of the ESA boundary
  - 2. Secure the area
  - 3. Notify the Project Manager

If an ESA is damaged, the Project Manager determines the necessary remediation and the party to perform the work. The City deducts the cost for this work from the Contractor bid price.

- K. Notify the Project Manager when buried man-made objects are encountered in an excavation as part of the excavation work and wait for direction from Project Manager unless shown on the plans for removal. All surplus material shall be disposed offsite.
- L. Remove excess excavated materials, subsoil and topsoil not intended for reuse, from site.
- M. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.
- N. When hauling is done over highways or City streets, and when directed by the Project Manager the loads shall be trimmed and all material removed from shelf areas of vehicles in order to eliminate spilling of material. If directed by the Project Manager, the loads shall be watered down or covered after trimming to eliminate dust.
- O. Excavation shall include the satisfactory removal and disposition of all materials not classified as rock excavation.
- P. Earth and rock, regardless of character and subsurface conditions, shall be excavated to the lines and grades as established by the plans.
- Q. All existing materials that are designated to be salvaged shall be removed, cleaned and hauled to the City Corporation Yard, unloaded and stockpiled, by the Contractor unless otherwise directed by the Project Manager.
- R. Existing pipes to be abandoned shall be filled with slurry, minimum of thirty (30) feet from either ends of the pipe and capped with concrete at the ends.
- S. Existing structures, pavement slabs, and structural sections to be abandoned shall be demolished to an elevation three (3) feet below finished grade, unless specified otherwise on the Drawings. The bottom (if any remains) shall be broken thoroughly to prevent entrapment of water and all voids backfilled with suitable backfill.
- T. Operations shall be conducted in such a manner that existing street, facilities, utilities, railroad tracks and other non-street facilities which are to remain in place will not be damaged.
- U. The Contractor, at his expense, shall furnish and install-sheet piling, cribbing, bulkheads, shores or whatever means may be necessary to adequately support material carrying such facilities, or to support the facilities themselves, and shall maintain such supports until they are no longer needed. Temporary pavements,



facilities, utilities and installations shall also be protected until they are no longer required. When temporary supports and other protective means are no longer required, they shall become the property of the Contractor and shall be removed and disposed of from the job site

- V. Prior to placing import fill material, all areas to receive fill shall be scarified and compacted. Unless otherwise stated in the appurtenant Geotechnical report, the area shall be scarified to a minimum of eight (8) inches, material shall be moisture conditioned by wetting or drying to optimum moisture content, and compacted.

### 3.4 ROCK EXCAVATION

- A. Rock excavation shall include excavating, grading, and disposing of materials classified as rock and shall include the satisfactory removal and disposition of rock 1/2 cubic yard or more in volume.
- B. No blasting is allowed.

### 3.5 GRADING

- A. Grading shall consist of placing fill materials on site to contours and elevations with select fill or import fill materials.
- B. Place fill material in continuous layers of maximum lifts of 8 inches (0.67 feet) and compact in accordance with schedule shown in this section, unless otherwise shown on the appurtenant Geotechnical Report.
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Construct slopes to the lines and grades shown on the Drawings.
- E. Slope grade away from the building minimum 2% slope for a minimum distance of 10 feet, unless noted otherwise.
- F. Make grade changes gradual. Blend slopes into level areas.
- G. Round the tops of excavation slopes and ends of excavation.
- H. Maintain completed slopes. Repair any slopes damaged by erosion.
- I. Repair or replace items indicated to remain that are damaged by excavation or filling.
- J. Identify any site low points which need positive drainage and make adjustments with approval from Project Manager prior to pouring concrete.

- K. Protection of existing slopes using erosion control measures as required in [Section 01 57 23 – Storm Water Pollution Prevention](#).

### 3.6 TOLERANCES

- A. [Section 01 45 00 – Quality Control](#): Tolerances.
- B. Immediately before placing subsequent layers of material, prepare the grading plane such that the grading plane:
  1. Does not vary more than 0.05 foot above or below the grade established by the Engineer where Hot Mix Asphalt (HMA) or aggregate base are to be placed.
  2. Does not extend above the grade established by the Engineer where concrete base or pavement is to be placed.
  3. Beneath structural approach slabs or the thickened portion of sleeper slabs do not extend above the grade established by the Engineer.
  4. At any point is within 0.05 foot above the grade established by the Engineer if the material to be placed on the grading plane is paid by the cubic yard.

### 3.7 COMPACTION

- A. Relative compaction specifications apply to material whether in an excavation or an embankment.
- B. The moisture content of material to be compacted to at least 95 percent must be such that the specified relative compaction is attained, unless specified otherwise in the appurtenant Geotechnical Report.
- C. Compact earthwork to a relative compaction of at least 95 percent for at least a depth of:
  1. 0.5 foot below the grading plane for the width between the outer edges of shoulders
  2. 2.5 feet below the finished grade for the width of the traveled way including any parking lots or other vehicular areas; to extend plus two (2) feet on each side.
- D. All fill material shall be compacted to at least 90 percent of maximum density as determined by ASTM D1557, Modified Proctor, beyond the depth specified above in 3.7.C, unless otherwise shown in the appurtenant Geotechnical Report.

### 3.8 STOCKPILING

- A. Stockpile materials on site at locations indicated on the plans or as designated by Project Manager.

- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.
- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- F. Stockpile unsuitable or hazardous materials on impervious material and cover to prevent erosion and leaching, until disposed of. Dispose unsuitable or hazardous material within 48 hours of removal.

### 3.9 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
- B. Leave unused materials in neat, compact stockpile.
- C. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

### 3.10 PROTECTION

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

**END OF SECTION 31 05 13**

## SECTION 31 05 14 – SUBGRADE ENHANCEMENT GEOSYNTHETIC

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Subgrade Enhancement Geogrid
  - 2. Subgrade Enhancement Geotextile.
  
- B. Related Sections:
  - 1. [Section 31 05 13 – Clearing & Grubbing, Excavation, and Earthwork](#)
  - 2. Project Geotechnical report (if available).

#### 1.2 UNIT PRICES - MEASUREMENT AND PAYMENT

- A. Subgrade Enhancement Geogrid/Geotextile
  - 1. Basis of Measurement: By square yard measured parallel to the surface, not including the additional quantity used for overlaps.
  - 2. Basis of Payment: Includes furnishing, storing, maintaining, placing the subgrade enhancement geogrid/geotextile between the subgrade and the pavement structure or as shown on the Drawings.

#### 1.3 REFERENCES

- A. State Standard Specifications:
  - 1. Section 19-10 – Subgrade Enhancement Geosynthetic
  - 2. Section 96 - Geosynthetics

#### 1.4 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Samples: Submit samples of the geogrid when requested by the Project Manager.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

## **PART 2 - PRODUCTS**

### **2.1 SUBGRADE ENHANCEMENT GEOGRID**

- A. Subgrade enhancement geogrid must be biaxial geogrid. Biaxial geogrid must conform to Section 96-1.02P- Biaxial Geogrid.
- B. Biaxial geogrid must be a punched and drawn polypropylene material formed into an integrally formed biaxial grid.

### **2.2 SUBGRADE ENHANCEMENT GEOTEXTILE**

- A. Subgrade enhancement geotextile must be Class B2 as specified in Section 96-1.02O- Subgrade Enhancement geotextile, unless otherwise shown on the Drawings.
- B. A polyester geotextile must not be used for subgrade enhancement geotextile within four (4) inches of recycled concrete.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Before placing subgrade enhancement geogrid/geotextile, remove loose or extraneous material and sharp objects that may come in contact with the geosynthetic material.
- B. Place the geosynthetic:
  - 1. Under the manufacturer's instructions
  - 2. Longitudinally along the roadway alignment
  - 3. Without wrinkles.
- C. Overlap the adjacent edges of the rolls at least two (2) feet. Overlap the ends of rolls at least two (2) feet in the direction of spread covering the subgrade enhancement geosynthetic. Geogrid or Geotextile should be extended all the way to the gutter lip.
- D. Fold or cut the geosynthetic to conform to curves. Overlap any cut material at least two (2) feet. Hold the overlap in place with staples, pins, or small piles of material placed on the subgrade enhancement material.
- E. Make any repairs to the geogrid or geotextile material by placing a new piece of material over the damaged areas with at least three (3) feet of overlap from the edges of the damaged area.

- F. Compact the aggregate base with either a
  - 1. Smooth wheeled roller with no vibrations
  - 2. Rubber tire roller
- G. Do not stockpile material on the geosynthetic.
- H. Do not place any geosynthetic material that cannot be covered on the same day.
- I. Do not operate equipment or vehicles directly on geosynthetic material unless one of the following conditions are met:
  - 1. Vehicles and equipment are
    - a. Equipped with rubber tires
    - b. Operated under 10 miles per hour
    - c. Operated in a manner to avoid sudden braking and sharp turns
  - 2. At least 0.35 feet of aggregate base had been placed, spread, and compacted on the geogrid.
- J. Do not compact the subgrade geosynthetic material with a sheepsfoot or other non-smooth roller.
- K. Do not turn vehicles on material placed directly over geosynthetic material.
- L. Before operating equipment on areas where geosynthetic material has been placed, spread and compact 0.5 feet of material on the geosynthetic.

**END OF SECTION 31 05 13**

**SECTION 31 23 16 – UTILITY TRENCHING****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. The work of this Section includes all saw cutting, utility trenching, earthwork and removal of surface material as required for construction of the utility trenches. Such earthwork shall include, but may not necessarily be limited to, the loosening, removing, loading, transporting, depositing, and compacting in its final location of all materials wet and dry, as required for the purposes of completing the work, which shall include, but not necessarily be limited to, the furnishing, placing, and removing of sheeting, shoring and bracing necessary to safely support the sides of all excavations; all pumping, ditching, draining and other required measures for the removal or exclusion of water from the excavation; the supporting of structures above and below the ground; all backfilling around structures and all backfilling of trenches and pits; restoration of surface, pavement markings, the disposal of excess excavated materials; borrow of materials to make up deficiencies for fills; and all other incidental earthwork.
2. All utility lines not owned by the City shall be designed and constructed in accordance with the rules and regulations of serving utilities. All utilities shall be installed prior to placement of the wearing surface of the street. It shall be the responsibility of the Contractor to conform to these provisions.
3. All broken concrete, pavement, base and other material and unsuitable and surplus excavated material shall be removed, hauled off the site and disposed of by the Contractor at a location obtained by the Contractor and approved by the Project Manager all at no additional cost to the City; said costs and fees shall be considered as included in the prices bid.
4. All materials regardless of character and subsurface conditions shall be excavated to the depths indicated or specified. During excavation, suitable trench material that will be used as backfill shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins, or shall be separately stockpiled. All excavated materials not required or unsuitable for backfill shall be disposed of outside the Right-of-Way as specified in Section 5-1.20B(4) "Contractor-Property Owner Agreement" of the State Standard Specifications

5. All hazardous materials shall be handled in accordance with all regulatory agency requirements and as specified in Section 14-11.03, "Hazardous Waste Management", of the State Standard Specifications. Contractor-generated hazardous waste shall be disposed of outside the Right-of-Way as specified in Section 14-11.06B, "Contractor-Generated Contaminated Soil", of the State Standard Specifications. Within 5 business days of transporting hazardous waste, submit documentation of proper disposal from the receiving landfill.
  6. Where there is not a specific bid item for Hazardous Waste Management, full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in handling of the hazardous waste shall be considered included in the price paid for various items of work and no separate compensation will be allowed therefor.
  7. All surface openings shall be saw cut using a power-driven saw with a diamond blade to provide a smooth joint for both concrete and bituminous street and sidewalk surfaces. All the trenches shall be "T" cut trenches as per City Standard details.
  8. Impact pavement breakers (drop hammers, stampers, jack hammers) are not permissible.
  9. The requirements of Section 7-1.02K(6) and 7-1.02L(2) of State Standard Specifications concerning Trench Safety and Antitrust Claims shall be complied with in addition to the requirements of Article 6 and Section 1503 of the State of California Construction Safety Orders.
  10. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations. Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if the pipe, cable, or duct can be safely and properly installed, backfilled with Controlled Low Strength Materials not tamped in such tunnel sections.
- B. Related Sections:
1. [Section 01 33 00 - Submittal Procedures](#)
  2. [Section 02 41 00 - Demolition](#)
  3. [Section 31 05 13 – Clearing & Grubbing, Excavation, and Earthwork](#)
  4. [Section 32 11 23 - Aggregate Base Courses](#)
  5. [Section 32 12 16 - Asphalt Paving](#)
  6. [Section 32 13 13 - Concrete Surface Improvements](#)
  7. [Section 33 05 13 - Manholes and Structures](#)
- C. California Codes:
1. Titles 17 and 22 California Code of Regulations - Chapter 16 – California Waterworks Standards



2. Water Main Separation Criteria: Chapter 16 - California Waterworks Standards Article 6 - §64572

## 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT (For City CIP Projects only)

### A. Utility Trenching and Earthwork:

1. Measurement: Utility Trenching is typically not a measured item. However, when a bid item is included for Utility Trenching or Joint Utilities Trenching, measurement, unless otherwise designated, shall be the number of linear feet of longitudinal trench centerline, measured along the design slope of the trench bottom, to the nearest foot to the conduit end, pay line, or outside face of connecting structure as designated. Any trenching or excavation for connecting structures shall be included in the measurement for the structure.
2. Payment: Unless there is a separate bid item, full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in Utility Trenching, complete in place including saw cut, excavating to required elevations, protecting the excavation in compliance with Cal/OSHA, removing and disposing of excavated materials, removing and disposing of any asphalt paving mats or fabrics, stockpiling excavated materials, dewatering, bedding, backfill, removing trench sheathing, shoring and bracing when no longer required, restoration and disposing of materials outside the Right-of-Way shall be considered as included in various items of work most closely related to and no separate compensation will be allowed therefor. Payment is not made for over excavated work nor for replacement materials, unless approved in writing by the Project Manager.

## 1.3 REFERENCES

### A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

### B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>).
4. ASTM D1633 - Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders.
5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
7. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
10. ASTM D3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
11. ASTM D3786 - Standard Test Method for Bursting Strength of Textile Fabrics -Diaphragm Bursting Strength Tester Method
12. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
13. ASTM D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
14. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
15. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity
16. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
17. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile
18. Cal/OSHA - Division of Occupational Safety and Health (DOSH) Administration

- C. State Codes;
  - a. California Labor Code
  - b. Construction Safety Orders of the State of California
- D. State of California (Caltrans) - State Standard Specifications:
  - a. Section 25 - Aggregate Subbases
  - b. Section 26 - Aggregate Bases

#### 1.4 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

- B. Utility Structure: Maintenance holes, inlets, catch basins or vaults

## 1.5 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Excavation Protection Plan: Contractor's attention is directed to the provisions in Section 6705 of the California Labor Code. Prior to beginning any trench or structure excavation five (5) feet or more in depth, the Contractor shall submit to the Project Manager for review for compliance with Section 6705 of the Contractor's detailed excavation protection plan showing the design of all shoring, bracing, sloping of the sides of excavation, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trenches or structure excavations.
- C. Product Data: Contractor shall submit data for various types of backfill, trenching and shoring plans, and geotextile fabric. Contractor shall submit laboratory results indicating all soils and backfill material are not hazardous.
- D. Samples: Contractor shall submit fill samples, in air-tight containers for each type of fill to testing laboratory.
- E. Materials Source: Contractor shall submit name of imported fill materials suppliers.
- F. Manufacturer's Certificate: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.
- G. Contractor shall submit a Safety Certification

## 1.6 QUALITY ASSURANCE

- A. Capital Improvement Projects (CIP):
  1. All soil and backfill testing shall be done by a testing laboratory of the City's choice at the City's expense except as otherwise specified in Paragraph 1.6 B. below. The Contractor shall notify the Project Manager at least 48 hours prior to performing any utility excavation and before beginning of backfill materials.
  2. Where soil material is required to be compacted to a percentage of maximum density the maximum density at optimum moisture content will be determined in accordance with ASTM D 1557. Where cohesionless, free draining soil material is required to be densified to a percentage of relative density the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 2922, or by such other means acceptable to the Project Manager.

3. In case the first test and one re-test of the fill or backfill show non-compliance with the requirements, the Contractor shall accomplish such remedy as may be required to insure compliance. Subsequent re-testing after the first re-test to show compliance shall be at the Contractor's expense.

- B. All Other Projects including but not limited to permit projects, utility company projects, development and redevelopment projects:
  1. All soil and backfill testing shall be by the Permittee/Developer/Utility Company's Geotechnical Engineer of Record and shall submit all testing information to the City.
  2. Maintain one copy of the Construction Documents and City Standard Details and Specifications on site.

## 1.7 QUALIFICATIONS

- A. If the Contractor's excavation protection plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative system plan shall be prepared, stamped and signed by a Civil or Structural Engineer licensed in the State of California at the Contractor's expense.

## 1.8 FIELD MEASUREMENTS

- A. Contractor shall verify field measurements prior to fabrication.

## 1.9 COORDINATION

- A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

## **PART 2 - PRODUCTS**

### 2.1 SUITABLE FILL MATERIALS

- A. Suitable backfill shall be a selected or processed clean, fine earth, rock, or sand, free from objectionable materials, vegetation, or other deleterious substances.
- B. All import material from a source outside the project limits for use as backfill shall be clean soil, not hazardous, free from organic material, trash, debris, rubbish, broken Portland cement concrete, bituminous materials or other objectionable materials. Whenever the Contractor elects to use imported material for backfill, it shall be delivered not less than 10 days prior to the intended use and a sample of the material shall be submitted to the Project Manager for review. The sample

shall have a minimum dry weight of 100 pounds and shall be clearly identified as to source, including street address and community of origin. The Project Manager will determine the suitability, the minimum relative compaction to be attained, and the placement method. If the backfill material is found not suitable, the Contractor shall remove material from the site and dispose of at no additional cost to the City.

- C. Should the imported material not be substantially the same as the approved sample, it shall not be used for backfill and shall be removed from the job site at the Contractor's expense.
- D. The densification method for imported material authorized by the Project Manager will be dependent upon its composition, the composition of the in-place soil at the point of placement, once the relative compaction to be obtained.
- E. The following are the types of backfill materials:
  - 1. **Sand** shall be a material with 100 percent passing a 3/8" sieve, at least 90 percent passing a No. 4 sieve, and a sand equivalent value not less than 30.
  - 2. **Class 2 Aggregate Base** shall be crushed rock aggregate base material meeting the requirements of Section 26, "Aggregate Bases", for 3/4" maximum aggregate gradation, of the State Standard Specifications. Recycled Aggregate Base is an acceptable backfill material.
  - 3. **Controlled Low Strength Materials (CLSM)** shall be fluid workable mixture of cement, pozzolan, aggregate and water mixed in accordance with ASTM C94. Cement shall be Type II Cement and comply with ASTM C150. Pozzolan shall be added to improve the flowability and shall be Type F in accordance with the requirements of ASTM C618. Water must be free of oil, salts, and other impurities that adversely affect the backfill. Aggregate must consist of well graded mixture of crushed rock, soil, or sand with a maximum aggregate size of 1/2-inch. 100percent of the aggregate shall pass the 3/4" sieve and not more than 30-percent retained on the 3/8" sieve and not more than 12 percent shall pass the No. 200 sieve. Air entraining admixtures shall be added to improve the workability and shall in accordance with the requirements of ASTM C260. Density of CLSM shall be between 120 pounds per cubic feet to 135 pounds per cubic feet. Minimum 28-day compressive strength for CLSM shall be between 50psi minimum to 100psi for depths 20 feet or less in height of cover. For depths greater than 10 feet in height, CLSM mix shall have a minimum 28-day compressive strength of 100 psi.
  - 4. **Native** material shall be material obtained from on-site excavations, provided the materials are not classified as unsuitable. Native materials shall be free of stones, lumps, rubbish, debris, organic material, broken

concrete or bituminous surfacing over 4 inches in diameter, objectionable material, vegetation, and deleterious substances.

5. **Class 2 Permeable Material** shall be hard, durable, crushed stone, or gravel, and free from slaking or decomposition under action of alternate wetting or drying, uniformly graded, and shall meet the requirements of Section 68-2.02F for Class 2 "Permeable Material", of the State Standard Specifications.
6. **Topsoil** shall be material which has been obtained at the site or may be imported and shall meet the requirements of [Section 32 90 00 - Landscape Work](#). Removal of topsoil shall be done after the area has been stripped of vegetation and debris as specified.

## 2.2 UNSUITABLE BACKFILL MATERIALS

- A. Any material determined to be hazardous is defined as unsuitable material.
- B. Unsuitable soils for backfill material shall include soft, spongy, unstable or other similar soils which, when classified under ASTM D 2487, fall in the classifications of Pt, OH, or OL. Types CH and MH soils will be permitted in unimproved areas only where required compaction and stability can be demonstrated. In addition, any soil which cannot be compacted sufficiently to achieve the percentage of maximum density specified for the intended use, shall be classified as unsuitable material.
- C. Washed, smooth rock (pea gravel) is classified as unsuitable material.

## 2.3 FILTER FABRIC

- A. Filter Fabric shall be permeable, non-woven synthetic fabric meeting the requirements of Section 96-1.02B, "Filter Fabric" of the State Standard Specifications. Filter fabric shall have minimum Grab breaking load in each direction of 157 pounds, a minimum puncture strength of 310 pounds, apparent opening size between 40 and 70.

## 2.4 TEMPORARY STEEL PLATES

- A. When approved by the Project Manager, the Contractor may use steel plate bridging in-lieu of backfill and temporary asphalt where the roadway surface is to be opened to traffic. All steel plates shall be without deformation. Inspectors shall determine the trueness of steel plates by using a straight edge and shall reject any plate that is permanently deformed.

- B. Trench plates shall be coated with Antiskid type surface meeting State Standard Specifications of a nominal Coefficient of friction of 0.35 in accordance with California Test Method 342 (Appendix H).
- C. The following table shows the advisory minimal thickness of steel plate bridging required for a given trench width (A-36 grade steel, designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual).

Trench Width	Minimum Steel Plate Thickness (inches)
10 inches	1/2 inch
1 feet 11 inches	3/4 inch
2 feet 7 inches	7/8 inch
3 feet 5 inches	1 inch
4 feet 3 inches	1-3/4 inch

NOTE: For trench width spans greater than 4 feet 3 inches, a structural design shall be prepared, signed, and stamped by a California Registered Civil Engineer.

- D. A Rough Road signs (W8-8) with black lettering on an orange background shall be used in advance of steel plate bridging.

**PART 3 - EXECUTION**

3.1 DEFINITIONS - PIPE ZONE, BEDDING, TRENCH & FINAL ZONE

- A. **Pipe Zone:** Pipe Zone is defined as the vertical trench cross-section between the trench subgrade, which is 0.4 times the outside diameter of the pipe in inches below the bottom surface of the pipe or 4” minimum whichever is greater, and 12 inches above the top surface of the pipe.
- B. **Bedding:** Bedding is defined as that portion of the Pipe Zone between the trench subgrade, which is 0.4 times the outside diameter of the pipe in inches below the bottom surface of the pipe or 4” minimum whichever is greater and a level line from the bottom of the pipe.
- C. **Trench Zone:** The Trench Zone is defined as the vertical trench cross-section between top of Pipe Zone and 36” below finish paved surface. In unpaved areas, the Trench Zone shall be the vertical cross-section between the top of Pipe Zone and 24 inches below finished unpaved or landscape surface.
- D. **Final Zone:** The Final Zone is defined as the upper 36 inches of vertical cross-section below the finished paved surface. In unpaved or landscaped areas, the Final Zone is the upper 24 inches of vertical cross-section below the finished surface.

- E. **Pavement Section:** The Pavement Section is defined as the engineered layers of pavement and base conforming to the hot mix asphalt pavement or concrete pavement and aggregate base thickness as shown on the Plans.
- F. **Backfill:** Backfill is considered to be the material used to fill the portion of a trench between the pipe Bedding and the roadway subgrade or finish surface in non-roadway areas
- G. **Trench Plugs:** Trench plugs are temporary barriers placed within an open trench excavation in order to minimize the volume and velocity of trench water flow at the base of slopes and to reduce erosion in the trench, preventing the trench from becoming a subsurface drainage path. These trench plugs may consist of unexcavated portions of the trench, compacted subsoil, sandbags, or some functional equivalent.

### 3.2 PIPE ZONE BACKFILL MATERIALS

- A. Bedding as defined in this section shall be Sand or Class 2 Aggregate Base.
- B. Pipe Zone backfill, excluding bedding as defined in this section shall be
  1. Sand for plastic pipe
  2. Sand or Class 2 Aggregate Base for ductile iron pipe, vitrified clay pipe and reinforced concrete pipe.
- C. For dry utility and/or joint trench, Pipe Zone backfill shall conform to latest Pacific Gas and Electric Company (PG&E) Greenbook's Engineering Material Specification No. 4123 - Backfill Sand or meeting the utility owner's specifications.
- D. Trench plugs shall be provided at minimum intervals of 200 feet where pipelines are installed on grades exceeding 4 percent, and where backfill materials have gradation less than 10 percent passing a No. 4 sieve.
- E. Unless otherwise specified Bedding and backfill around sub-drainage systems shall be minimum of 12 inches of Class 2 Permeable Material as specified in Section 68-2.02F(3) of the State Standard Specifications.

### 3.3 TRENCH ZONE BACKFILL MATERIALS

- A. Trench Zone backfill as defined in this section shall be Class 2 Aggregate Base in paved areas.
- B. Native backfill material shall be used in unpaved or landscape areas.



3.4 FINAL ZONE BACKFILL MATERIALS

- A. Final Zone backfill as defined in this section shall be
  - 1. Native backfill in unpaved areas
  - 2. Native backfill with 6 inches thick minimum Top Soil material in landscape areas.
  - 3. Class 2 Aggregate Base in paved areas below the Pavement Section.

3.5 TRENCH WIDTH & LENGTH

- A. Minimum Trench width shall be as follows:

Utility Pipe Outside Diameter (O.D.) (inches)	Minimum Trench Width (inches)
For Pipe Sizes under 12 inches	Pipe O.D. + 12 inches
For Pipe Sizes between 12 inches to 48 inches	Pipe O.D. + 24 inches
For Pipe Sizes above 48 inches	Pipe O.D. + 48 inches

For Dry Utilities (electrical, telephone, cable, street light and traffic signal conduits), the trench width shall be 18" minimum.

- B. Maximum Length of Open Trench: Except by permission of the Project Manager, the maximum length of open trench where prefabricated pipe is used shall be the distance necessary to accommodate the amount of pipe installed in a single day and shall not exceed 300 feet. The distance is the collective length at any location, including open excavation, pipe laying and appurtenant construction and backfill which has not been temporarily re-surfaced.
- C. Except by permission of the Project Manager, the maximum length of open trench in any one location where concrete structures are cast in place will be that which is necessary to permit uninterrupted progress.

3.6 PREPARATION

- A. Call Local Utility Line Information service at USA North 811 not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Contractor's Licensed Land Surveyor shall provide all construction surveying and staking prior to beginning any trenching and excavation.

- C. Protect bench marks, street monuments, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Contractor shall maintain and protect above and below grade utilities unless otherwise noted.
- E. Establish temporary traffic control per Contractor's approved traffic control plans when trenching is performed in public right-of-way. Relocate controls as required during progress of Work.

### 3.7 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations more than 5 feet deep to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. All sheeting, shoring and bracing shall conform to Cal/OSHA.
- C. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- D. Design sheeting and shoring to be removed at completion of excavation work.
- E. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- F. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.
- G. **Access to Trenches** - A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for the employees, the Contractor, and any other personnel.
- H. **Bracing Excavations** - The manner of bracing excavations shall be as set forth in the rules, orders and regulations of the Division of Industrial Safety of the State at California.

### 3.8 TEMPORARY ACCESSIBLE PEDESTRIAN BRIDGES

- A. Temporary Accessible Pedestrian bridges of approved construction not less than four feet in width in compliance with ADA, and provided with hand rails and supports of dressed lumber, shall be installed over trenches at all crosswalk intersections, and at such other points where traffic conditions make it advisable. Substantially constructed bridges, adequate for handling all vehicular traffic, shall be installed over any trench or other excavation in a street intersection, whenever

such excavation is in excess of half the width of the street crossing. Adequate bridges shall be provided to make possible the safe and full use of all driveways or roadways used to move vehicles from the public street onto private property.

- B. All bridges required to be installed shall be maintained in place as long as the condition of the work requires their use for the safety and convenience of the public. Removal or relocation of these temporary bridges shall be at the Contractor's own discretion and risk.

### 3.9 TRENCHING AND EXCAVATION

- A. All excavations for utilities, pipelines and Minor Structures shall be open cut trenches, unless otherwise shown.
- B. Do not advance open trench more than 200 feet ahead of installed pipe.
- C. Cut trenches to widths per Standard Specifications or as indicated on the Drawings and sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.
- D. Excavate trenches to depth per Standard Specifications or as indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utility pipes.
- E. Do not interfere with 45-degree bearing splay of foundations.
- F. When Project conditions permit, slope side walls of excavation per Cal/OSHA. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- G. Excavation and other work under or adjacent to existing pipe lines, cables, conduit runs or structures of any kind, shall be prosecuted in such a manner as not to interfere with the safe operation and use of such installations. Should any damage be incurred to existing facilities during the Contractor's operations, the Contractor shall immediately notify the proper owners or authorities, and shall arrange for the immediate repair of same at the Contractor's own expense.
- H. Excavations for appurtenant structures, such as but not limited to maintenance holes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall, for the purpose of shoring and bracing, be deemed to be in the category of trench excavation.
- I. Excavation shall include the removal of all water and materials of any nature which interfere with the construction work. Removal of ground water to a level below the structure sub-grade will be necessary unless specified otherwise. The water removed during excavation shall not be directed to storm drain system. The

contractor shall apply to Delta Diablo for a Discharge Permit to dispose the water encountered during excavations into the sanitary sewer system.

- J. Should the Contractor elect to tunnel or jack any portion, he shall first obtain approval from the Project Manager. Payment for such work will be made as though the originally specified method of construction has been used.
- K. Trenching, tunneling, boring and jacking shall comply with the applicable provisions of the State Standard Specifications, these specifications and the plans. All work shall comply with the applicable Federal, State and local laws, regulations, codes and ordinances, and in addition, shall meet the respective utility agencies requirements for joint trench construction for installation of conduits, including, but not limited to, safety, depth, size, type, connection and other regulations and shall be considered as included in the various contract items of work and no additional compensation shall be made therefore.
- L. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be subject to rejection. Any corrective work shall be approved by the Project Manager and shall be at no cost to the City.
- M. When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose, the existing improvement before laying any pipe or conduit. The Project Manager shall be given the opportunity to inspect the existing pipe or conduit before connection is made.
- N. Gravity flow pipe shall be laid downstream to upstream with the socket or collar ends of the pipe upgrade unless authorized by the Project Manager.
- O. Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position.
- P. Any adjustments in line or grade of not more than 0.1 feet up or down which may be necessary to accomplish the intent of the plans shall be considered as included in the various contract items of work and no additional compensation will be made therefore.
- Q. Locations of existing underground utilities and structures, insofar as they are known from information furnished by the respective utility companies and agencies, have been shown on the plans. The City assumes no responsibility for the accuracy or completeness of said data, which is offered solely for the convenience of the Contractor it shall be the Contractor's responsibility to verify the location of these obstructions, and to locate any other underground utilities or structures, which might interfere with the Contractor's operations.

- R. If soft spongy, unstable or other similar material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to a depth ordered by the Project Manager and replaced with bedding material suitably densified. Additional bedding so ordered, over the amount required by the plans or specifications, will be paid for as provided in the Proposal or the Special Provisions. If the necessity for such additional bedding material has been caused by an act or failure to act on the part of the Contractor, or is required for the control of ground water, the Contractor shall bear the expense of the additional excavation and bedding.
- S. Where pipe culverts are to be installed in new embankment, it shall first be constructed to the required height as shown on the plans, and for a distance each side of the culvert location of not less than five (5) times the diameter of the culvert, after which the trench shall be excavated with sides as nearly vertical as soil conditions will permit and culvert installed
- T. For excavations in landscape areas, all damaged irrigation systems, including irrigation piping and electrical wiring shall be repaired and restored to the original condition on the same day they are damaged. All landscape surface areas shall be restored to its original condition unless specified otherwise.
- U. No tree roots over 1.5 inches in diameter shall be cut without the authorization from the Project Manager or City's Arborist. If existing roots over 1 inch in diameter are cut during the course of work, the cut faces shall be thoroughly coated with emulsified asphalt made especially for use on cut or damaged plant tissues. All exposed roots shall be covered with wet burlap to prevent them from drying out.
- V. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- W. Correct over excavated areas with compacted backfill as specified for authorized excavation as directed by Project Manager.
- X. Remove excess subsoil not intended for reuse, from site. The legal disposal of excess materials shall be the responsibility of the Contractor.
- Y. Use of explosives and blasting material will not be permitted.
- Z. Stockpile excavated material in area designated on site as shown on the Contractor's approved Staging Plans.
- AA. In areas of high vehicular or pedestrian volumes, the Project Manager may order the immediate removal of excavated material and that sidewalks and gutters be kept clean at all times.
- BB. The Contractor may transport or backhaul material to be used as backfill material from any portion of a project to any other portion or line of the same project, or from any project being constructed under one contract to any other project being

constructed under that same contract. Such transported material shall be clean soil, free from organic material, trash, debris, rubbish, or other objectionable substances except that broken Portland cement concrete or bituminous type paving allowable for the type of backfill specified may be permitted

### 3.10 OVER-EXCAVATION

- A. When ordered by the Project Manager, whether or not indicated in the project plans and specifications, trenches shall be over-excavated beyond the depths shown and such over-excavation shall be to the depths ordered the Project Manager. Backfill for over excavation backfill shall be Class 2 Permeable materials. For wet trenches, Contractor shall install a filter fabric on top and below the permeable materials.

### 3.11 PIPE LAYING

- A. Lay pipes to lines and grades indicated on Drawings, with uniform bearing under the full length of the barrel of the pipe. Project Manager reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Pipe sections shall be laid and joined in such a manner that the offset of the inside of the pipe at any joint will be held to a minimum at the invert. The maximum offset at the invert of pipe shall be 1 percent of the inside diameter of the pipe or 3/8 inch, whichever is smaller.
- C. After the joints have been made, the pipe shall not be disturbed in any manner.
- D. At the close of work each day, or whenever the work ceases for any reason, the end of the pipe shall be securely closed unless otherwise permitted by the Project Manager.
- E. All pipe shall be installed in accordance with the manufacturer's recommendations.
- F. The interior of the pipe shall be clean and free from foreign materials before sections of the pipe are connected. The open ends of the pipe shall be sealed with watertight plugs or other approved means at times when pipe laying is not in progress. Under no conditions shall ground water be allowed to enter the pipe.
- G. Dropping or bumping of pipe will not be permitted. Care shall be exercised by the Contractor to prevent damage to the pipe during handling. There shall be no distortion or deflection of the pipe which might induce damage to the pipe, pipe lining, pipe coating or joints.

- H. Pipe will be carefully inspected in the field before and after laying. In no event shall rejected pipe be installed. Any pipe failing to pass inspection after laying shall be subject to rejection. Any corrective work shall be approved by the Project Manager and shall be at no cost to the City.
- I. The Contractor shall provide a minimum of twelve (12) inches vertical clearance between the pipe and proposed or existing facilities and improvements or per the Utility owner's requirements. A minimum of twelve inches (12 inches) vertical clearance between the pipe and sanitary sewers, gas or petroleum lines and telephone cables shall be provided. Clearance for electrical conduits shall be as provided in the applicable General Safety Orders or utility regulations. Sanitary sewer and water lines shall be 10 feet horizontally clear and not in the same trench and in conformance with Water Main Separation Criteria: Chapter 16 - California Waterworks Standards Article 6 - §64572, unless specifically shown or directed by the Project Manager.
- J. Every precaution shall be taken against floating the pipe. In case of such floating, the Contractor shall replace the pipe to its proper location at his own expense, and replace any damaged pipe which may have resulted.

### 3.12 PLACING AND SPREADING OF BACKFILL MATERIALS

- A. Regardless of compaction method, backfill shall be evenly spread in horizontal layers so that when compacted each layer shall not exceed eight (8) inches in thickness. During spreading, each layer shall be thoroughly mixed as necessary to promote uniformity of material and uniformity of moisture throughout backfill materials. Material placed in excess of eight (8) inches in thickness shall be removed and re-compacted with the next lift.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Water shall be added before or during spreading until the proper moisture content is achieved where the backfill material moisture content is below the optimum moisture content.
- D. Where the backfill material moisture content is too high to permit the specified degree of compaction, the material shall be dried or replaced until the moisture content is satisfactory.
- E. Unless otherwise approved by the Project Manager, all trenches within the existing roadway shall be backfilled completely and the roadway made passable to traffic at the end of each day's operation.
- F. Backfill, or fill, as the case may be, for cast-in-place structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes and reinforced concrete conduits shall start at the sub-grade for the structure.

- G. Except where the pipe must remain exposed for force main leakage tests and subject to the provisions herein, the Contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised so that the conduit will not be damaged or displaced. If the pipe is supported by concrete bedding placed between the trench wall and the pipe, the remainder of any bedding material shall be placed to 1 foot over the top of the conduit. The backfill above the concrete bedding shall not be placed nor sheeting pulled until the concrete has attained sufficient strength as required by the Project Manager.
- H. Trenches shall not be backfilled until all required pressure tests are performed and until the utilities systems as installed conform to the requirements specified in the several sections covering the installation of the various utilities.
- I. Voids left by the removal of sheeting, piles and similar sheeting supports shall be immediately backfilled and compacted into place to assure dense and complete filling of the voids.
- J. After the placing of backfill has been started, the Contractor shall proceed as soon as practicable with compaction.
- K. Backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot rollers, pneumatic tire rollers, vibrating rollers, or other mechanical tampers. All such equipment shall be of a size and type approved by the Project Manager. Impact-type pavement breakers (stompers) will not be permitted. Sheepsfoot equipment shall be limited to outside the Pipe Zone.
- L. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will produce required results or will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The Contractor shall make its own determination in this regard.
- M. Material for mechanically compacted, backfill shall be placed in lifts which, prior to compaction, shall not exceed the thickness specified above.
- N. Mechanically compacted backfill shall be placed in horizontal layers of thickness compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened (or dried, if necessary), and then tamped, vibrated or rolled until the specified relative compaction has been attained.

### 3.13 COMPACTION OF BACKFILL MATERIALS

- A. Compaction of backfill materials shall be in accordance with ASTM D1557 for cohesive type soils and in accordance with ASTM D4253 and D4254 for cohesionless, free-draining granular type materials. The following compaction test requirements shall apply:



Location of backfill	Relative Compaction
Pipe Zone (including Bedding)	90
Trench Zone	90
Final Zone (paved areas, excluding the Pavement Section)	95
Final Zone (unpaved or landscape areas)	90
Over-excavated areas	90
Around minor structures	90
Beneath minor structures	95

- B. Compaction of Pipe Zone including Bedding material shall be by hand tamping, hand held mechanical vibrating equipment or other means approved by the Project Manager.
- C. Each layer of backfill material shall be mechanically compacted to the specified percentage of maximum density. Equipment that is consistently capable of achieving the required degree of compaction shall be used and each layer shall be compacted over its entire area while the material is at the required moisture content range. Flooding, ponding, or jetting shall not be used.
- D. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.
- E. Backfill within 3 feet of structures or walls shall be compacted with hand operated equipment. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to the depth of the fill at that time.

3.14 TEMPORARY RESURFACING

- A. Unless permanent pavement is placed immediately, temporary bituminous re-surfacing 2 inches thick shall be placed and maintained in streets and parking lot areas and at locations determined by the Project Manager wherever excavation is made through pavement, sidewalk or driveways. Temporary asphalt shall be placed flush with the adjacent pavement grade.
- B. Hot Mix Asphalt shall be used for temporary resurfacing when permanent surfacing is not to be placed within seven (7) days.
- C. In sidewalk areas the temporary bituminous re-surfacing shall be at least 1-inch-thick, in all other areas it shall be at least 2 inches thick. At major intersections and other critical locations, a greater thickness may be ordered. Temporary resurfacing shall be placed as soon as the condition of the backfill is suitable to receive it and shall remain in place until the condition of the backfill is suitable for permanent resurfacing. Surfacing shall be maintained in a smooth and level condition. The temporary paving shall conform to the requirements of Section 39

of the State Standard Specifications and unless specified differently in the Special Provisions, may use any of the mixes allowed in Section 39 for such temporary surfacing of trenches.

- D. The re-surfacing shall be placed, rolled, maintained, removed and disposed of by the Contractor.

### 3.15 PAVEMENT SECTION REPLACEMENT

- A. Unless otherwise specified on the plans or in the Special Provisions, all existing pavement surface improvements damaged or removed as a result of the Contractor's operations shall be reconstructed by the Contractor per City of Pittsburg Standard Detail R-5, to same dimensions, except for pavement thickness, and with the same type materials used in the original work. Trench resurfacing shall match the existing pavement thickness, but no less than 3 inches.
- B. The type and thickness of the replacement pavement, base, cement treated base, and sub-base for trenches in public streets and highways shall be as shown on the plans or designated by the Project Manager.
- C. Unless otherwise specified, the following requirements shall govern:

Sub-base: Existing sub-base shall be replaced with Class 2 Aggregate Base. The thickness of sub-base replacement shall be designated by the Project Manager, and that portion of trench backfill lying within such designated limits shall be compacted in accordance with this Section and shall not be less than ninety-five (95) percent as determined by California Test Method No. 216.

- D. Surfacing of trenches in new street sections shall be as required to match the Pavement Section as shown on the project plans and specifications.

### 3.16 TOLERANCES

- A. [Section 01 45 00 - Quality Control](#): Tolerances.
- B. Top Surface of Backfilling under paved areas: Plus or minus 1/2 inch from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 1/2 inch from required elevations.

### 3.17 FIELD QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Field inspecting, testing, adjusting, and balancing.

- B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, and AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
  - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at the Contractor's expense.

### 3.18 PROTECTION OF FINISHED WORK

- A. [Section 01 77 00 - Closeout Requirements](#): Contractor shall protect all the finished work and any damage to the finished work shall be replaced at the Contractor's expense.

### 3.19 TEMPORARY STEEL PLATE BRIDGING

- A. When backfilling operations of an excavation in the roadway including bike lanes, sidewalks and parking strip, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring shall be required to preserve unobstructed traffic and pedestrian flow. In such cases, the following conditions shall apply:
  - 1. Steel plates used for bridging must extend a minimum of 12-inches beyond the edges of the trench.
  - 2. Steel plate bridging shall be installed to operate with minimum noise or movement.
  - 3. The trench shall be adequately shored to support the bridging and traffic loads.
  - 4. Temporary paving with cold asphalt concrete shall be used to feather the edges of the plates, if plate installation by Method (2) described below, is used.
  - 5. Bridging shall be secured against displacement by using adjustable cleats, shims, or other devices.
- B. The Contractor is responsible for maintenance of the steel plates, shoring, asphalt concrete ramps, and ensuring that they meet minimum specifications.
- C. All work done by the City crews for lack of maintenance of the temporary steel plates as specified above by the Contractor shall be back charged to the Contractor.
- D. Steel plate bridging shall not exceed four (4) consecutive working days in any given week and should not be left through the weekend, unless approved by the Engineer.

- E. Steel plate bridging and shoring shall be installed using either Method (1) or (2):
1. **Method 1** For speeds of 45 MPH or greater:

The pavement shall be cold planed to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate. Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of two (2) dowels pre-drilled into the corners of the plate and drilled 2-inches into the pavement. Subsequent plates are to be butted and tack welded to each other.

2. **Method 2** For speeds less than 45 MPH:

Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of two (2) dowels pre-drilled into the corners of the plate and drilled 2-in into the pavement. Subsequent plates are to be butted and tack welded to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope 8.5 percent with a minimum 12-inch taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of asphalt concrete mix, concrete slurry, epoxy or an equivalent that is satisfactory to the Project Manager.

**END OF SECTION 31 23 16**

**SECTION 32 11 23 - AGGREGATE BASE COURSES****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Class 2 Aggregate Base course.

## B. Related Sections:

1. [Section 31 23 16 - Utility Trenching](#): Compacted fill under base course.
2. [Section 32 12 16 - Asphalt Paving](#): Binder and finish asphalt courses.
3. [Section 32 13 13 - Concrete Surface Improvements](#): Finish concrete surface course.

## 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

## A. Aggregate Base Course:

1. Basis of Measurement: By the cubic yard as specified in the bid form. Quantities of aggregates will be calculated on the basis of dimensions shown on the plans. No allowance will be made for aggregate rejected or placed outside said dimensions unless otherwise order by the Project Manager.
2. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, driveways, curb ramps, median curbs, median nose surfacing, bus turnouts, retaining curbs, and in utility trenches shall not be measured unless specified otherwise in the Contract.
3. Basis of Payment: Includes full compensation for furnishing all labor, materials, tools, equipment and incidentals, in aggregate base supplying fill material, stockpiling, scarifying subgrade surface, placing where required, watering, dust palliative, leveling, compacting and certifying the top of aggregate base design grades.
4. Aggregate Base used under concrete work such as curb and gutter, valley gutter, sidewalk, retaining curbs, etc. shall considered incidental to the item most closely related to and no separate compensation will be allowed therefor. Aggregate base used in utility trenches shall be considered incidental to the cost per linear foot paid for the utility pipes as shown on the bid form and no separate compensation will be allowed therefor.

### 1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
- B. Caltrans Standard Specifications:
  - 1. Section 26 Aggregate Base.
- C. CalRecycle
  - 1. <http://www.calrecycle.ca.gov/ConDemo/Aggregate/>

### 1.4 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data:
  - 1. Submit data for geotextile fabric and herbicide.
- C. Samples: Submit, in air-tight containers, 5 lbs sample of each type of aggregate fill to testing laboratory or as required by the City.
- D. Submit aggregate base gradation, R-value requirements, and sand equivalent requirements as specified in this sections.
- E. Aggregate samples must not be treated with lime, cement, or chemicals before testing for durability index.
- F. Aggregate from untreated reclaimed processed asphalt concrete, Portland cement concrete, lean concrete base or cement-treated base is not considered treated.
- G. If the aggregate gradation test results, sand equivalent test results, or both do not comply with the Contract compliance requirements, remove the aggregate base or request a payment deduction. If the payment deduction request is authorized, \$2.00/cubic yard is deducted.
- H. Materials Source: Submit name of aggregate materials suppliers.
- I. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- J. Field survey and certify the top of aggregate base design grades as specified in [Section 01 71 23 - Construction Surveying](#).

- K. Supplier shall submit certification data that aggregate base meets the requirements per Caltrans Testing Methods.

#### 1.5 SUSTAINABLE DESIGN SUBMITTALS

- A. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source and origin for salvaged and reused products.
    - b. Certify recycled material content for recycled content products.
    - c. Certify source for regional materials and distance from jobsite.

#### 1.6 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work according to City Standards.

### **PART 2 - PRODUCTS**

#### 2.1 SUSTAINABILITY CHARACTERISTICS

- A. Materials and Resources Characteristics:
  - 1. Recycled Content Materials: Furnish materials with maximum available recycled content.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of jobsite.

#### 2.2 AGGREGATE MATERIALS

- A. Aggregate must be clean and consist of any combination of the following:
  - 1. Broken Stone
  - 2. Crushed Gravel
  - 3. Natural rough-surfaced gravel
  - 4. Sand
  - 5. Processed reclaimed asphalt concrete, Portland cement concrete, lean concrete base, or cement-treated base.
- B. Quality: Aggregate base furnished for the base material shall be free from vegetable matter and other deleterious substances, and shall be of such nature

that it can be compacted readily under watering and rolling to form a firm stable base.

- C. Maximum aggregate size shall be 3/4-inch maximum aggregate gradation unless specified otherwise.
- D. Class 2 Aggregate Base: ASTM D2940; graded type. Conform to Section 26 of the Caltrans Standard Specifications. Aggregate gradation for 3/4-inch maximum aggregate base must be within the percentage passing limits for the sieve sizes shown in the following table:

**Aggregate Gradation**

Sieve Size	Percentage Passing	
	Operating Range	Contract compliance
2"	-	-
1-1/2"	-	-
1"	100	100
3/4"	90-100	87-100
No. 4	35-60	30-65
No. 30	10-30	5-35
No. 200	2-9	0-12

- E. The aggregate quality characteristic must comply with the requirements shown in the following table:

**Aggregate Quality Characteristics**

Quality Characteristics	Requirement	
	Operating Range	Contract compliance
Resistance (R-value, min.)	-	78
Sand Equivalent (min.)	25	22
Durability Index (min.)	-	35

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Verify compacted subgrade is dry and ready to support paving and imposed loads.
  - 1. Proof roll subgrade with minimum two perpendicular passes to identify soft spots unless specified otherwise in the Project Geotechnical Report.
  - 2. Remove soft subgrade and replace with compacted fill unless specified otherwise in the Project Geotechnical Report or as ordered by the Project Manager.



- B. Immediately before spreading aggregate base, the subgrade must comply with the specified compaction and elevation tolerance for the material involved and be free from loose or extraneous materials.
- C. Contractor may use aggregate base to fill areas of the subgrade that are lower than the grade as shown on the Drawings.

### 3.2 PREPARATION

- A. Correct irregularities in subgrade gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

### 3.3 AGGREGATE PLACEMENT

- A. Deliver uniform thickness of aggregate base to the roadbed. Deposit aggregate base in layers or windrows.
- B. Spread and shape the aggregate base to such thickness that after watering and compacting, the completed aggregate base is within the tolerances specified below in Section 3.5.
- C. Avoid material segregation. Segregated materials shall be re-mixed until uniform.
- D. Aggregate base must be free from pockets of coarse or fine material.
- E. If the aggregate base thickness shown is 0.50 foot or less, spread and compact the aggregate base in one layer. If the thickness shown is more than 0.50 foot, spread and compact the aggregate base in at least 2 approximately equal layers in thickness. The compacted thickness of any one later must not exceed 0.50 foot.
- F. At locations inaccessible to spreading equipment, spread and compact aggregate base by any means that will attain the specified requirements; by hand compaction if needed.
- G. Apply water to moisture condition the aggregate base as needed for optimum moisture content for compaction.
- H. Compact each aggregate base layer to at least 95 percent relative compaction.
- I. If bi-axial is installed as shown on the Drawings or as directed by the City's Project Manager, compact aggregate base with either (1) a smooth-wheeled roller or (2) a rubber-tired roller. Do not use vibratory devices during compaction.
- J. Level and contour surfaces to elevations, profiles, and gradients indicated.

- K. Maintain optimum moisture content of fill materials to attain specified compaction density.
- L. Correct areas of aggregate base that do not comply with the described thickness.

### 3.4 TOLERANCES

- A. [Section 01 45 00 - Quality Control](#): Tolerances.
- B. Maximum Variation from Flat Surface: 1/4 inch measured with 10-foot straight edge.
- C. Maximum Variation from Thickness: 1/4-inch.
- D. Maximum Variation from Elevation: 1/4-inch.

### 3.5 FIELD QUALITY CONTROL

- A. [Section 01 77 00 - Closeout Requirements](#): Field inspecting, testing, adjusting, and balancing.
- B. When tests indicate Work does not meet specified requirements, correct areas of aggregate base that do not comply with the specified requirements and retest, or request a payment deduction. If a payment deduction is authorized, the deduction is calculated by multiplying:
  - 1. Deficient thickness less allowable tolerance
  - 2. Planned width
  - 3. Longitudinal distance of the deficient thickness
  - 4. \$17.00/cubic yard of the item price adjusted for cubic yards, whichever is higher

**END OF SECTION 32 11 23**

**SECTION 32 12 16 - ASPHALT PAVING****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Asphalt materials.
2. Aggregate materials.
3. Type A HMA Asphalt paving
4. Tack coat
5. Asphalt Rubber Binder Seal Coat

## B. Related Requirement:

1. [Section 32 11 23 - Aggregate Base Courses](#): Compacted subbase for paving.
2. [Section 33 05 13 - Manholes and Structures](#)

## 1.2 PRICE AND PAYMENT PROCEDURES

A. [Section 01 29 00 - Payment Procedures](#): Contract Sum/Price

## B. Asphalt Paving or HMA:

1. Basis of Measurement: By ton and will be based on certified weight-meters certificates showing gross, net weight and the type and grading of the mix for each load unless specified otherwise on the Bid Form.
2. Basis of Payment: Includes priming surfaces, tack coating surfaces, fog seal, furnishing, placing, compacting asphalt pavement and temporary HMA tapers.

## C. Asphalt Dikes:

1. Basis of Measurement: By lineal foot.
2. Basis of Payment: Includes priming surfaces, tack coating surfaces, furnishing, placing, compacting.

## 1.3 REFERENCE STANDARDS

## A. American Association of State Highway and Transportation Officials:

1. AASHTO M17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.

2. AASHTO M29 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
3. AASHTO M140 - Standard Specification for Emulsified Asphalt.
4. AASHTO M208 - Standard Specification for Cationic Emulsified Asphalt.
5. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
6. AASHTO M320 - Standard Specification for Performance-Graded Asphalt Binder.
7. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
8. AASHTO MP1a - Standard Specification for Performance-Graded Asphalt Binder.
9. AASHTO T283-14 – Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.
10. AASHTO T324 (Modified) -Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA).

B. Asphalt Institute:

1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot- Mix Types.
2. AI MS-19 - Basic Asphalt Emulsion Manual.
3. AI SP-2 - Superpave Mix Design.

C. State Standard Specification:

1. Section 39 Asphalt Concrete.
2. Section 92 Asphalt Binder.
3. Section 94 Asphaltic Emulsions
4. Section 96 Geosynthetics

#### 1.4 SUBMITTALS

A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.

B. Job Mix Formula (JMF): Except for the Hot Mix Asphalt (HMA) to be used in miscellaneous areas (median island areas not including inside shoulders, island areas, sidewalk, gutters, ditches, over side drains and aprons at end of drainage structures) and dikes, submit the proposed JMF for Type A HMA.

C. The JMF must be submitted on the Contractor Job Mix Formula Proposal form along with:

1. Mix design documentation on Contractor's Hot Mix Asphalt Design data form dated with 12 months of submittal.
2. Safety Data Sheets (SDS) for the following:
  - a. Asphalt Binder
  - b. Supplemental fine aggregate except fines from dust collectors
  - c. Antistripping additives.

- D. The Contractor's Hot Mix Asphalt Design Data form must show documentation on aggregate quality.
- E. Submit QC test results for Reclaimed Asphalt Pavement (RAP) gradation with the combined aggregate gradation within 2 business days of taking RAP samples during Type A HMA production.
- F. Contractor shall submit a new JMF if there are changes to any of the following:
  - 1. Target asphalt binder percentage greater than  $\pm 0.2$  percent.
  - 2. Asphalt binder supplier
  - 3. Combined aggregate gradation
  - 4. Aggregate sources
  - 5. Liquid antistrip producer or dosage
  - 6. Average binder content in a new processed RAP stockpile by more than  $\pm 2.0$  percent from the average RAP binder content reported on Contractor Hot Mix Asphalt Design Data form.
  - 7. Average maximum specific gravity in a new processed RAP stockpile by more than  $\pm 0.060$  percent from the average maximum specific gravity value reported on Contractor's Hot Mix Asphalt Design Data form.
  - 8. Any material in the JMF.
- G. Submit a current asphalt concrete mix design from two separate sources (primary source and backup source) for asphalt concrete proposed to be used.
- H. Contractor shall provide delivery tickets to the City at the time of delivery of each load of product, including asphalt concrete, tack coat, sealant, and paving reinforcement fabric. Each delivery ticket shall include or be accompanied by appropriate batch information produced by the batching plant or factory of origin and information stating the mix or model number, total yield in tons, gallons, or square feet, and time, date, and location of delivery.
- I. Any asphalt concrete rejected by the Project Manager shall be deducted from the total quantity of asphalt concrete tonnage.
- J. Reference Plan: Contractor shall have a walk through with the Project Manager for all installed underground boxes and/or iron elements, 10 days prior to any pavement repair. Contractor shall submit a reference plan (RP) to the Project Manager's review for utility facilities adjustment 3 working days prior to lowering any utility facilities.
- K. Contractor shall submit a paving plan for longitudinal joints.

#### 1.5 QUALITY CONTROL PLAN

- A. The Contractor shall submit a Quality Control (QC) plan for HMA.
- B. The QC plan shall describe the organization and procedures for:

1. Controlling HMA quality characteristics
2. Taking samples, including sampling locations.
3. Establishing, implementing, and maintaining QC
4. Determining when corrective actions are needed.
5. Implementing corrective actions.
6. Using methods and materials for backfilling core locations.

C. The QC plan must address the elements affecting HMA Quality, including

1. Aggregates
2. Asphalt binder
3. Additives
4. Productions
5. Paving

D. For CIP projects, the Contractor shall permit the City’s certified testing laboratory to take samples of the aggregate and asphalt emulsion used in the project at the City’s discretion. Gradation and sand equivalent tests may be run on the aggregate and residual asphalt tests on the emulsion. City will compare the test results with this Section and notify the Contractor if any test fails to meet specifications.

E. The Contractor shall furnish all tools and equipment and employ sufficient trained personnel to operate all equipment and perform all handwork efficiently and skillfully.

1.6 AGGREGATES TESTING:

A. Contractor shall test the quality of aggregates under the test methods and frequencies shown in the following table and provide results to the City:

**Aggregate Testing Frequencies**

Quality Characteristic	Test Method	Minimum Testing Frequency
Gradation <sup>a</sup>	AASHTO T 27	1 per 750 tons and any remaining part
Sand Equivalent <sup>b,c</sup>	AASHTO T 176	
Moisture Content <sup>d</sup>	AASHTO T 255	
Crushed particles	AASHTO T335	1 per 10,000 tons or 2 per project whichever is greater
Los Angeles Rattler	AASHTO T96	
Flat and Elongated particles	AASHTO D4791	
Fine Aggregate angularity	AASHTO T 304 Method A	

<sup>a</sup>If RAP is used, test the combined aggregate gradation under California Test 384.

<sup>b</sup>Reported Value must be average of 3 tests from a single sample

<sup>c</sup>Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, “Manual Shaker,” 7.1.2, “Alternate Method No.2,” and 8.4.3, “Hand Method”, do not apply. Prepare the stock solution as specified in Section 4.8.1, “Stock solution with formaldehyde”, except omit the addition of formaldehyde.

<sup>d</sup>Test at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

1.7 AMBIENT CONDITIONS

- A. [Section 01 50 00 - Temporary Facilities and Controls](#): Ambient conditions control facilities for product storage and installation.
- B. Do not place HMA on wet pavement or frozen surface.
- C. Maximum lift thickness for asphalt paving shall be 4-inches unless shown otherwise on the Drawings.
- D. Spread Type A HMA at the ambient air and surface temperatures shown in the following table unless shown otherwise on the Drawings:

Lift Thickness (Feet)	Ambient air (°F)		Surface (°F)	
	Unmodified asphalt binder	Modified asphalt binder	Unmodified asphalt binder	Modified asphalt binder
< 0.15	55	50	60	55
≥ 0.15	45	45	50	50

**PART 2 - PRODUCTS**

2.1 ASPHALT PAVING

- A. Asphalt Concrete shall conform to Section 39, “Asphalt Concrete”, of the State Standard Specifications and the City Standard Specifications.
- B. Asphalt Concrete for surfacing shall be Hot Mix Asphalt (HMA) Type A.
- C. Asphalt Materials:
  - 1. Asphalt Binder: Asphalt Binder must comply with Section 92, “Asphalt Binders” of the State Standard Specifications.

- a. For a leveling course, the grade of the asphalt binder for the Hot mix asphalt (HMA) must be PG 64-10 or PG 64-16.
  - b. For Miscellaneous areas, and asphalt dikes the grade of the asphalt binder for the Hot mix asphalt (HMA) must be PG 70-10. Minimum asphalt binder content must be 6.40 percent for 3/8" maximum size aggregate.
  - 2. Tack Coat: Diluted cationic emulsified asphalt per Section 94, "Asphaltic Emulsions", of the State Standard Specification. Asphaltic emulsion shall be Grade CSS1h setting type.
  - 3. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt paving.
- D. Reclaimed Asphalt Pavement (RAP) aggregate may be substituted for a part of virgin aggregate in a quantity not to exceed fifteen percent (15%) by weight of the aggregate blend.
- 1. RAP shall conform to Section 39-2.02A (3) (c), "Reclaimed Asphalt Pavement", of the State Standard Specifications.
  - 2. During Type A HMA production, sample RAP twice daily and perform QC testing for:
    - a. Aggregate gradation at least once a day under California Test 384.
    - b. Moisture content at least twice a day.
  - 3. If RAP is used, RAP quality requirements must be as shown in the following table.

**Reclaimed Asphalt Pavement Quality**

Quality Characteristic	Test method	Requirement
Binder Content (% within the average value reported)	AASHTO T 164	± 2.00
Specific Gravity (within the average value reported)	AASHTO T 209	± 0.06

- E. Aggregate Materials:
- 1. Coarse Aggregate: ASTM D692; Aggregate retained on a no. 4 sieve. crushed stone or gravel.
  - 2. Fine Aggregate: ASTM D1073, AASHTO M29; Aggregate passing a no. 4 sieve. Natural sand or sand manufactured from stone or gravel.
  - 3. Mineral Filler: finely ground mineral particles, free of foreign matter consisting of rock dust, slag dust, hydrated lime, hydraulic cement, or any combination of these and complying with AASHTO M17. Mineral fillers shall only be used if needed to improve the workability of the mix or gradation of the aggregate.
  - 4. The aggregate gradation for Type A HMA must comply with the requirements shown in the following table unless specified otherwise on the Drawings:



**Aggregate Gradation Requirements**

<b>Type A HMA pavement thickness shown</b>	<b>Gradation</b>
Greater than 0.10 to less than 0.20 foot	1/2 inch
0.20 to less than 0.25 foot	3/4 inch
0.25 foot or greater	3/4 inch

5. The top 0.20-foot layer of asphalt pavement on the roadway shall have an aggregate gradation of 1/2" inch maximum.
6. Aggregate gradation must be within the Target Value (TV) limits for the specified sieve size shown in the following tables:

**Aggregate Gradation for Type A HMA (percentage passing)  
1 inch**

<b>Sieve Size</b>	<b>Target value limit</b>	<b>Allowable tolerance</b>
1"	100	-
3/4"	88-93	TV ± 5
1/2"	72-85	TV ± 6
3/8"	55-70	TV ± 6
No. 4	35-52	TV ± 7
No. 8	22-40	TV ± 5
No. 30	8-24	TV ± 4
No. 50	5-18	TV ± 4
No. 200	3-7	TV ± 2.0

**3/4 inch**

<b>Sieve Size</b>	<b>Target value limit</b>	<b>Allowable tolerance</b>
1"	100	-
3/4"	90-98	TV ± 5
1/2"	70-90	TV ± 6
No. 4	42-58	TV ± 5
No. 8	29-43	TV ± 5
No. 30	10-23	TV ± 4
No. 200	2-7	TV ± 2.0

**1/2 inch**

<b>Sieve Size</b>	<b>Target value limit</b>	<b>Allowable tolerance</b>
3/4"	100	-
1/2"	95-98	TV ± 5
3/8"	72-95	TV ± 5
No. 4	52-69	TV ± 5
No. 8	35-55	TV ± 5
No. 30	15-30	TV ± 4
No. 200	2-8	TV ± 2.0

**3/8 inch**

Sieve Size	Target value limit	Allowable tolerance
3/4"	100	-
1/2"	95-98	TV ± 5
3/8"	72-95	TV ± 5
No. 4	52-69	TV ± 5
No. 8	35-55	TV ± 5
No. 30	15-30	TV ± 4
No. 200	2-8	TV ± 2.0

7. Before the additional of asphalt binder, the aggregates must comply with the quality requirements shown in the following table:

Quality characteristics	Test Method	Requirement
Aggregate Gradation <sup>a</sup>	AASHTO T27	JMF ± Tolerance
Percent of crushed particles	AASHTO T 335	95
Coarse aggregate (min, %)		
One-fractured face		
Two-fractured face		
Fine aggregate (min, %)	AASHTO T96	70
Passing No. 4 sieve and retained on No. 8 sieve.)		
One-fractured face		
Los Angeles Rattler (max, %)	AASHTO T176	12
Loss at 100 Rev.		
Loss at 500 Rev.		
Sand equivalent (min.) <sup>b, c</sup>	ASTM D4791	47
Flat and elongated particles (max, % by weight at 5:1)	AASHTO T304, Method A	10
Fine aggregate angularity (min, %) <sup>d</sup>		45
<p><sup>a</sup>The Project Manager determines combined aggregate gradations containing RAP under California Test 384.</p> <p><sup>b</sup>Reported value must be the average of 3 tests from a single sample.</p> <p><sup>c</sup>Use of a sand reading indicator is required as shown in AASHTO T176, Figure 1. Section 4.7, "Manual Shaker", 7.1.2, "Alternate Method No.2." and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.</p> <p><sup>d</sup>The Project Manager waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.</p>		

2.2 TYPE A HMA PRODUCTION

- A. Contractor shall test the quality characteristics of Type A HMA under the test methods and frequencies shown in the following table and provide results to the City:

**Type A HMA Production Testing Frequencies**

Quality Characteristic	Test method	Minimum testing frequency
Asphalt Binder	AASHT T 308, Method A	1 per 750 tons and any remaining part
HMA Moisture Content	AASHTO T 329	1 per 2,500 tons but not less than 1 per paving day
Air Void Content	AASHTO T 269	1 per 4,000 tons or 2 every 5 paving days whichever is greater
Voids in mineral aggregate	SP-2 Asphalt Mixture Volumetrics	1 per 10,000 tons or 2 per project whichever is greater
Dust proportion	SP-2 Asphalt Mixture Volumetrics	
Density of core	California Test 375	2 per paving day
Nuclear gauge density	California Test 375	3 per 250 tons or 3 per paving day, whichever is greater
Hamburg wheel track	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is greater.
Moisture susceptibility	AASHTO T 283	

2.3 TYPE A HMA ACCEPTANCE

- A. In place Type A HMA quality requirements shall be as shown in the following table:

**Type A HMA Acceptance In Place**

Quality Characteristic	Test method	Requirement
Asphalt Binder content (%)	AASHTO T 308 Method A	JMF – 0.3, +0.50
HMA moisture content (max, %)	AASHTO T 329	1.00
Voids in mineral aggregate on laboratory-produced HMA (min, %) <sup>d</sup> Gradation: No. 4 3/8-inch 1/2-inch	SP-2 Asphaltic Mixture Volumetrics	16.5-19.5 15.5-18.5 14.5-17.5

3/4-inch 1-inch with NMAS = 1-inch with NMAS = 3/4-inch		13.5-16.5 13.5-16.5 14.5-17.5
Voids in mineral aggregate on plant-produced HMA (min, %) <sup>a</sup> Gradation: No. 4 3/8-inch 1/2-inch 3/4-inch 1-inch with NMAS = 1-inch with NMAS = 3/4-inch	SP-2 Asphaltic Mixture Volumetrics <sup>c</sup>	15.5-18.5 14.5-17.5 13.5-16.5 12.5-15.5 12.5-15.5 13.5-16.5
Dust proportion	SP-2 Asphaltic Mixture Volumetrics	0.6-1.3 <sup>g</sup>
Density of core (% of max theoretical density) <sup>e,f</sup>	California Test 375	91.0-97.0
Hamburg wheel track (min number of passes at 0.5-inch rut depth) Binder grade: PG 58 PG 64 PG 70 <del>PG 76 or higher</del>	AASHTO T 324 (Modified)	10,000 15,000 20,000 <del>25,000</del>
Hamburg wheel track (min number of passes at inflection point) Binder grade: PG 58 PG 64 PG 70 <del>PG 76 or higher</del>	AASHTO T 324 (Modified)	10,000 10,000 12,500 <del>15,000</del>
Moisture susceptibility (min, psi, dry strength)	AASHTO T 283	100
Moisture susceptibility (min, psi, wet strength)	AASHTO T 283	70
<sup>a</sup> Prepare 3 briquettes. Report the average of 3 tests, <sup>b</sup> For CIP projects, the City's Testing Laboratory determines the bulk specific gravity of each lab-compacted briquette under AASHTO T 275, Method A, and theoretical maximum specific gravity under AASHTO T 209, Method A. <sup>c</sup> Determine the bulk specific gravity under AASHTO T 275, Method A. <sup>d</sup> For CIP projects, the City's Testing Laboratory determines the laboratory-prepared Type A HMA value for only mix design verification.		

<sup>e</sup>For CIP projects, the City's Testing Laboratory determines percent of theoretical maximum density under California Test 375 except for CIP Projects, City's Testing Laboratory uses:

1. AASHTO T 275 to determine in-place density of each density core.
2. AASHTO T 209, method A to determine theoretical maximum density instead of calculating test maximum density.

<sup>f</sup>For CIP projects, the City's Testing Laboratory determines theoretical maximum density under AASHTO T 209, Method A, at the frequency specified in California Test 375, part 5, section D.

<sup>g</sup>For lime-treated aggregates, the dust proportion requirement is 0.6-1.5

## 2.4 SOURCE QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Testing, inspection and analysis requirements.
- B. Test samples in accordance with AI MS-2.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. [Section 01 70 00 - Execution](#): Requirements for installation examination.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted aggregate base is dry and ready to support paving and imposed loads as specified in the project Geotechnical Report or as directed by the Project Manager.
  1. Proof roll subbase with minimum two perpendicular passes to identify soft spots.
  2. Remove soft subbase and replace with compacted fill.
- D. Verify with a licensed land surveyor that the gradients and elevations of base are correct.
- E. Verify drainage grates and frames, and manhole frames are installed in correct position and elevation.

### 3.2 CONSTRUCTION

- A. Contractor may deposit HMA in a windrow and load it in the paver if:
  1. Paver is equipped with a hopper that automatically feeds the screed.

2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without contaminating or damaging HMA and subgrade base material.
  3. Activities for depositing, pickup loading and paving are continuous.
  4. HMA temperature in the windrow does not fall below 260-degree F.
- B. HMA placed in a windrow on the roadway surface must not extend more than 250 feet in front of the loading equipment or material transfer vehicle.
- C. HMA handled, spread, or windrowed must not stain the finished surface of any improvement, including pavement.
- D. Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.
- E. HMA must be free of:
1. Segregation
  2. Coarse or fine aggregate pockets
  3. Hardened lumps
- F. Complete finish rolling activities before the pavement surface temperature is
1. Below 150 degrees F for HMA with unmodified binder
  2. Below 140 degrees F for HMA with modified binder

### 3.3 SPREADING AND COMPACTING EQUIPMENT

- A. Paving equipment for spreading must be:
1. Self-propelled
  2. Mechanical
  3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane.
  4. Equipped with a full-width compacting device.
  5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope.
- B. Install and maintain grade and slope reference.
- C. The screed must be heated and produce a uniform HMA surface texture without tearing, shoving, or gouging.
- D. The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.
- E. Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

- F. In areas inaccessible to spreading and compacting equipment:
  - 1. Spread the HMA by any means to obtain the specified lines, grades and cross sections.
  - 2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction.

### 3.4 MATERIAL TRANSFER VEHICLE:

- A. The material transfer vehicle must have sufficient capacity to prevent stopping the paver and must be capable of:
  - 1. Either receiving HMA directly from trucks or using a windrow pickup head to load it from a windrow deposited on the roadway surface.
  - 2. Remixing the HMA with augers before transferring into the paver's receiving hopper or feed system.
  - 3. Transferring HMA directly into the paver's receiving hopper or feed system.

### 3.5 METHOD COMPACTION EQUIPMENT:

- A. For method compaction, each paver spreading HMA must be followed by 3 rollers:
  - 1. One vibratory roller specified designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
  - 2. One oscillating-type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
  - 3. One steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

### 3.6 SURFACE PREPARATION:

- A. Before placing HMA, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.
- B. Prepare subgrade to receive HMA under the sections for the material involved. Subgrade must be free of loose and extraneous material.

### 3.7 TACK COAT:

- A. Apply tack coat in accordance with Section 39-2.01C(3)(f) of the State Standard Specifications.

- B. Apply tack coat:
  - 1. To existing pavement including planed surfaces.
  - 2. Between HMA layers
  - 3. To vertical surfaces of:
    - a. Curbs
    - b. Gutters
    - c. Construction joints.
- C. Coat surfaces of manholes and catch basins.
- D. Equipment for the application of tack coat must comply with Section 37-1.03B, "Equipment" of the State Standard Specifications.
- E. Before placing HMA, apply tack coat in one (1) application at the minimum residual rate shown in the following table for the condition of the underlying surface:

**Tack Coat Application Rates for HMA**

HMA Over:	Minimum residual rates (gal/sq. yd) CSS1/CSS1h asphaltic emulsion
New HMA (between layers)	0.02
Concrete Pavement and existing asphalt concrete surfacing	0.03
Planed pavement	0.05

- F. If a stress absorbing membrane interlayer as specified in Section 37-2.05, "Stress Absorbing Membrane Interlayers", of the State Standard Specification is applied, the tack application rates for new HMA apply.
- G. Notify the Project Manager if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.
- H. Apply tack coat to vertical surfaces with a residual rate that will thoroughly coat the vertical face without running off.
- I. Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.
- J. Close areas to traffic receiving tack coat. Do not allow the tracking of tack coat onto pavement surfaces beyond the job site.
- K. If an asphalt binder is used for tack coat, the asphalt binder temperature must be from 285 to 350-degree F when applied.



### 3.8 LONGITUDINAL JOINTS

- A. Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line.
- B. A vertical longitudinal joint of more than 0.15 foot is not allowed at any time between adjacent open lanes to traffic.
- C. For an HMA thickness of 0.15 foot or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.
- D. For an HMA thickness greater than 0.15 foot, you must place HMA on adjacent travel way lanes or shoulder such that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. Place Kraft paper or other authorized release agent under the conform tapers to facilitate the taper removal when paving activities resume.
- E. If placing HMA against the edge of existing pavement, saw cut or grind the pavement straight and vertical the joint to the full depth and remove extraneous material.

### 3.9 MISCELLANEOUS AREAS AND DIKES

- A. Asphalt concrete for dikes shall be Type A, 3/8" maximum size aggregate.
- B. Prepare the areas to receive HMA for miscellaneous areas and dikes, including excavation, placing tack coat, and backfill as needed.
- C. Spread the HMA in miscellaneous areas in 1 layer and compact to the specified lines and grades.
- D. The finished surface must be:
  - 1. Textured uniformly
  - 2. Compacted firmly
  - 3. Without depressions, humps, and irregularities.

### 3.10 COMPACTION

- A. Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving.

- B. If a vibratory roller is used as a finish roller, turn the vibrator off.
- C. If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.
- D. Relative compaction will be determined by California Test 375.

### 3.11 PAVEMENT CRACK SEALING

- A. See [Section 32 12 17 – Asphalt Paving Rehabilitation](#) for Pavement Crack Sealing Specifications.

### 3.12 ASPHALT PAVING TOLERANCES

- A. [Section 01 45 00 - Quality Control](#): Tolerances.
- B. Flatness: Maximum variation of 1/8 inch measured with 10-foot straight edge.
- C. Scheduled Compacted Thickness: Within 1/4 inch.

### 3.13 FIELD QUALITY CONTROL

- A. [Section 01 45 00 – Quality Control](#): Requirements for testing, adjusting, and balancing.
- B. Asphalt Paving Mix Temperature: Measure temperature at time of placement.

### 3.14 PROTECTION

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from mechanical injury for until surface temperature is less than 140 degrees F.

**END OF SECTION 32 12 16**

**SECTION 32 12 17 - ASPHALT PAVEMENT REHABILITATION****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Asphalt materials.
2. Aggregate materials.
3. Type A HMA Asphalt paving
4. Tack coat
5. Cold Planing
6. Geosynthetic pavement interlayer
7. Crack treatment
8. Adjusting iron castings to grade
9. Surface slurry.
10. Micro-surfacing

## B. Related Requirement:

1. [Section 32 11 23 - Aggregate Base Courses](#): Compacted subbase for paving.
2. [Section 33 05 13 - Manholes and Structures](#)

## 1.2 PRICE AND PAYMENT PROCEDURES

A. [Section 01 29 00 - Payment Procedures](#) Contract Sum/Price

## B. Asphalt Paving or HMA:

1. Basis of Measurement: By ton and will be based on certified weight-meters certificates showing gross, net weight and the type and grading of the mix for each load.
2. Basis of Payment: Includes priming surfaces, tack coating surfaces, fog seal, furnishing, placing, compacting, and testing base course.

## C. Cold Planing Asphalt Pavement:

1. Basis of Measurement: By Square foot.
2. Basis of Payment: Includes removing existing pavement markers, legends and pavement striping, removing detector loops, grinding or cold planing asphalt pavement to achieve a minimum 2-inch HMA thickness overlay, and preparing surface for HMA overlay.

3. If a separate bid item is not listed in the bid form for Monument Protection and Referencing, full compensation for referencing monuments, re-establishing the monuments and submitting corner record to the County by a Licensed Land Surveyor shall be considered as included in the price paid for Cold Planing Asphalt Pavement and no separate compensation will be allowed therefor.
4. If a separate bid item is not listed in the bid form for lowering of utilities and re-adjustment of utility boxes, valves, grates and manholes covers to finish grade after paving, full compensation for adjusting the utility boxes, valves, grates and manhole covers to finish grade shall be considered as included in the price paid for Cold Planing Asphalt Pavement and no separate compensation will be allowed therefor.

D. Geosynthetic Pavement Interlayer:

1. Basis of Measurement: By square yard of area measured from the actual pavement covered over the interlayer. If multiple layers of pavement interlayer are used, square footage of each layer would be added for the measurement.
2. Basis of Payment: Includes priming surfaces, tack coating surfaces, furnishing, placing, overlapping and compacting.

E. Crack Treatment:

1. Basis of Measurement: Crack treatment will be measured per lineal foot, unless specified otherwise in the Contract Documents.  
Basis of Payment: Crack treatment is considered incidental to the item most closely related to and no separate compensation will be allowed therefor.

F. Slurry seal:

1. Basis of Measurement: By square feet of area measured from the actual pavement covered by slurry seal application
2. Basis of Payment: Includes coordinating with utility companies, covering and protecting utility structures before and after slurry seal, sweeping, traffic controls, surface preparation, equipment inspections, applying slurry seal, rolling, clean up, and opening to traffic.

G. Micro-surfacing:

1. Basis of Measurement: By square feet of area measured from the actual pavement covered by Micro-surfacing application.
2. Basis of Payment: Includes coordinating with utility companies, covering and protecting utility structures before and after micro-surfacing, grade, sweeping, traffic controls, surface preparation, equipment inspections, applying micro-surfacing, rolling, clean up, and opening to traffic.

### 1.3 REFERENCE STANDARDS

#### A. American Association of State Highway and Transportation Officials:

1. AASHTO M17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
2. AASHTO M29 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
3. AASHTO M140 - Standard Specification for Emulsified Asphalt.
4. AASHTO M208 - Standard Specification for Cationic Emulsified Asphalt.
5. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
6. AASHTO M320 - Standard Specification for Performance-Graded Asphalt Binder.
7. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
8. AASHTO MP1a - Standard Specification for Performance-Graded Asphalt Binder.
9. AASHTO T283-14 – Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.
10. AASHTO T324 (Modified) -Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA).

#### B. Asphalt Institute:

1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot- Mix Types.
2. AI MS-19 - Basic Asphalt Emulsion Manual.
3. AI SP-2 - Superpave Mix Design.

#### C. State Standard Specification:

1. Section 39 Asphalt Concrete.
2. Section 92 Asphalt Binders.
3. Section 94 Asphaltic Emulsions
4. Section 96 Geosynthetics

### 1.4 SUBMITTALS

#### A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.

#### B. Job Mix Formula (JMF): Except for the Hot Mix Asphalt (HMA) to be used in miscellaneous areas (median island areas not including inside shoulders, island areas, sidewalk, gutters, ditches, over side drains and aprons at end of drainage structures) and dikes, submit the proposed JMF for Type A HMA.

#### C. The JMF must be submitted on the Contractor Job Mix Formula Proposal form along with:

1. Mix design documentation on Contractor's Hot Mix Asphalt Design data form dated with 12 months of submittal.
  2. Safety Data Sheets (SDS) for the following:
    - a. Asphalt Binder
    - b. Supplemental fine aggregate except fines from dust collectors
    - c. Antistrip additives.
- D. The Contractor's Hot Mix Asphalt Design Data form must show documentation on aggregate quality.
- E. Submit QC test results for Reclaimed Asphalt Pavement (RAP) gradation with the combined aggregate gradation within 2 business days of taking RAP samples during Type A HMA production.
- F. Contractor shall submit a new JMF if there are changes to any of the following:
  1. Target asphalt binder percentage greater than  $\pm 0.2$  percent.
  2. Asphalt binder supplier
  3. Combined aggregate gradation
  4. Aggregate sources
  5. Liquid antistrip producer or dosage
  6. Average binder content in a new processed RAP stockpile by more than  $\pm 2.0$  percent from the average RAP binder content reported on Contractor Hot Mix Asphalt Design Data form.
  7. Average maximum specific gravity in a new processed RAP stockpile by more than  $\pm 0.060$  percent from the average maximum specific gravity value reported on Contractor's Hot Mix Asphalt Design Data form.
  8. Any material in the JMF.
- G. Submit a current asphalt concrete mix design from two separate sources (primary source and backup source) for asphalt concrete proposed to be used.
- H. For Capital Improvement Projects (CIP) projects, the Contractor shall provide delivery tickets to the City at the time of delivery of each load of product, including asphalt concrete, tack coat, sealant, and paving reinforcement fabric. Each delivery ticket shall include or be accompanied by appropriate batch information produced by the batching plant or factory of origin and information stating the mix or model number, total yield in tons, gallons, or square feet, and time, date, and location of delivery.
- I. Any asphalt concrete rejected by the Project Manager shall be deducted from the total quantity of asphalt concrete tonnage.
- J. Reference Plan: Contractor shall have a walk through with Engineer for all installed underground boxes and/or iron elements, ten (10) working days prior to any pavement repair. Contractor shall submit a reference plan (RP) for utility facilities adjustment prior to covering or lowering any utility facilities three (3) working days prior to any pavement repair.

- K. Submit a laboratory report of test results and a proposed mix design 10 days before starting placement of slurry seal. The report and mix design must include the specific materials to be used. The laboratory report must include:
  - 1. Test results used in the mix design
  - 2. Proportions of the following materials based on the aggregate's dry weight:
    - a. Aggregate
    - b. Filler determined from tests, minimum and maximum
    - c. Water, minimum and maximum
    - d. Asphalt solid content
    - e. Set control agent
  - 3. Comparison of slurry seal test results to the specified values
  
- L. Submit a laboratory report of test results and a proposed mix design 10 days before starting placement of micro-surfacing. The report and mix design must include the specific materials to be used. The laboratory report must include:
  - 1. Test results used in the mix design
  - 2. Proportions of the following materials based on the aggregate's dry weight:
    - a. Aggregate
    - b. Water, minimum and maximum
    - c. Additives
    - d. Mineral filler, minimum and maximum
    - e. Micro-surfacing emulsion residual asphalt content, minimum and maximum
  - 3. Recommend changes to the following proportions based on heating the mixture to 100-degree F and mixing for 60 seconds:
    - a. Water
    - b. Additives
    - c. Mineral Filler
  - 4. Comparison of each individual material's test results to its specified values.
  - 5. Quantitative moisture effects on the aggregate's unit weight determined under ASTM C29.

## 1.5 QUALITY CONTROL PLAN

- A. The Contractor shall submit a Quality Control (QC) plan for HMA.
- B. The QC plan shall describe the organization and procedures for:
  - 1. Controlling HMA quality characteristics
  - 2. Taking samples, including sampling locations.
  - 3. Establishing, implementing, and maintaining QC
  - 4. Determining when corrective actions are needed.
  - 5. Implementing corrective actions.
  - 6. Using methods and materials for backfilling core locations.
- C. The QC plan must address the elements affecting HMA Quality, including

1. Aggregates
2. Asphalt binder
3. Additives
4. Productions
5. Paving

- D. For CIP projects, the Contractor shall permit the City's certified testing laboratory to take samples of the aggregate and asphalt emulsion used in the project at the City's discretion. Gradation and sand equivalent tests may be run on the aggregate and residual asphalt tests on the emulsion. City will compare the test results with this Section and notify the Contractor if any test fails to meet specifications.
- E. The Contractor shall furnish all tools and equipment and employ sufficient trained personnel to operate all equipment and perform all handwork efficiently and skillfully.

#### 1.6 AGGREGATES TESTING:

- A. Contractor shall test the quality of aggregates under the test methods and frequencies shown in [Section 32 12 16 – Asphalt Paving](#).

#### 1.7 AMBIENT CONDITIONS

- A. Refer to [Section 32 12 16 – Asphalt Paving](#) for ambient air and surface temperatures for spreading HMA.

### **PART 2 - PRODUCTS**

#### 2.1 ASPHALT PAVING

- A. Asphalt Concrete shall conform to Section 39, "Asphalt Concrete", of the State Standard Specifications and the City Standard Specifications.
- B. Asphalt Concrete for surfacing shall be Hot Mix Asphalt (HMA) Type A.
- C. Asphalt Materials:
1. Asphalt Binder: Asphalt Binder must comply with Section 92, "Asphalt Binders", of the State Standard Specifications.
    - a. For a leveling course, the grade of the asphalt binder for the Hot mix asphalt (HMA) must be PG 64-10 or PG 64-16.
    - b. For Miscellaneous areas, and asphalt dikes the grade of the asphalt binder for the Hot mix asphalt (HMA) must be PG 70-10. Minimum



- asphalt binder content must be 6.40 percent for 3/8" maximum size aggregate.
- 2. Tack Coat: Diluted cationic emulsified asphalt per Section 94, "Asphaltic Emulsion", of the State Standard Specification. Asphaltic emulsion shall be Grade CSS1h setting type.
- 3. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt paving.
- 4. Oil
  
- D. Reclaimed Asphalt Pavement (RAP) aggregate may be substituted for a part of virgin aggregate in a quantity not to exceed fifteen percent (15%) by weight of the aggregate blend.
  - 1. RAP shall conform to Section 39-2.02A(3)(c), "Reclaimed Asphalt Pavement", of the State Standard Specifications.
  - 2. During Type A HMA production, sample RAP twice daily and perform QC testing for:
    - a. Aggregate gradation at least once a day under California Test 384.
    - b. Moisture content at least twice a day.
  - 3. If RAP is used, RAP quality requirements must be as shown in the following table.

**Reclaimed Asphalt Pavement Quality**

Quality Characteristic	Test method	Requirement
Binder Content (% within the average value reported)	AASHTO T 164	± 2.00
Specific Gravity (within the average value reported)	AASHTO T 209	± 0.06

- E. Aggregate Materials: All aggregate materials shall conform to the aggregate material specifications specified in [Section 32 12 16 – Asphalt Paving](#).

2.2 TYPE A HMA PRODUCTION

- A. Contractor shall test the quality characteristics of Type A HMA under the test methods and frequencies shown in [Section 32 12 16 – Asphalt Paving](#).

2.3 TYPE A HMA ACCEPTANCE

- A. For Type A HMA quality requirements, see Type A HMA acceptance specified in [Section 32 12 16 – Asphalt Paving](#).

## 2.4 GEOSYNTHETIC PAVEMENT INTERLAYER:

- A. Geosynthetic pavement interlayer shall conform to Geosynthetic pavement interlayer specified in [Section 32 12 16 – Asphalt Paving](#).

## 2.5 CRACK TREATMENT:

- A. Crack sealant must comply with Section 37-6, “Crack Treatments”, of the State Standard Specifications.
- B. The pavement crack treatment material must comply with the requirements for Type 1 or Type 2 crack treatment material shown in the following table:

**Crack Treatment Material**

Quality characteristic <sup>a</sup>	Test method <sup>b</sup>	Requirements	
		Type 1	Type 2
Softening Point (min, °C)	ASTM D36/D36M	102	96
Cone Penetration at 77-degrees F (max)	ASTM D5329	35	40
Resilience at 77-degree F, unaged (% min)	ASTM D5329	20-60	25-65
Flexibility <sup>c</sup> (°C)	ASTM D3111	0	0
Tensile adhesion (min, %)	ASTM D5329	300	400
Specific Gravity (max.)	ASTM D70	1.25	1.25
Asphalt Compatibility	ASTM D5329	Pass	Pass
Sieve test (% passing)	See note d	100	100

<sup>a</sup>Cold-applied crack treatment material residue collected under ASTM D6943, Method B and sampled under ASTM D140 must comply with the grade specifications.

<sup>b</sup>Except for viscosity, cure each specimen at a temperature of  $23 \pm 2$  °C and a relative humidity of  $50 \pm 10$  percent for  $24 \pm 2$  hours before testing.

<sup>c</sup>For the flexibility test, the specimen size must be  $6.4 \pm 0.2$  mm thick by  $25 \pm 0.2$  mm wide by  $150 \pm 0.5$  mm long. The test mandrel diameter must be  $6.4 \pm 0.2$  mm. The bend arc must be 180 degrees. The bend rate must be  $2 \pm 1$  seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

<sup>d</sup>For hot-applied crack treatment, dilute with toluene and sieve through a no. 8 sieve. For cold-applied crack treatment, sieve the material as-received through a no. 8 sieve. If the manufacturer provides a statement that added components passed the no. 16 sieve before blending, this requirement is void.

- C. The material shall be capable of being melted and applied to cracks and joints at temperatures below 400-degrees F. When heated, it shall readily penetrate cracks 1/4-inch wide or wider.
- D. Crack treatment material must be delivered to the job site with manufacturer’s name, production location, brand or trade name, designation, crack treatment trade name, batch number, maximum heat temperature and expiration date for cold application only.
- E. Hot-applied crack treatment must be delivered to the job site premixed in cardboard containers with meltable inclusion liners or in a fully meltable package.
- F. Sand applied to tacky crack treatment material must be clean, free of clay, and comply with the gradation shown in the following table:

**Sand Gradation**

Sieve Size	Percent passing
No. 4	100
No. 50	0-30
No. 200	0-5

2.6 SLURRY SEAL

- A. Slurry Seal shall be in conformance with Section 37-3 – Slurry Seal and Micro-Surfacing of the State Standard Specifications.
- B. Applying slurry seal consists of spreading a mixture of asphaltic emulsion, aggregate, set-control additives, and water on a surface or pavement.
- C. Aggregates for slurry seal and micro-surfacing must comply with the gradation requirements shown in the following table:

**Sand Gradation**

Sieve Size	Percent passing (Class II)
3/8"	100
No. 4	94-100
No. 8	65-90
No. 16	40-70
No. 30	25-50
No. 200	5-15

- D. Aggregate must be rock dust or sand such as plaster sand. Aggregate larger than No. 50 sieve must be 100 percent crushed rock. Aggregate must be free from vegetable matter, deleterious substances, caked or clay clumps, and oversized particles.
- E. The mix design must have the percent of asphaltic emulsion, based on percentage by weight of the dry aggregate, within the range of 12%-18% for Class II aggregate type.
- F. Minimum sand equivalent per California Test 217 and minimum durability index and California Test 229 shall be 55 for Class II Aggregate.

2.7 MICRO-SURFACING

- A. Micro-surfacing shall be in conformance with Section 37-3, "Slurry Seal and Micro-surfacings", of the State Standard Specifications.
- B. Applying Micro-surfacing consists of spreading a mixture of micro-surfacing emulsion, water, additives, mineral filler and aggregate on the pavement.
- C. Micro-surfacing mix design must have the material proportion limits shown in the following table:

**Micro-surfacing Mix Design Proportion Limits**

Material	Proportion Limits
Micro-surfacing emulsion residual asphalt	5.5%-9.5% of aggregate by weight
Water and additives	No Limit
Mineral Filler	0%-3% aggregate dry weight

- D. Aggregate for micro-surfacing except mineral filler must comply with the requirements shown in the following table:

**Micro-surfacing aggregate**

Quality Characteristic	Test Method	Requirement
Sand equivalent (min.)	California Test 217	65
Durability index (min.)	California Test 229	65
Percentage of crushed particles (min., %) <sup>a</sup>	California Test 205	95
Los Angeles Rattler Loss at 500 revolutions (max, %) <sup>b</sup>	California Test 211	35
<sup>a</sup> Crushed particles must have at least 1 fractured face		
<sup>b</sup> California Test 211 must be performed on the aggregate before crushing.		

- E. Micro-surfacing emulsion must be a homogeneous mixture of asphalt, polymer, and emulsifier solution and shall conform to Section 37-3.03A(4)(b)(ii), "Micro-surfacing Emulsion", of the State Standard Specifications.
- F. If Portland cement is used as mineral filler, it must be any combination of Type I, Type II or Type II cement.

## 2.8 SOURCE QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Testing, inspection and analysis requirements.
- B. Test samples in accordance with AI MS-2.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. [Section 01 70 00 - Execution](#) and [Section 01 77 00 - Closeout Requirements](#): Requirements for installation examination.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted aggregate base is dry and ready to support paving and imposed loads as specified in the project Geotechnical Report or as directed by the Project Manager.
  - 1. Proof roll subbase with minimum two perpendicular passes to identify soft spots.
  - 2. Remove soft subbase and replace with compacted fill.
- D. Verify with a licensed land surveyor that the gradients and elevations of base are correct.
- E. Verify drainage grates and frames, and manhole frames are installed in correct position and elevation.

### 3.2 DEMOLITION

- A. Saw cut and notch existing paving as indicted on Drawings. Before removing any portion of an asphalt concrete facility, make a sawcut full depth to a true line along the limits of the removal area.
- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.

- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.
- D. Where replace asphalt concrete surfacing is shown, remove the full depth of the existing asphalt concrete surfacing and replace with HMA.
- E. Before removing asphalt concrete, outline the replacement areas and cut neat lines with a saw or grind to full depth of on the existing asphalt concrete. Do not damage asphalt concrete and base that is to remain in place.
- F. Any excavations of the base material beyond the specified plane, shall be replaced with HMA. No additional compensation will be allowed for HMA placed beyond the specified plane.
- G. Do not use a material transfer vehicle for replacing asphalt concrete surfacing.
- H. When base and surfacing are described to be removed, remove base and surfacing to a depth of at least 6 inches below the grade of the existing surfacing. Backfill resulting holes and depressions.
- I. All material removed shall become the property of the Contractor and shall be disposed of in a legal manner.

### 3.3 COLD PLANING ASPHALT CONCRETE PAVEMENT

- A. Cold planning asphalt concrete pavement includes the removal of pavement markers, traffic stripe, and pavement markings within the area of cold planning.
- B. Cold plane existing asphalt paving to a minimum depth that results in a new HMA pavement section which is minimum 2-inch thick as shown on the Drawings. Contractor shall make a sawcut after cold planing at the conform edges to allow for a minimum 2-inch vertical surface at the conforms.
- C. HMA for temporary tapers must be of the same quality that is used for the HMA overlay.
- D. Do not use a heating device to soften the pavement.
- E. The cold planning machine must be:
  - 1. Equipped with a cutter head width that matches the planing width unless a wider cutter head is authorized
  - 2. Equipped with automatic controls for the longitudinal grade and transverse slope of the cutter head and:
    - a. If a ski device is used, it must be at least 30 feet long, rigid, and a 1-piece unit. The entire length must be used in activating the sensor.
    - b. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system

- must be used at or near the centerline of the roadway. On the adjacent pass with the cold planing machine, a joint matching shoe may be used.
3. Equipped to effectively control dust generated by the planing operation.
  4. Operated such that no fumes or smoke is produced.
- F. Replace broken, missing, or worn machine teeth.
- G. If the Contractor does not complete placing the HMA surfacing before opening the area to traffic, the Contractor must:
1. Construct a temporary HMA taper to the level of the existing pavement
  2. Place HMA during the next work shift
  3. Submit a corrective action plan that shows that the Contractor will complete cold planing and placement of HMA in the same work shift. Do not restart cold planing activities until the corrective action plan is authorized.
- H. The completed surface of the planed pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. With the straightedge at right angles to the centerline, the transverse slope of the planed surface must not vary more than 0.03 foot.
- I. Where lanes are open to traffic, the drop-off between adjacent lanes must not be more than 0.15 foot.
- J. Remove cold planed material concurrently with planing activities such that the removal does not lag more than 50 feet behind the planer. All materials removed shall become the property of the Contractor and shall be disposed of in a legal manner.
- K. The Contractor shall be responsible for maintaining the street in a clean condition during the course of the cold planing or grinding operations using a vacuum sweeper.
- L. If a drop-off between the existing pavement and the planed areas at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper. The HMA temporary taper must be:
1. Placed to the level of existing pavement and tapered on a slope of 30:1 (horizontal: vertical) or flatter to the level of the planed areas.
  2. Compacted by any method that will produce a smooth riding surface.
- M. Completely remove temporary tapers before placing permanent surfacing.
- N. Remove and replace any traffic signal detector loops and loop conductors including the loop conductors leading into the detector box. For City owned traffic signals where traffic signal detector loops are present, the Contractor shall notify the Project Manager a minimum of one (1) week prior to beginning work near the loops. For Caltrans traffic signals the Contractor shall notify Caltrans in conformance with Caltrans requirements.

### 3.4 CONSTRUCTION

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for construction of asphalt paving.

### 3.5 SPREADING AND COMPACTING EQUIPMENT

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for construction of compaction of asphalt paving.

### 3.6 MATERIAL TRANSFER VEHICLE:

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for material transfer vehicle.

### 3.7 METHOD COMPACTION EQUIPMENT:

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for material method compaction equipment.

### 3.8 SURAFCE PREPARATION:

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for surface preparation and tack coat.

### 3.9 GEOSYNTHETIC PAVEMENT INTERLAYER

- A. Where shown on Drawings, place geosynthetic pavement interlayer over a coat of asphalt binder and in compliance with the manufacturer's instructions. Do not place the interlayer on a wet or frozen surface.
- B. Before placing the interlayer and asphalt binder:
  - 1. Repair cracks 1/4-inch and wider, spalls, and holes in the pavement. Repairing cracks is not change order work.
  - 2. Clean the pavement of loose and extraneous material.
- C. Immediately before placing the interlayer, apply  $0.25 \pm 0.03$  gal of asphalt binder per square yard of interlayer or until saturated. Apply asphalt binder the width of the interlayer plus 3 inches on each side. At an overlap, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.
- D. Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2-inch thick. If the overlapping wrinkle is more than 1/2-inch thick, cut the wrinkle out and overlap the interlayer no more than 4 inches.



- E. Overlap the interlayer borders between 4 to 6 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.
- F. Use rolling equipment to correct distortions or wrinkles in the interlayer.
- G. If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.
- H. Before placing HMA on the interlayer, do not expose the interlayer to:
  - 1. Traffic except for crossings under traffic control and only after you place a small HMA quantity.
  - 2. Sharp turns from construction equipment
  - 3. Damaging elements.
- I. Pave HMA on the interlayer during the same work shift. The minimum HMA thickness over the interlayer must be 0.17-foot thick including at pavement conforms as shown on the drawings.

### 3.10 LONGITUDINAL JOINTS

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for longitudinal joints.

### 3.11 WIDENING EXISTING PAVEMENT

- A. If widening existing pavement, construct new pavement structure to match the elevations of the existing pavement's edge before placing HMA over the existing pavement.

### 3.12 COMPACTION

- A. Refer to [Section 32 12 16 - Asphalt Paving](#) for compaction.

### 3.13 PAVEMENT CRACK SEALING

- A. Prior to overlaying existing pavements, crack sealing operations shall be performed in accordance with the following:
  - 1. Crack sealing shall be performed on all pavement cracks 1/4-inch wide or wider. Cracks between 1/4-inch and 1/2-inch wide shall be routed to a depth and width of 1/2-inch prior to sealing.
  - 2. Fill or repair cracks wider than 1-inch or as shown on the Drawings.
  - 3. Crack sealing shall be performed after any required pavement repair or grinding operations and prior to placing flexible pavement coatings, pavement reinforcing fabric, or overlay.

4. All pavement cracks not routed shall first be treated for weed prevention.
5. For hot-applied crack treatment material, rout cracks or sawcut to form a reservoir.
6. Immediately prior to performing crack sealing, the cracks shall be cleaned by the use of oil-free compressed air at a pressure of at least 90 psi such that all vegetation, dirt, and other objectionable materials are removed. The compressed air shall be filtered of moisture and oils. Under damp conditions, a hot compressed air lance shall be utilized to dry the cracks as well. The hot air lance must not apply flame directly on the pavement.
7. Crack sealant material shall conform to the provisions of PART 2 "Products" of this Section and shall be applied at the temperature and rate recommended by the manufacturer.
8. Apply crack treatment with a nozzle inserted into the crack. Fill the crack flush. If after 2 days the crack treatment is more than 1/4-inch below the specified level, the sealant fails, or the crack re-opens, re-treat the crack.
9. Extensively cracked pavement areas shall not be crack sealed unless specifically directed by the Project Manager. This is necessary to avoid interference with proper adhesion of the flexible pavement coatings, pavement reinforcing fabric, or overlay, and to avoid subsequent asphalt bleeding on the new surface. Where the Project Manager determines excessive coating or thickness of pavement crack sealant by the Contractor, the Contractor shall perform the necessary pavement base repairs at the Contractor's expense to correct the problem prior to placement of any flexible pavement coating, pavement reinforcing fabric, or overlay.
10. Immediately remove crack treatment material that is spilled or deposited on the pavement surface.
11. Crack seal areas shall be protected from traffic until the material has sufficiently cured and does not track. Any damage or loss of material from freshly placed crack seal material shall be replaced by the Contractor.
12. Before opening to traffic, apply sand or the manufacturer's recommended detackifying agent to tacky crack treatment material on the traveled way. Sweep up excess sand before opening to traffic.

### 3.14 ADJUST IRON CASTINGS TO GRADE

- A. Before applying slurry seal or micro-surfacing, cover manholes, valves and monument covers, grates or other exposed facilities located within the area of application using plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with enough control points to locate the facilities after application of the seal coat.
- B. All Iron Castings shall be set to finish grade after placing the asphalt concrete. The adjustment of structures and monuments to grade shall be in conformance with Section 15, "Existing Facilities," of the State Standard Specifications and this Section.

- C. When streets are overlaid unless deemed unsuitable by the Project Manager, existing frames and covers shall be salvaged and re-used. All iron castings damaged during construction shall be replaced by the Contractor with new iron castings at the Contractor's expense. Replacement iron castings for City utility structures shall be replaced in conformance with the appropriate technical section. Replacement iron castings for other Agency utility structures shall be replaced in conformance with the appropriate Agency requirements.
- D. All water valve covers shall be exposed on the same day in which they are covered by resurfacing operations.
- E. All maintenance hole covers shall be raised no later than 2 working days after resurfacing is placed, and shall be patch-paved with asphalt concrete within 2 working days after being raised.
- F. Tops of frames shall be set flush with finish grade. Frames which are not flush with finish grade shall be re-adjusted by the Contractor at the Contractor's expense.
- G. After adjusting frames Contractor shall ensure all covers are removable and seat properly when replaced. For new iron castings the new covers shall not rock.
- H. Hand mixing of concrete for use in raising iron castings to grade will be allowed. Concrete shall be placed and thoroughly consolidated in conformance with [Section 32 13 13 - Concrete Surface Improvements](#).
- I. The contractor shall place a false bottom in manholes and valve boxes prior to starting any work. The contractor is to remove any debris with a vacuum cleaner and remove the false bottom after paving. False bottom is to be constructed of 1" marine grade moisture-resistant plywood or City approved equal. The plywood is cut to a circle or otherwise shaped to fit the bottom of the manhole or valve box and then cut in half. The false bottom is then placed in the manhole or valve box with the seam crossing the flow or in such a manner to protect the sewer system from any debris. False bottom is to be placed on blocks at a minimum of 1" above all inlets to the manhole. False bottom shall be connected to the blocks via nails or staples to prevent the blocks from falling into the flow. Blocks shall not obstruct any part of the flow. All debris shall be removed from manhole prior to constructing false bottom. All debris shall be removed from manhole each time the manhole is worked on. False bottoms must be approved by the City prior to installations.
- J. Asphalt concrete patch paving shall be 1/2" maximum asphalt concrete placed over a tack coat. Patch paving may be placed by hand using a vibratory plate compactor or roller in conformance with this Section.

### 3.15 SLURRY SEAL & MICRO-SURFACING

- A. Proportion slurry seal ingredients in compliance with the authorized mix design. Proportion and blend different aggregate types before adding other ingredients. After proportioning, the slurry seal mixture must be workable.
- B. Proportion the micro-surfacing materials using the authorized mix design. Field conditions may require adjustments to the proportions during construction. Obtain Project Manger's written authorization before adjusting proportions.
- C. Before placing slurry seal or micro-surfacing, clean the pavement surface by removing loose particles of extraneous materials, including paving and dirt. Use any nondestructive methods, such as flushing and sweeping, cleaning any oil spots.
- D. If the slurry seal and micro-surfacing activities affect access to public parking, residential property or commercial property, business; notify residents, businesses, and utility companies at least 48 hours before starting activities, The notice must:
  - 1. Describe the work to be performed
  - 2. Detail streets and limits of activities
  - 3. Indicate work hours
  - 4. Be authorized by the Project manager
  - 5. Have an emergency contact information for the Contractor.
- E. Before starting slurry seal and micro-surfacing activities, post signs at 100-foot intervals on the affected streets. Signs must display *No Parking-Tow Away*. Signs must state the day of the week and hours parking or access will be restricted. Signs when no longer required shall be removed.
- F. Place slurry seal and micro-surfacing of both the pavement and air temperatures are at least 50 degrees F. Do not place Slurry or micro-surfacing if either the pavement or air temperature is below 50-degree F and falling. The expected high temperature must be at least 65 degrees F within 24 hours after placement.
- G. Do not place slurry seal or micro-surfacing if rain is imminent or the air temperature is expected to be below 36 degrees F within 24 hours after placement.
- H. Longitudinal joint must correspond with lane lines. Spread slurry in full lane widths.
- I. Longitudinal and transverse joints must be uniform, straight, neat in appearance, butt-type joints, without material buildup, and without uncovered areas.
- J. Spread slurry seal uniformly within the spread rate range of 10 to 15 lbs. of dry aggregate per square yard for Class II aggregate. Do not spot, rehandle or shift the mixture.

- K. Coat the pavement surface with CSS grade asphaltic emulsion mixed with additional water. The ratio of water to asphaltic emulsion must be 3 to 1. Apply the tack coat at a rate from 0.08 to 0.15 gal/sq. yd.
- L. The slurry seal mixture must be uniform and homogenous after spreading, and there must not be separation of the emulsion and aggregate after setting.
- M. The slurry seal surface must be cured to allow traffic without pilot cars within 1 hour after placement. The slurry seal must not show bleeding, raveling, separation, or other distresses for 15 days after placing.
- N. Protect the slurry seal from damage until it has cured and will not adhere or picked up by vehicle tires.
- O. Before micro-surfacing, fog the roadway surface with water ahead of the spreader box. The fog spray must be adjusted for pavement temperature, surface texture and dryness.
- P. The completed spread rate must be within 10 percent of the specified spread rate. The micro-surfacing spread rates must be within the ranges shown in the following table:

**Micro-surfacing Spread Rates**

Micro-surfacing type	Location	Range (lbs. of dry aggregate per sq. yd.)
Type II	Full lane width	10-20
Type III <sup>a</sup>	Full lane width	20-32

<sup>a</sup>Over asphalt concrete pavement

- Q. Spread micro-surfacing either in the direction of traffic or in the opposite direction.
- R. Finished micro-surfacing must be free of irregularities such as scratch or tear marks. Do not leave any marks that are over 1-inch wide or 6-inches long.
- S. Sweep the micro-surfacing 24 hours after the placement without damaging the micro-surfacing. For 5 days afterward, sweep the micro-surfacing daily.
- T. If bleeding, raveling, delaminating, rutting, or wash-boarding occurs after placing the micro-surfacing make repairs as approved by the Project Manager.
- U. Sidewalk and driveways must be kept clean with an air compressor after 1<sup>st</sup> and 5<sup>th</sup> day of sweeping.

3.16 ASPHALT PAVING TOLERANCES

- A. [Section 01 45 00 – Quality Control](#): Tolerances.
- B. Flatness: Maximum variation of 1/8 inch measured with 10-foot straight edge.
- C. Scheduled Compacted Thickness: Within 1/4 inch.

3.17 FIELD QUALITY CONTROL

- A. [Section 01 45 00 – Quality Control](#): Requirements for testing, adjusting, and balancing.
- B. Asphalt Paving Mix Temperature: Measure temperature at time of placement.

3.18 PROTECTION

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from mechanical injury for until surface temperature is less than 140 degrees F.

**END OF SECTION 32 12 17**

**SECTION 32 13 13 - CONCRETE SURFACE IMPROVEMENTS****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Aggregate base course.
2. Concrete Surface Improvements for:
  - a. Concrete sidewalks
  - b. Concrete driveways
  - c. Concrete curb ramps
  - d. Concrete curbs and gutters
  - e. Concrete retaining curbs
  - f. Concrete median curbs
  - g. Concrete median nose surfacing
  - h. Concrete valley gutters
  - i. Concrete bus turnouts
  - j. Concrete survey monuments
  - k. Concrete ditches
3. Forms for Concrete
4. Concrete reinforcement (reinforcing bars, welded wire fabric and accessories).
5. Portland Cement Concrete placement
6. Concrete Joints - Expansion, Weakened plane and Score joints
7. Curing compounds

## B. Related Requirements:

1. [Section 09 90 00 - Painting and Coating](#): Pavement markings.
2. [Section 31 05 13 - Clearing & Grubbing, Excavation, and Earthwork](#)
3. [Section 32 11 23 - Aggregate Base Courses](#)
4. [Section 32 12 16 - Asphalt Paving](#)
5. [Section 33 05 13 - Manholes and Structures](#)

## 1.2 PRICE AND PAYMENT PROCEDURES

A. [Section 01 29 00 - Payment Procedures](#)

## B. Aggregate Base Course:

1. Basis of Measurement: Not measured.

2. Basis of Payment: Incidental to measurement for concrete surface improvements and includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.

C. Concrete Surface Improvements:

1. Basis of Measurement: By square feet for sidewalks, driveways, curb ramps, valley gutters, bus turnouts, trash enclosure pads and median nose surfacing; By linear feet for curb & gutter, concrete retaining curbs, and median curbs. Concrete pads around utility facilities and miscellaneous concrete footings are incidental to the bid item most closely related to and no separate compensation allowed therefor. Truncated domes for curb ramps are not measured separately are considered incidental to the pay item for Curb Ramps. Retaining curbs at curb ramps are not measured and are considered incidental to the measurement of curb ramps. Curb and gutter and vertical curbs adjacent to the curb ramp will be measured separately. Concrete Survey Monuments shall be measured on a per unit basis.
2. Basis of Payment: Includes all labor, materials, tools, equipment, and incidentals including subgrade preparation, excavation, base preparation, forms, reinforcing, concrete, accessories, placing concrete, finishing concrete, expansion joints, weakened plane joints, scoring joints, curing, removal of all forms, and testing.

### 1.3 REFERENCE STANDARDS

A. State of California (Caltrans) Standards:

1. Section 19 Earthwork
2. Section 26 Aggregate Base
3. Section 51 Concrete Structures
4. Section 52 Reinforcement
5. Section 73 Concrete Curbs and Sidewalks
6. Section 90 Concrete

B. American Association of State Highway and Transportation Officials:

1. AASHTO M295 - Standard Specification for Coal Fly Ash or Calcined Natural Pozzolan for Use in Concrete.
2. AASHTO M302 – Standard Specification for Ground Blast-Furnace Slag for Use in Concrete and Mortars
3. AASHTO T160 - Standard Method of Test for Length Change of Hardened Hydraulic Cement Mortar and Concrete

C. American Concrete Institute:



1. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specification for Structural Concrete
3. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
4. ACI 308.1 - Specification for Curing Concrete.
5. ACI 347 – Guide to Formwork for Concrete

D. American Forest & Paper Association:

1. AF&PA - National Design Specification (NDS) for Wood Construction.

E. APA - The Engineered Wood Association:

1. APA/EWA PS 1 - Voluntary Product Standard - Structural Plywood.

F. ASTM International:

1. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
5. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
6. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
7. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
8. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
9. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
10. ASTM C150 - Standard Specification for Portland Cement.
11. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
12. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
13. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
14. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
15. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
16. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
17. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
18. ASTM C595 - Standard Specification for Blended Hydraulic Cements.

19. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
20. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.
21. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
22. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
23. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
24. ASTM D209 - Standard Specification for Lampblack Pigment
25. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

G. Concrete Reinforcing Steel Institute:

1. CRSI 10-MSP – Manual of Standard Practice
2. CRSI 10PLACE – Placing Reinforcing Bars

H. West Coast Lumber Inspection Bureau:

1. WCLIB - Standard No. 17 Grading Rules for West Coast Lumber.

#### 1.4 SUBMITTALS

A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.

B. Product Data:

1. Submit data on concrete materials, joint filler, joint sealants, admixtures, curing compounds.
2. Submit certified copies of mill test report of reinforcement materials analysis. Indicate bending and cutting schedules and supporting and spacing devices.
3. Submit manufacturer's information on curing compounds. Submit detailed instructions on installation requirements, including storage and handling procedures.
4. Shop drawings indicate formwork, shoring and reshoring.

C. Design Data:

1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
  - a. Hot and cold weather concrete work.

2. Identify mix ingredients and proportions, including admixtures.
3. Chloride can contribute to corrosion of metals embedded in concrete. Admixture manufacturers shall identify chloride content of admixtures and whether or not chloride was added during manufacture.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

E. Source Quality Control Submittals: Indicate results of factory tests and inspections.

F. Certifications:

1. At the time of delivery provide certificates of compliance signed by both the Contractor and Supplier to verify the following:
  - a. Materials supplied comply with the specification in all respects.
  - b. Proportioning and mixing is in compliance with a design mix which has been field tested in accordance with the herein requirements and produces the required compressive strength under like conditions.
  - c. Statement of type and amount of admixtures.
  - d. All Certificates shall include the Material and Supplier's mix design number.
  - e. Volume of concrete. At the time of delivery provide certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

## 1.5 QUALITY ASSURANCE

- A. Perform Work according to ACI 301.
- B. Obtain cementitious materials from same source throughout unless approved by the City.
- C. Concrete finish shall be consistent with adjacent concrete unless specified otherwise on the Drawings.
- D. For wood products furnished for Work of this Section, comply with AF&PA.

## 1.6 MOCKUP

- A. [Section 01 45 00 - Quality Control](#): Requirements for mockup.

- B. Construct mockup, 5 feet x 5 feet, including paving, expansion joints, weakened plane joints, score joints, surface texture, and base material for decorative colored concrete work.
- C. Locate where directed by the Project Manager.
- D. Remove mockup when directed by Project Manager.

## 1.7 AMBIENT CONDITIONS

- A. [Section 01 50 00 - Temporary Facilities and Controls](#): Ambient conditions control facilities for product storage and installation.
- B. Do not place concrete when surface is wet or frozen.
- C. Do not place concrete when base surface temperature is less than 45 degrees F, nor when conditions indicate that the temperature may fall less than 45 degrees F. within 24 hours, except with the written permission of the City Engineer. Salt chemicals, or other foreign materials shall not be mixed with the concrete for the purpose of preventing freezing. Concrete shall be effectively protected from freezing or frost for period of 5 days after placing.
- D. Concrete for structures shall not be mixed or placed while the ambient temperature is above 110 degrees F. unless adequate means are employed to cool the aggregate and water and satisfactory provisions have been made for protecting the work.

## PART 2 - PRODUCTS

### 2.1 AGGREGATE BASE COURSE

- A. Aggregate Base: 3/4" maximum - Class 2 Aggregate Base as specified in Section 32 11 23 - Aggregate Base Courses.

### 2.2 CONCRETE SURFACE IMPROVEMENTS

- A. Form Materials:
  - 1. Form Materials: Conform to ACI 301 and shall be new.
  - 2. Plywood:
    - a. Species: Douglas fir.
    - b. Grade: Solid one side
    - c. Edges: Clean and true.
  - 3. Plywood Forms:
    - a. Application: Exposed finish concrete.

- b. Description:
    - 1) Comply with APA/EWA PS 1.
    - 2) Panels: Full size, 4 by 8 feet.
    - 3) Label each panel with grade trademark of APA/EWA.
  - c. Plywood for Surfaces to Receive Membrane Waterproofing:
    - 1) Minimum Thickness: 5/8 inch.
    - 2) Grade: APA/EWA "B-B Plyform Structural I Exterior."
- 4. Formwork shall be designed for the loads and lateral pressure outlined in Section 102 of ACI 347 and other loads indicated and shall be designed to have sufficient strength to carry the dead weight of the concrete as a liquid, without appreciable deflection. If any such deflection occurs, it shall be sufficient cause for rejection of the work.
  - 5. Where necessary to maintain the tolerances indicated, the formwork shall be cambered to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and due to construction loads.
  - 6. Forms shall be smooth, mortar-tight, true to the required lines and grades and of sufficient strength to resist springing out of shape during the placing of concrete.
  - 7. Surfaces of forms shall be free from irregularities, dents, snags, rust, and other material which would discolor or transfer to the concrete.
- B. Reinforcement:
- 1. Deformed Reinforcing: Steel: ASTM A615, 60 ksi yield grade, deformed billet bars, uncoated finish.
  - 2. Welded Deformed Wire Fabric: ASTM A497; in [flat sheets] [coiled rolls]; [unfinished] [epoxy coated finish].
  - 3. Dowels: ASTM A615; 60 ksi yield strength, plain steel bars; cut to length indicated on Drawings, square ends with burrs removed; unfinished. One end of the dowel shall include a sleeve over the dowel.
  - 4. Tie Wire: ASTM A1064, Minimum 16 gage, black annealed type.
  - 5. Chairs, Bolsters, Bar Supports, and Spacers:
    - a. Size and Shape: To strengthen and support reinforcement during concrete placement conditions.
  - 1. Splicing: Splice reinforcing where indicated on Drawings. The length of lapped splices shall be as follows:
    - a. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, except when otherwise shown on the Drawings.
    - b. Reinforcing bars No. 9, 10 and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the Drawings.
    - c. If not indicated on Drawings, locate reinforcement splices at point of minimum stress. Obtain approval of splice locations from the City.
  - 2. Reinforcing bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or

- reduce the bond. All bending shall be done cold, to the shapes shown on the Drawings.
3. Place, support, and secure reinforcement against displacement by using precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Supports and ties shall be such as to permit walking on reinforcing without undue displacement.
  4. Do not deviate from required position beyond specified tolerances.
  5. Accommodate placement of formed openings.
  6. Spacings:
    - a. Space reinforcement bars with minimum clear spacing as shown on the Drawings.
    - b. If bars are indicated in multiple layers, place upper bars directly above the lower bars, unless specified otherwise on the Drawings.
  7. Maintain minimum concrete cover around reinforcement according to ACI 318 code and as follows:
    - a. Footings and Concrete formed against earth: 3 inches
    - b. Concrete Exposed to Earth or Weather: 2 inches
  8. Splice reinforcing where indicated on Drawings. The length of lapped splices shall be as follows:
    - a. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, except when otherwise shown on the Drawings.
    - b. Reinforcing bars No. 9, 10 and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the Drawings.
  9. All reinforcing shall be securely tied in place prior to pouring concrete.
  10. Placing of dowels or other reinforcing in the wet concrete is not permitted.
- C. Joint Filler: ASTM D1751; Premolded expansion joint filler 1/4-inch thick.
- D. Joint seal materials must be either silicone joint sealant, asphalt rubber joint sealant, or preformed compression joint seal. Silicone or asphalt rubber joint sealant must not bond or react with the backer rod.
- a. Silicone Joint Sealant. Silicone joint sealant must be on the Authorized Material List for silicone joint sealant.
  - b. Asphalt Rubber Joint Sealant. Asphalt rubber joint sealant must:
    - 1) Be asphalt binder mixed with not less than 10 percent ground rubber by weight. Ground rubber must be vulcanized or a combination of vulcanized and devulcanized materials that pass a no. 8 sieve.
    - 2) Comply with ASTM D6690 for Type II.
    - 3) Be capable of melting at a temperature below 400 degrees F and applied to cracks and joints.
    - 4) Be delivered in containers complying with ASTM D6690.

E. Concrete Materials:

1. Cement: Cement shall conform to Section 90, "Concrete" of the State Standard Specifications.
2. Fine and Coarse Aggregates: Conform to the requirements of Section 90-1.02C, "Aggregates" of the State Standard Specifications. Size of aggregate for Portland cement concrete mix to be used for Survey monuments shall be 1/2-inch maximum.
3. Water: Conform to Section 90-1.02D, "Water" of the State Standard Specifications.
4. Air Entrainment: Air Entrainment admixtures shall meet the requirements of Section 90-1.02E(3), "Air-Entraining Admixtures" of the State Standard Specifications.
5. Chemical Admixture: Chemical admixtures shall meet the requirements of Section 90-1.02E(2), "Chemical admixtures" of the State Standard Specifications.
6. Supplementary Cementitious Materials - Fly Ash: Conform to the requirements of Section 90-1.02B(3), "Supplementary Cementitious Materials" of the State Standard Specifications.
7. Supplementary Cementitious Materials - Slag: Conform to the requirements of Section 90-1.02B(3), "Supplementary Cementitious Materials" of the State Standard Specifications.
8. Color Pigment: ASTM C979; mineral oxides, alkali and fade resistant. The dosage must not exceed 10 percent by weight of cementitious material in the concrete mix design.
  - a. Lampblack: Conform to ASTM D209, and shall be of approved quality mixed at a rate of one pound per cubic yard of concrete.
  - b. Color: No added color unless specified otherwise on the Drawings, except lampblack.

## 2.3 CONCRETE MIX

### A. Concrete Mix:

1. Concrete shall conform to Section 90, "Concrete", of the State Standard Specifications.
2. The concrete shall contain not less than 564 pounds of cementitious material per cubic yard.
3. Maximum slump for concrete is 4".
4. Provide concrete to the following criteria:

Item	Min. 28-day Compressive Strength (psi)
Sidewalks	4,000
Driveways	4,000
Curb Ramps	4,000
Curb and Gutters	4,000
Median Curbs	4,000
Median Nose Surfacing	4,000
Concrete Ditches	4,000
Valley Gutters	5,000
Bus Turnouts	5,000
Survey Monuments	5,000

2.4 CONCRETE CURING COMPOUND

- A. Curing Compound: ASTM C309, Type 1D, Class A and shall conform to Section 90-1.03B (3) “Curing Compound Method”, of the State Standard Specifications.

2.5 SOURCE QUALITY CONTROL

- A. [Section 01 45 00 - Quality Control](#): Testing and Inspection Services.
- B. Submit proposed mix design of each class of concrete to City for review prior to commencement of Work.
- C. Concrete Slump shall conform to Section 90-1.02G (6) “Quantity of Water and Penetration or Slump”, of the State Standard Specifications
- D. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.



**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. [Section 01 70 00 - Execution](#) and [Section 01 77 00 - Closeout Requirements](#): Requirements for installation examination.
- B. Verify compacted subgrade and base is dry and ready to support paving and imposed loads.
  - 1. Proof roll subgrade with two perpendicular passes to identify soft spots.
  - 2. Remove soft subgrade and replace with compacted fill as specified in [Section 31 05 13 – Clearing & Grubbing, Excavation, and Earthwork](#).
- C. Verify gradients and elevations of base are correct.

**3.2 PREPARATION**

- A. [Section 01 70 00 - Execution](#) and [Section 01 77 00 - Closeout Requirements](#): Requirements for installation preparation.
- B. Moisten subgrade to minimize absorption of water from fresh concrete.
- C. Notify City minimum 24 hours prior to commencement of concrete operations.

**3.3 INSTALLATION**

- A. Subgrade Preparation:
  - 1. Remove soft or spongy basement material to a depth of six (6) inches below the subgrade elevations for sidewalks, driveways, curb ramps, curbs, gutter depressions, median nose island paving, valley gutters, bus turnouts, and other miscellaneous concrete pads. Backfill the subgrade with earth, sand, gravel or suitable backfill materials to produce a stable foundation.
  - 2. The subgrade, including any base material, shall be thoroughly compacted by an approved mechanical device to not less than ninety-five percent (95%) relative compaction as determined by Test Method No. Calif. 216 or 231 before placing the concrete at bus turnouts, driveways and valley gutters.
  - 3. The subgrade, including any base material, shall be thoroughly compacted by an approved mechanical device to not less than ninety percent (90%) relative compaction as determined by Test Method No. Calif. 216 or 231 before placing the concrete at curb and gutters, sidewalk, median nose surfacing and curb ramps.

- B. Sawcutting Existing Concrete:
1. Where a portion of existing concrete surface improvements is to be removed and replaced, the section to be removed shall be sawcut with an approved concrete saw to a minimum depth of 2-1/2 inches. For sidewalks, curbs, gutters, concrete pads, curb ramps, and driveways the limit of the saw cut shall be at a minimum the first score line beyond the limits of the area to be replaced or as directed by the City.
- C. Base Course:
1. Aggregate Base Course: Install as specified in [Section 32 11 23 - Aggregate Base Courses](#).
- D. Forms:
1. No forms shall be placed prior to approval of the aggregate base and subgrade by the City.
  2. Place and secure forms and screeds to correct location, dimension, profile, and gradient.
  3. All dirt, chips, soil, dust, nails, and other foreign matter shall be completely removed from forms before any concrete is deposited therein.
  4. Form boards having joints opened by shrinkage of the wood shall be swelled by wetting until closed, before concrete is placed.
  5. The design and construction of forms and form supports shall be subject to approval, but responsibility for their adequacy shall rest with the Contractor.
  6. Forms shall be carefully set to alignment and grade and shall conform to the required dimensions. Forms shall be held rigidly in place by stakes. Clamps, spreaders and braces shall be used where required to insure rigidity in the forms.
  7. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
  8. When grades are less than 0.4 percent, the Contractor shall set grade stakes at a minimum of 25 foot intervals.
  9. Where shown on the Drawings, specified in the Special Provisions or permitted by the City, side forms for footings may be omitted and concrete may be poured against the firm earth.
- E. Coating:
1. Before concrete is placed, the contact surfaces for forms shall be coated with an approved non-staining form coating compound.
  2. Forms previously used shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being re-used.
  3. When forms are coated to prevent bond with concrete, coating shall be done prior to placing of the reinforcing steel.
  4. Excess coating material shall not be allowed to stand in puddles in the forms nor allowed to come in contact with concrete against which fresh concrete will be placed
- F. Reinforcement:

1. Place reinforcing as indicated on Drawings.
2. Interrupt reinforcing at weakened plane and expansion joints as shown on the Drawings.
3. Place dowels where required to achieve concrete paving and curb alignment as detailed.

G. Ties:

1. Approved form clamps or bolts shall be used to fasten forms.
2. The use of ties consisting of twisted wire loops to hold forms in position during the placing of concrete will not be permitted.
3. Bolts and form clamps shall be positive in action and shall be of sufficient strength and number to prevent spreading of the forms.
4. They shall be of such type that when the forms are removed all metal shall be at least one (1) inch from any surface.
5. Spreader cones and ties shall not exceed one (1) inch in diameter. These shall be of the type which do not have to be completely withdrawn as holes through the wall will not be permitted

H. Joints

1. Place weakened plane joints at D/4 (1" deep and 1/8" wide with rounded edges of 1/8" radius for a 4" thick concrete sidewalk) at maximum of 10 foot intervals, unless shown otherwise on the Drawings. Align curb, gutter, and sidewalk joints.
2. Place expansion joints (full depth of concrete section and 1/2" wide) at maximum of 40 foot intervals, at begin and end of curve, all changes in horizontal alignment, back of sidewalk at driveways, at corners of tree wells and corners of utility vaults, unless shown otherwise on the Drawings. Align curb, gutter, and sidewalk joints.
3. Place joint filler between concrete paving components and building or other appurtenances. Recess top of filler 1/4 inch for sealant installation.
4. Seal all expansion joints as shown on the Drawings.
5. The joint opening shall be thoroughly cleaned before the sealing material is placed.
6. Sealing material shall not be spilled on exposed surfaces of the concrete. Any excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.
7. Provide scored joints transversely (1/4" deep and 1/8" wide with rounded edges of 1/8" radius for a 4" thick concrete sidewalk) at maximum of 5 foot intervals, unless shown otherwise on the Drawings and between sidewalk and back of curbs at an optimum time after finishing. Provide additional score lines longitudinally at mid-point on sidewalks 8 feet and over in width.
8. Provide keyed joints as indicated.
9. For sidewalk replacement projects, match adjacent scoring and joint pattern.

I. Inspections prior to Placing Concrete:

1. All excavations, false-work, forms, reinforcement, joints made prior to pouring, electrical and mechanical inserts, etc., shall be inspected and approved before concrete is placed, and if found unsatisfactory the work shall not proceed until all defects have been remedied. Approval will in no way relieve the Contractor of his obligations to produce the finished concrete required by the Drawings and the Specifications

J. Placing Concrete:

1. Place concrete according to Section 73, "Concrete Curbs and Sidewalks" of the State Standard Specifications.
2. All concrete shall be placed while fresh and before it has taken an initial set.
3. Re-tempering partially hardened concrete with additional water or vibrating will not be permitted.
4. Runways or other means must be provided to convey the concrete to the place of deposit in order not to disturb forms or reinforcement. Runways shall not be blocked up on reinforcement and wheel barrows shall not be run directly over reinforcement.
5. Immediately before placing reinforcement or pouring concrete on the ground, the surface of the ground shall be brought to a true, even plane, and compacted to a solid bearing by rolling or tamping. The subgrade surface shall then be dampened to prevent absorption of water from the concrete. Too much water shall not be used and no pools shall form on the area to receive concrete.
6. Concrete shall be effectively protected from freezing or frost for period of 5 days after placing.
7. The concrete shall be deposited as nearly as possible in its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be permitted.
8. Fresh concrete shall not be permitted to fall from a height greater than 4 feet without the use of adjustable pipes or "elephant trunks."
9. Concrete shall be placed with square ends and level tops. Concrete shall be deposited continuously or in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section.
10. The Contractor shall stamp an appropriate two (2) inch symbol S, W or C in the top of curb at all locations where sanitary sewer, water or conduit crosses under curbs.
11. All exposed edges shall be tooled with a one-half inch (1/2") radius tool.
12. If a section cannot be placed continuously, keyed construction joints shall be located at points as indicated or as approved. Placing shall be carried out at such a rate that the concrete which is being integrated with fresh concrete is still plastic.
13. Concrete placement shall be stopped at construction joints before rainfall starts or is sufficient to cause damage to the work.
14. Poured work shall be covered and protected.
15. Concrete, after being deposited, shall be consolidated until all voids are filled and free mortar appears on the surface.

16. Consolidate the concrete by means of high frequency internal vibrators of type, size, and number as approved by the City. The number of vibrators employed shall be ample to consolidate the incoming concrete to a proper degree within 15 minutes after it is deposited in forms. Vibrators shall not be attached to nor held against the forms or the reinforcing steel. The location, manner, and duration of the application of the vibrators shall be such as to secure maximum consolidation of the concrete without causing segregation of mortar and coarse aggregate and without causing water or cement paste to flush to the surface. The thickness of the layers shall be not greater than can be satisfactorily consolidated with the vibrators. The vibrators shall vertically penetrate a few inches into the previous lift (which should not be rigid) at regular intervals. The use of approved external vibrators for consolidating concrete will be permitted when the concrete is inaccessible for adequate consolidation, provided the forms are constructed sufficiently rigid to resist displacements and damage from external vibration.
17. The forms on the face of curbs shall not be removed while the concrete is sufficiently plastic to slump.

K. Finishing:

1. After the concrete has been placed and consolidated, the surface of the concrete shall receive a preliminary finish. The preliminary finish shall consist of carefully striking of the surface of the concrete with a template, strike board, or approved compacting type screed, operated on and between supports or headers, until a uniform surface is obtained.
2. Horizontal surfaces shall receive a broom finish unless otherwise shown on the Drawings. Make the broom finish perpendicular to the path of travel on surfaces used by Pedestrians.
3. Miscellaneous concrete footings shall be sloped to provide drainage away from the post/pipe.
4. Imperfect or Damaged Work: The Contractor shall repair and clean all concrete damaged or discolored during construction.
5. Finishing Unformed Surfaces: Following completion of the preliminary finish, a final finish of the type indicated shall be provided.

L. Curing and Protection

1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
2. Curing concrete shall conform to Section 90-1.03B – “Curing Concrete”, of the State Standard Specifications.
3. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
4. Membrane-Curing Compound: Apply curing compound in two coats with second coat applied at right angles to first over the entire exposed faces of the concrete.
5. Do not permit traffic over unprotected surfaces.

### 3.4 TOLERANCES

- A. [Section 01 45 00 – Quality Control](#): Tolerances.
- B. Maximum Variation from True Position: 1/4 inch.
- C. The finished surface must not vary more than 0.02 foot from a 10-foot straightedge except at grade changes.

### 3.5 FIELD QUALITY CONTROL

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for testing, adjusting, and balancing.
- B. Perform field inspection and testing according to State Standard Specifications.
- C. Inspect reinforcing placement for size, spacing, location, support.
- D. For development projects, Developer's or Contractor's testing firm will take cylinders and perform slump and air entrainment tests according to ACI 301. For City projects, the City's testing team will perform testing.
- E. Clean any discolored concrete by abrasive blast cleaning or other authorized method.
- F. Strength Test Samples:
  - 1. Sampling Procedures: ASTM C172.
  - 2. Cylinder Molding and Curing Procedures: ASTM C31, cylinder specimens, standard cure/field cured.
  - 3. The frequency of sampling will be determined by the City.
  - 4. Sample concrete and make at a minimum of one set of three cylinders (each cylinder must be six (6) inches in diameter by 12 inches depth) for every 100 cubic yards less of each class of concrete placed each day and for every 5,000 square feet of surface area paving.
  - 5. Make one additional cylinder during cold weather concrete and placement, and field cure.
- G. Field Testing:
  - 1. Slump Test Method: ASTM C143.
  - 2. Air Content Test Method: ASTM C173 or ASTM C231.
  - 3. Temperature Test Method: ASTM C1064.
  - 4. Density: ASTM C138
  - 5. Measure slump and temperature for each compressive strength concrete sample.
  - 6. Measure air content in air entrained concrete for each compressive strength concrete sample.

- H. Cylinder Compressive Strength Testing:
  - 1. Test Method: ASTM C39.
  - 2. Test Acceptance: Average compressive strength of three consecutive compressive strength test shall be equal to or greater than minimum specified compressive strength specified in this Section. No single strength test should fall below the specified compressive strength by more than 500 psi.
  - 3. Test one cylinder at 7 days.
  - 4. Test two cylinders at 28 days.
  - 5. Retain one cylinder for testing when requested by City.
  - 6. Dispose remaining cylinders when testing is not required.
- I. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.
- J. The finished surface shall be true and straight, and shall be of uniform width, free from humps, sags, or other irregularities.
- K. Where curb and gutter, valley gutter and bus turnout gutter grades are less than one percent (1%), the Contractor shall water test the gutters for low spots. Any depressions shall be corrected prior to asphalt concrete paving.

### 3.6 PROTECTION

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.
- C. Do not permit pedestrian or vehicular traffic over paving for 7 days minimum after finishing until 75 percent design strength of concrete has been achieved, unless approved by the City.
- D. Vandalism: Contractor shall be responsible for protection of newly poured concrete against vandalism. Any damage to the newly poured concrete shall be the responsibility of the Contractor and shall be replaced at the Contractor's expense.

**END OF SECTION 32 13 13**

## SECTION 32 17 00 - PAVEMENT DELINEATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Work under this section shall consist of all traffic striping, markings and all other directional information or pavement delineation on the surfaces of streets, detour roads, parking lots, median strips and curbing in accordance with the plans, Special Provisions and as specified herein, in conformance with the applicable provisions of the Department of Transportation Standard Specifications, California Manual on Uniform Traffic Control Devices (CA MUTCD), and California Vehicle Code.
- B. Related Sections:
  - 1. [Section 01 33 00 – Submittal Procedures](#)
  - 2. [Section 01 60 00 - Product Requirements](#)
  - 3. [Section 01 77 00 - Closeout Requirements](#)
  - 4. [Section 01 78 00 - Closeout Submittals](#)

#### 1.2 REFERENCES

- A. Department of Transportation (Caltrans Standard Specifications)
- B. California Manual on Uniform Traffic Control Devices (CA MUTCD)
- C. California Vehicle Code (CVC)

#### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Submittal procedures.
- B. Certificates of Compliance: Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.
- C. Product Data: Provide manufacturers specification and literature for materials furnished.

#### 1.4 CLOSEOUT SUBMITTALS

- A. [Section 01 78 00 - Closeout Submittals](#): Requirements for submittals.



### 1.5 QUALITY ASSURANCE

- A. Perform work in accordance with the plans, Special Provisions and as specified herein, in conformance with the applicable provisions of the Caltrans Standard Specifications, CA MUTCD, and CVC.

### 1.6 QUALIFICATIONS

- A. Pavement markings installer shall have experience in the type of work required and a reputation for producing satisfactory work on time.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. [Section 01 60 00 - Product Requirements](#): Product transportation, storage, handling, and protection requirements.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.
- D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

### 1.8 ENVIRONMENTAL REQUIREMENTS

- A. [Section 01 60 00 - Product Requirements](#): Environmental conditions affecting products on site.
- B. Install pavement markers only when ambient temperature and humidity conditions acceptable per manufacturer's specifications.
- C. Testing and removal of yellow traffic stripe and pavement markings with hazardous waste residue shall be in conformance with Department of Transportation Standard Specification 14-11.12, "Removal of Yellow Traffic Stripe and Pavement Marking with Hazardous Waste Residue".

### 1.9 MAINTENANCE/EXTRA MATERIALS

- A. [Section 01 77 00 - Closeout Requirements](#): Extra materials and maintenance products.

**PART 2 - PRODUCTS****2.1 GENERAL**

- A. Unless otherwise specified in the Special Provisions or contract plans, all pavement striping and markings (except temporary) shall be thermoplastic.

**2.2 THERMOPLASTIC**

- A. Thermoplastic for traffic stripes and pavement markings shall conform to Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications.
- B. The thermoplastic material shall conform to Caltrans Specification PTH-02SPRAY, PTH-02HYDRO or PTH-02ALKYD. Glass beads to be applied to the surface of the molten thermoplastic material shall conform to the requirements of Caltrans Standard Specification.
- C. Concrete surfaces shall be treated before thermoplastic stripes and markings are installed, per Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specification.

**2.3 PAINT**

- A. Paint for traffic stripes and pavements markings shall conform to Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications and the following:
  - 1. Waterborne Traffic Line (White, Yellow, Black): Caltrans Standard Specification PTWB-01
  - 2. Acetone-Based (White, Yellow, Black): Specification PT-150VOC(A)
  - 3. Waterborne Traffic Line for disabled persons' parking, and other curb markings (blue, red, green): Federal Specification No. TT-P-1952D
- B. Glass beads shall conform to Caltrans Standard Specification.

**2.4 PAVEMENT MARKERS**

- A. Pavement markers shall conform to Section 81-3, "Pavement Markers," of the Caltrans Standard Specifications, as specified herein, and in the Special Provisions.
- B. Fire Hydrant markers shall be two-way, reflective blue markers.

2.5 TEMPORARY PAVEMENT DELINEATION

- A. Temporary Pavement Delineation shall conform to Section 12-6, "Temporary Pavement Delineation," and Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications.

2.6 ADHESIVE

- A. Adhesive for Pavement Markers shall be the hot melt bituminous type conforming to Section 81-3, "Pavement Markers," of the Caltrans Standard Specifications.

PART 3 - EXECUTION

3.1 LAYOUT, ALIGNMENT, AND SPOTTINGS

- A. All layout, spotting and tracking required shall be performed by and at the expense of the Contractor and approved by the City, prior to placement of pavement striping or markings.
- B. When no previously applied figures, markings, or traffic striping are available to serve as a guide, suitable layouts shall be spotted in advance of the permanent paint application by any means satisfactory to the City.
- C. The Contractor shall mark or otherwise delineate the traffic lanes in the new roadway or portion of roadway, or detour before opening it to traffic.
- D. The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimensions, and application of the delineation or marking.
- E. The Contractor shall furnish all equipment, materials, labor and supervision necessary for installing pavement striping and markings in accordance with the contract plans for temporary detours required for the safe control of traffic through and/or around the project.
- F. Standard word markings, letters, numerals, and symbols shall be as shown, on the plans. In the absence of such information, all stencils and templates shall be identical with those used by the City. The Contractor shall obtain stencils for all required legends.

3.2 TEMPORARY PAVEMENT MARKINGS

- A. Should the Contractor elect to alter the existing traffic stripes and markings, or to divert the flow of traffic on construction projects for his own convenience and

there are no special pavement markings or lane delineations shown on the plans or in the Special Provisions, he shall, at no expense to the City, provide the necessary temporary striping in accordance with the CA MUTCD, unless otherwise directed by the City. Removal of such striping shall be at the Contractor's expense. The Contractor shall remove all existing or temporary detour striping or markings that may confuse the public. When temporary detour striping or markings are no longer required, they shall be removed prior to applying the new traffic stripes or markings.

- B. Temporary Traffic Stripe or Marking Tape shall be removed "clean" prior to installation of permanent pavement delineation.

### 3.3 REMOVAL OF EXISTING MARKINGS

- A. Existing striping and pavement markings that will be in conflict with the finish traffic circulation shall be removed as directed by the City in accordance with Section 84-9 of the Caltrans Standard Specifications.
- B. The Contractor shall conduct his work so as not to damage existing pavement and public improvements to remain. Any resultant damage determined to be excessive by the City shall be repaired in kind by the Contractor at its sole expense.
- C. Damage to the pavement resulting from removal of pavement markers shall be considered as any depression more than 1/4-inch (6.35mm) deep and shall be repaired by the Contractor by filling the depression with hot melt bituminous adhesive to the satisfaction of the City.
- D. Where blast cleaning is used for the removal of traffic stripes and pavement markings or objectionable material, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.
- E. Where removal of traffic stripes and pavement markings is done by grinding or sandblasting methods, the effected pavement surface shall be completely covered by applying asphaltic emulsion conforming to Section 94 of Caltrans Standard Specifications.
- F. All reference markings made by the Contractor shall be done with spray chalk.
- G. All temporary traffic stripes and pavement markings shall be removed by the Contractor on the same day as placement of the permanent striping and markings.

### 3.4 PAVEMENT MARKER INSTALLATION

- A. Placement of pavement markers shall conform to Section 81-3, "Pavement Markers," of the Caltrans Standard Specifications, as specified herein, and in the Special Provisions.
- B. Fire hydrant markers shall be two-way blue retroreflective pavement markers and installed at all fire hydrant locations, as directed by the City.

### 3.5 PAVEMENT MARKINGS INSTALLATION

- A. Placement of all traffic stripes and pavement markings shall be in conformance with Section 84, "Markings" of the Caltrans Standard Specifications, referenced Plans of the Caltrans Standard Plans, with color required as shown on the Drawings and as specified herein.
- B. Any overlap, dripping, or tracking of fresh thermoplastic or paint onto unmarked surfacing shall be removed to the satisfaction of the City.
- C. Thermoplastic and paint shall be placed as close as possible to existing utility structure and monument frames and covers without covering them.
- D. The Contractor shall protect all fresh thermoplastic and paint and shall repair or replace all damage to traffic stripes and pavement markings caused by his failure to do so at its own expense.
- E. All traffic stripes and pavement markings, new or existing, within or adjacent to the work limits which become defaced or damaged during the Contractor's operations shall be replaced by the Contractor at its expense concurrently with other traffic marking operations in the immediate area. The City shall be the sole judge as to which stripes or legends are defaced or damaged.
- F. Curb painting shall be applied as shown on the plans and as directed by the City. Curb painting shall include the application of two coats of traffic paint with glass beads incorporated in the second coat. Top and face of curb shall be painted. Color of curb markings shall conform to ASTM D6628.
- G. All traffic stripes and pavement markings shall be placed at application rates in conformance with Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications.

### 3.6 GLASS BEAD APPLICATION

- A. All traffic stripes, except the black separation line, shall be beaded.

- B. Glass beads shall be applied directly and uniformly to the set traffic line with a bead dispenser machine placed the proper distance behind the paint spray nozzle, unless pre-mix is approved.
- C. Glass beads shall be applied to pavement markings and crosswalks by a special paint spray gun developed for this purpose.
- D. Glass beads shall be applied at application rates in conformance with Section 84-2, "Traffic Stripes and Pavement Markings", of the Caltrans Standard Specifications.:

### 3.7 CLEANING

- A. [Section 01 77 00 - Closeout Requirements](#): Final cleaning.
- B. Clean finishes and touch up damage.

### 3.8 PROTECTION OF FINISHED WORK

- A. [Section 01 77 00 - Closeout Requirements](#): Protecting finished work.

**END OF SECTION 32 17 00**

**SECTION 33 01 30 – TESTING FOR SANITARY SEWER, STORM DRAINAGE -  
PIPING AND MANHOLES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. The CONTRACTOR shall provide all materials, equipment and labor to perform and complete pipeline flushing and testing, and Closed Circuit Television Inspection (CCTV) complete, for sanitary sewer and storm drain system piping, as specified herein.
- B. The CONTRACTOR shall be responsible for conveying test water from the source to the point of usage and also for proper disposal, as required, of water used in the testing operations. All costs associated with supply and disposal of test water shall be at the Contractor's expense.
- C. Section Includes:
  - 1. Testing of Gravity Sewer Piping and Storm Drainage Piping:
    - a. Low pressure air testing.
  - 2. Deflection testing of plastic sewer piping and storm drainage piping.
  - 3. Testing of Manholes:
    - a. Vacuum testing.
  - 4. Closed Circuit Television Inspection (CCTV)
- D. Related Requirements:
  - 1. [Section 01 33 00 – Submittal Procedures](#)
  - 2. [Section 01 70 00 - Execution](#)
  - 3. [Section 01 77 00 - Closeout Requirements](#)
  - 4. [Section 33 31 13 - Sanitary Sewer Piping](#)
  - 5. [Section 33 41 13 - Storm Drainage Piping](#)

**1.2 REFERENCE STANDARDS**

- A. ASTM International:
  - 1. ASTM C 828 - Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines.
  - 2. ASTM C1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.

3. ASTM D2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings. (For Determining Dimension of PVC pipes).

### 1.3 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Contractor shall submit following items a minimum of 3 working days prior to start of testing:
  1. Testing procedures.
  2. List of test equipment.
  3. Testing sequence schedule.
  4. Provisions for disposal of flushing and test water.
  5. Certification of test gage calibration certified by laboratory at the Contractor's expense prior to the leakage test.
  6. Deflection mandrel drawings and calculations.
- C. Test and Evaluation Reports: Contractor shall submit results of manhole and piping tests.
- D. The Contractor shall provide all inspection data and files on a portable external hard drive or CD or DVD and shall become the property of the City once submitted. All mpg video files and individual report PDF's contained on the hard drive shall be named as follows: upstream manhole ID-downstream manhole ID-Date Time Stamp; (i.e.MH22-MH23 MM-DD-YYYY-HH:MM:SS.mpg)
- E. The Contractor shall utilize Pipeline Assessment and Certification Program (PACP) certified inspectors for the CCTV work at all times and PACP latest Version. coding methods shall be employed for all CCTV inspections conducted. Evidence of PACP certification of the Operator shall be provided to the City prior to the commencement of any work

## PART 2 - PRODUCTS

### 2.1 MATERIAL REQUIREMENTS

- A. All testing equipment and materials including but not limited to materials and equipment specified below shall be provided by the Contractor. No materials shall be used which would be injurious to pipeline system or structure or future function.
- B. All test gages shall be laboratory-calibrated test gages and shall be recalibrated by a certified laboratory at the Contractor's expense prior to the leakage test. A timeline for the last testing of the calibration gage shall be submitted prior to use.



## 2.2 VACUUM TESTING

- A. Contractor shall furnish all equipment:
  - 1. Vacuum pump.
  - 2. Vacuum line.
  - 3. Vacuum Tester Base:
    - a. Compression band seal.
    - b. Outlet port.
  - 4. Shutoff valve.
  - 5. Stopwatch.
  - 6. Plugs.
  - 7. Vacuum Gage: Calibrated to 0.1 in. Hg.

## 2.3 AIR TESTING

- A. Contractor shall furnish all equipment:
  - 1. Air compressor.
  - 2. Air supply line.
  - 3. Shutoff valves.
  - 4. Pressure regulator.
  - 5. Pressure relief valve.
  - 6. Stopwatch.
  - 7. Plugs.
  - 8. Pressure Gage: Calibrated to 0.1 psi.

## 2.4 DEFLECTION TESTING

- A. Contractor shall furnish all equipment:
  - 1. "Go, no go" mandrels of various sizes with diameter not less than 95 percent of the average inside diameter of pipe, as determined by ASTM standard to which pipe is manufactured.
  - 2. Pull/retrieval ropes.

## 2.5 CCTV INSPECTION

- A. For Capital Improvement Projects (CIP) and new development projects, the CCTV inspections shall be completed by the City. The Project Developer shall pay the City for the CCTV inspection services and fees. The developer will only be responsible to conduct the CCTV inspections if the City is unable to perform the work.

- B. Television inspection equipment shall have an accurate footage counter that will display on the monitor and record the camera distance from the centerline of the starting manhole.
- C. The camera shall be of the remotely operated pan and tilt type and shall have full HD resolution (1920x1080 pixels) camera capable of zooming. The rotating camera and light head configuration shall have the capability of panning 360° with pan and tilt capability of providing a full view of the pipe to ensure complete inspection of the mainline pipe and service laterals. A disk to determine the depth of water shall be installed to the CCTV camera.
- D. The camera, television monitor, and other components shall be color. To ensure peak picture quality throughout all conditions encountered, the color camera shall be equipped with the necessary circuitry to allow for the remote adjustment of the optical focus iris from the power control unit at the viewing station. A variable intensity control of the camera lights shall also be located at the viewing station
- E. Lighting and camera quality shall be suitable to allow a clear, in focus picture for the entire inside periphery of the pipe.
- F. Camera quality shall be suitable to provide a full 360° view of the pipe during the inspection pipelines extending at least ten (10) feet in front of the camera.
- G. The travel speed of the camera shall be variable but uniform and shall not exceed 30 feet per minute. Any means of propelling the camera through the sewer line which would produce non-uniform or jerky movement of the camera, will not be acceptable.
- H. The television system shall be capable of performing line segment inspection in increments of 400 feet with one setup.
- I. Service laterals shall be inspected utilizing a CCTV inspection push camera system, capable of inspecting up to one hundred (100) feet of pipe.
- J. Water shall be flowing in pipe continuously during CCTV recording.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Verify that manholes and piping are ready for testing.
- B. Verify that trenches are backfilled.

### 3.2 PREPARATION

- A. [Section 01 70 00 - Execution](#): Requirements for preparation.
- B. Lamping:
  - 1. Lamp gravity piping after flushing and cleaning.
  - 2. Perform lamping operation by shining light at one end of each pipe section between manholes.
  - 3. Observe light at other end.
  - 4. Pipe not installed with uniform line and grade will be rejected.
  - 5. Remove and reinstall rejected pipe sections.
  - 6. Re-clean and lamp until pipe section is installed to uniform line and grade.
- C. Plugs:
  - 1. Plug outlets, wye branches, and laterals.
  - 2. Brace plugs to resist test pressures.

### 3.3 FIELD QUALITY CONTROL

- A. [Section 01 45 00 – Quality Control](#): Requirements for testing, adjusting, and balancing.
- B. All sanitary sewer and storm drain lines shall be cleaned and flushed prior to testing using a high-pressure sewer jet with vacuum equipment or other methods acceptable to the Project Manager.
- C. Contractor will be solely responsible for conveying test water from the source point to the point of usage as part of Contractor's expense and will be solely responsible for the proper disposal of all water used in the flushing and testing process. Disposal of all water shall be in accordance with appropriate regulatory agency requirements. All flushing and testing operations shall be performed in the presence of the Project Manager. During flushing of the sanitary sewer and storm drain lines, the manholes at the low end of the new line shall be plugged and incoming water pumped to a drain point approved by the Project Manager. Before the plug can be removed, all sand, silt, gravel and other foreign material shall be completely removed from the manhole.

### 3.4 LOW-PRESSURE AIR TESTING FOR STORM DRAINAGE AND SANITARY SEWER PIPING

- A. The Contractor shall furnish all materials, equipment and labor for making an air test. Air test equipment shall be approved by the Project Manager. The Contractor may conduct an initial air test of the sewer main line after densification of the backfill but prior to installation of the laterals. Such tests will be considered

to be for the Contractor’s convenience and need not to be performed in the presence of the Project Manager.

1. Test each reach of gravity sewer piping between manholes by plugging and bracing all openings in the main sewer line and the end of all laterals.
2. Prior to any air pressure testing, all pipe plugs shall be checked with a soap solution to detect any air leakage. If any leaks are found, the air pressure shall be released, the leaks eliminated and the test procedure started over again.
3. The final leakage test of the sewer main line and laterals shall be conducted in the presence of the Project Manager.
4. Introduce air pressure within the line slowly to approximately 4 psig using a compressed air supply.
5. Determine ground water elevation above spring line of piping.
6. For every foot of ground water above spring line of piping, increase starting air test pressure by 0.43 psi.
7. Do not increase pressure above 10 psig.
8. Allow pressure to stabilize for at least five minutes before the actual test begins.
9. Adjust pressure to 3.5 psig or to increased test pressure as determined above when ground water is present.
10. Minimum Testing Duration in Minutes:

Pipe Size (inches)	Distance between openings					
	50 ft	100 ft	150 ft	200 ft	250 ft	300 ft
3	0.10	0.20	0.30	0.40	0.50	0.60
4	0.15	0.30	0.45	0.60	0.75	0.90
6	0.35	0.70	1.05	1.40	1.75	2.10
8	0.60	1.20	1.80	2.40	3.00	3.60
10	0.75	1.50	2.25	3.00	3.75	4.50
12	0.90	1.80	2.70	3.60	4.50	5.40
15	1.05	2.10	3.15	4.20	5.25	6.30
18	1.20	2.40	3.60	4.80	6.00	7.20
21	1.50	3.00	4.50	6.00	7.50	9.00
24	1.80	3.60	5.40	7.20	9.00	10.80
27	2.10	4.20	6.30	8.40	10.50	12.60
30	2.40	4.80	7.20	9.60	12.00	14.40
33	2.70	5.40	8.10	10.80	13.50	16.20
36	3.00	6.00	9.00	12.00	15.00	18.00

11. Record drop in pressure during testing period.
12. If air pressure drops more than 1.0 psi during testing period, piping has failed.
13. If 1.0 psi air pressure drop has not occurred during testing period, piping is acceptable; discontinue testing.

14. If piping fails, test reach of piping in incremental stages until leaks are isolated, repair leaks, and retest entire reach between manholes.
15. After completion of the test, the air pressure shall be released slowly and the test plugs shall not be removed until the air pressure is no longer measurable.
16. At the Contractor's option, joints may be air tested individually, joint by joint, with the use of specialized equipment. The Contractor shall submit its joint testing procedure for the Project Manager's review prior to testing. Prior to each test, the pipe at the joint shall be wetted with water.

### 3.5 DEFLECTION TESTING OF PLASTIC STORM DRAINAGE AND SANITARY SEWER PIPING

#### A. See below for Deflection Testing requirements.

1. Contractor shall perform vertical ring deflection testing on PVC non-pressure piping after backfilling and initial paving has been in place and prior to last lift of paving.
2. Allowable maximum deflection for installed plastic sewer pipes shall not exceed the limits on the Central San Standard Specifications for Design and Construction.
3. Perform deflection testing using properly sized "go, no go" mandrel.
4. Furnish mandrel with diameter not less than 95 percent of the average inside diameter of pipe, as determined by ASTM standard to which pipe is manufactured; measure pipe diameter in compliance with ASTM D2122.
5. Perform testing without mechanical pulling devices.
6. All PVC non-pressure piping shall be tested by passing the mandrel from the nearest downstream structure to the nearest upstream structure.
7. Contractor shall locate, excavate, replace, and retest piping that exceeds allowable deflection.

### 3.6 MANHOLE TESTING

#### A. All manholes shall be vacuum tested for leakage after installation in the presence of the Project Manager. Prior to vacuum testing all manholes shall be visually inspected for leaks. All leaks, cracks and lift holes shall be repaired by the Contractor, prior to vacuum testing, to the satisfaction of the Project Manager. All repairs shall be made with non-shrink grout. Any alternative repair methods shall be approved by the Project Manager.

1. If air testing, test prior to backfilling in order to easily locate the leaks.
2. Repair both outside and inside of joint to ensure permanent seal.
3. Test manholes with manhole frame set in place.
4. Vacuum Testing:

- a. Comply with ASTM C1244.

- b. Plug pipe openings; securely brace plugs and pipe to sufficiently hold against vacuum pressure during testing, and removed following successful completion of the testing.
- c. Inflate compression band to create seal between vacuum base and structure.
- d. Connect vacuum pump to outlet port with valve open, then draw vacuum to ten (10) inches of Mercury (Hg). Stabilize the vacuum at ten (10) inches of Mercury (Hg).
- e. Close valve and shut off the vacuum pump.
- f. Manhole Test Duration in Seconds:
  - 1) Diameter 4 Feet: 60.
  - 2) Diameter 5 Feet: 75.
  - 3) Diameter 6 Feet: 90.
- g. Record vacuum drop during test period.
- h. If vacuum drop is greater than one (1) inches of Mercury (Hg) during testing period, repair and retest manhole.
- i. If vacuum drop of one (1) inches of Mercury (Hg) does not occur during test period; manhole is acceptable; discontinue testing.
- j. If vacuum test fails to meet one (1) inches of Mercury (Hg) drop in specified time after repair, repair and retest manhole.
- k. Manholes repairs and retesting shall proceed until a passing test is completed.

### 3.7 CCTV INSPECTION

- A. See below for CCTV requirements before final lift of paving:
  - 1. All sanitary sewer systems shall be CCTV inspected. In addition, all storm drain systems are subject to CCTV inspection. In all paved areas the CCTV inspection must be coordinated by the Contractor to allow sufficient time for the CCTV inspection to be performed after backfill, initial paving and prior to the final lift of asphalt paving being placed. The City's approved CCTV testing company will perform the CCTV inspections. The Contractor shall repair all problems revealed by the CCTV inspection. The Contractor shall coordinate with the Project Manager to arrange for a compatible time to conduct the inspection.
  - 2. The Contractor shall contact the Project Manager for a list of approved CCTV testing companies. The Contractor shall submit the sanitary sewer video (CD/DVD disk) to the City for review. No unrecorded gaps shall be left in the recording of a segment between the inspections. All recording of a single segment shall not extend over more than one CD/DVD disk.
  - 3. CD/DVD shall visually display, at a minimum, CCTV Contractor's name, project name, date of inspection, pipe segment number, manhole numbers as shown on the Drawings or lateral lot numbers. The distance between manholes shall be verified by measuring tape. If the counter distance and the

taping distance differ by more than 2 feet per 100 feet, the run shall be re-televised by the CCTV Contractor at the Contractor's expense.

4. Any of, but not limited to the following observations from CCTV inspections will require correction:
  - a. Low spot 0.0625 x diameter of pipe or greater (e.g., 0.5" for an 8" pipe).
  - b. Joint separations (3/4" or greater opening between pipe sections).
  - c. Cocked joints present in straight runs or on the inside of pipe curves.
  - d. Chips in pipe ends.
  - e. Cracked or damaged pipe.
  - f. Offset joints.
  - g. Infiltration.
  - h. Debris or other foreign objects.
  - i. Other obvious deficiencies.
  
5. CD/DVD disk, USB flash drive, or portable external hard drive shall become the property of the City.

**END OF SECTION 33 01 30**

**SECTION 33 05 13 - MANHOLES AND STRUCTURES****PART 1 - GENERAL**

## 1.1 SUMMARY

## A. Section Includes:

1. Cast-in-place concrete manholes and structures with transition to cover frame, covers, anchorage, and accessories.
2. Modular precast concrete manholes and structures with tongue-and-groove joints and transition to cover frame, covers, anchorage, and accessories.
3. Bedding and cover materials.

## B. Related Requirements:

1. [Section 03 30 00 – Utility Cast-in-Place Concrete](#): Concrete Forming and Accessories, Erection and bracing of forms.
2. [Section 03 30 00 – Utility Cast-in-Place Concrete](#): Concrete Reinforcing: Execution requirements for reinforcing steel as required by this Section.
3. [Section 03 30 00 – Utility Cast-in-Place Concrete](#): Concrete type for manhole and structure foundation slab construction.
4. [Section 31 05 13 – Clearing & Grubbing, Excavation, and Earthwork](#): Backfill.
5. [Section 31 23 16 – Utility Trenching](#): Excavating for manholes, structures, and foundation slabs.
6. [Section 33 01 30 – Testing for Sanitary Sewer, Storm Drainage – Piping and Manholes](#): Testing requirements for manholes.
7. [Section 33 05 17 – Precast Concrete Valve Vaults and Meter Boxes](#): Execution requirements for utility structures affected by this Section.
8. [Section 33 31 13 – Sanitary Sewer Piping](#): Piping connections to manholes.
9. [Section 33 41 13 – Storm Drainage Piping](#): Piping connections to manholes and structures.

## 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. [Section 01 29 00 – Payment Procedures](#): Contract Sum/Price modification procedures.

## B. Manholes and Structures:

1. Basis of Measurement: Manholes, Catch Basin, Area Drains, Headwalls, Flare pipe end are measured by each. Structure bedding and backfill are



incidental to the bid item most closely related to and no separate compensation allowed therefor.

2. Basis of Payment: Includes excavating, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, concrete foundation slab, concrete structure sections, bedding, backfill, concrete masonry structure construction, transition to cover frame, cover frame and cover to indicated design depth, forming, sealing pipe inlets and outlets and air testing of structures.

### 1.3 REFERENCE STANDARDS

#### A. American Association of State Highway Transportation Officials:

1. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
2. AASHTO M306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.

#### B. American Concrete Institute:

1. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.

#### C. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
4. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
5. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
6. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
7. ASTM C923 - Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.

### 1.4 SUBMITTALS

#### A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.

#### B. Product Data: Submit data for manhole covers, component construction, features, configuration, and dimensions.

#### C. Shop Drawings:

1. Indicate structure locations and elevations.
  2. Indicate sizes and elevations of piping, conduit, and penetrations.
- D. Manufacturer's Certificate: Certify that products meet or exceed the Specifications.
- E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years' documented experience.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. [Section 01 60 00 - Product Requirements](#): Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Comply with precast concrete manufacturer's instructions and ASTM C913 for unloading, storing, and moving precast manholes and drainage structures.
- D. Storage:
1. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property.
  2. Repair property damaged from materials storage.

## **PART 2 - PRODUCTS**

### 2.1 MANHOLES AND STRUCTURES

- A. Manufacturers:
1. Oldcastle Precast, Inc.
  2. Jensen Precast
  3. Cook Concrete Products, Inc.
  4. US Concrete Precast Group
  5. Forterra
  6. Or approved equal

- B. Manhole and Structure Sections:
  - 1. Description: Reinforced precast concrete conforming to ASTM C478 with gaskets conforming to ASTM C923.
  - 2. Joints for Precast Manholes and Structures:
    - a. Conforming to ASTM C913.
    - b. Maximum Leakage: 0.025 gal. per hour per foot of joint at 3 feet of head.
- C. Manhole and Structure Sections: Reinforced cast-in-place concrete as specified in [Section 03 30 00 – Utility Cast-in-Place Concrete](#).
- D. Mortar and Grout:
  - 1. Type S with minimum 28-day compressive strength of 2,100 psi.
- E. Reinforcement: Formed steel: Welded wire and reinforcing rebar per ASTM A615 Grade 60.
- F. Shaft Construction and Eccentric Cone Top Section:
  - 1. Pipe Sections: Reinforced precast concrete, unless specified otherwise.
  - 2. Joints:
    - a. Watertight Joints
    - b. Dry.
  - 3. Sleeved to receive pipe.
- G. Shape: Cylindrical for Manholes and Square or Rectangular for inlet structures
- H. Clear Inside Dimensions: Diameter of Minimum 48 inches for manholes unless specified otherwise on the Drawings.
- I. Design Depth: As indicated on Drawings.
- J. Clear Cover Opening: Diameter of Minimum 26 inches unless specified otherwise on the Drawings.
- K. Pipe Entry: Furnish openings as indicated on Drawings.
- L. Structure Joint Gaskets:
  - 1. ASTM C361.
  - 2. Material: Rubber.
- M. Steps: No steps are to be installed in any structures.

- N. All storm drain inlet structures require a fish decal with the wording, “No Dumping, Drains to Delta”, or as approved by the Project Manager.
- O. The exterior surfaces of all Precast Concrete Structure sections shall be waterproofed.
  - 1. Tremco, TREMproof 250GC
  - 2. Or approved equal.

## 2.2 FRAMES, GRATES AND COVERS

### A. Manufacturers:

- 1. D&L Foundry and Supply
- 2. Neenah Enterprises, inc.
- 3. EJ
- 4. Or approved equal.

### B. Description:

- 1. Construction: ASTM A48, Class 35B, AASHTO M306, cast iron.
- 2. Lid:
  - a. Machined flat bearing surface.
  - b. Lockable on all unpaved areas and Boltable for all grates.
  - c. One Pick/Lift hole
- 3. Grate: Grates shall be boltable and covers in unpaved areas shall be lockable.
- 4. Cover Design: Closed, Open checkerboard grille ASTM grid pattern and waterproof.
- 5. Frame and covers shall be non-rocking.
- 6. Wheel Load Rating: H-20.
- 7. Sealing gasket.
- 8. Cover: Molded with identifying name and logo: Storm Drain or Sanitary Sewer, City of Pittsburg.
- 9. Grate: Galvanized and Bicycle safe
- 10. All castings shall be thoroughly cleaned and subject to a hammer inspection after which they shall be twice dipped with an asphalt or coal tar coating applied at a temperature of not less than 290° F, nor more than 310° F.

## 2.3 RISER RINGS

### A. Riser Rings:

- 1. 4 Inches to 6 Inches Thick:

- a. Material: Precast concrete.
  - b. Comply with ASTM C478.
2. Less than 4 Inches Thick:
- a. Material: Cast iron.
  - b. Comply with AASHTO M306.

B. Accessories:

- 1. Joint Sealant: Comply with ASTM C990.

2.4 RUBBER SEAL WRAPS:

- 1. Rubber Seal Wraps shall be
  - a. Wraps and Band Widths: Conform to ASTM C877, Type III.
  - b. Cone/Riser Ring Joint: Minimum 3 inches of overlap.
  - c. Frame/Riser Ring Joint: 2 inches of overlap.
  - d. Additional Bands: Overlap upper band by 2 inches.

2.5 CONCRETE CRADLES

A. Concrete Cradle:

- 1. As specified in Section 03 30 00 – Utility Cast-in-Place Concrete.
- 2. Description: Minimum compressive strength of 4,000 psi, 28-day reinforced concrete, air entrained, rough troweled finish.

B. Cast-in-place Concrete Reinforcement: As specified in Section 03 30 00 – Utility Cast-in-place Concrete.

2.6 MATERIALS

A. Bedding and Backfill:

- 1. Install minimum 8-inches thick Class 2 Permeable material as specified in Section 31 23 16 – Utility Trenching below the manholes and structures.
- 2. Bedding and Backfill shall conform to Section 31 23 16 – Utility Trenching.

2.7 ACCESSORIES

A. Foundation Slab:

1. Cast-in-place concrete as specified in Section 03 30 00 – Utility Cast-in-Place Concrete.
  2. Top Surface: Level.
- B. Interior Manhole Coating: Coatings shall be white in color or grey in color.
1. Manufacturers:
    - a. Sewper Coat
    - b. Carboline
    - c. Or approved equal.
- C. Concrete: As specified in [Section 03 30 00 – Utility Cast-in-Place Concrete](#)
- D. Grout: As specified by the Manufacturer.

## 2.8 FINISHES

- A. Steel Galvanizing:
1. ASTM A123.
  2. Hot dip galvanize after fabrication.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that items provided by other Sections of Work are properly sized and located.
- B. Verify that built-in items are in proper location and are ready for roughing into Work.
- C. Verify correct size of manhole and structure excavation.

### 3.2 PREPARATION

- A. [Section 01 70 00 - Execution](#): Requirements for installation preparation.
- B. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers as indicated on Drawings to indicate its intended use.
- C. Coordinate placement of inlet and outlet pipe or duct sleeves required by other Sections.

- D. Do not install manholes and structures where Site conditions induce loads exceeding structural capacity of manholes or structures.
- E. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify that they are internally clean and free from damage; remove and replace damaged units.

### 3.3 INSTALLATION

#### A. Excavation and Backfill:

- 1. Excavate for manholes and structures as specified in [Section 31 23 16 – Utility Trenching](#) and in indicated locations and depths.
- 2. Provide twenty-four (24) inches of minimum clearance around sidewalls of manhole or structure for construction operations, granular backfill, and placement of geotextile filter fabric if required.
- 3. If groundwater is encountered, prevent accumulation of water in excavations; place manhole or structure in dry trench. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation, as approved by Project Manager.

#### B. Foundation Slab:

- 1. Cast-in-place foundation slab and trowel top surface level. Precast foundation slabs are acceptable with approval from City.
- 2. Place manhole sections plumb and level, trim to correct elevations, and anchor to foundation slab.

#### C. Install manholes and structures supported at proper grade and alignment on Class 2 permeable material bedding extending twenty-four (24) inches beyond the sidewalls of manholes or structures.

#### D. Backfill excavations for manholes and structures as specified in [Section 31 23 16 – Utility Trenching](#)

#### E. Form and place manhole or structure cylinder plumb and level, to correct dimensions and elevations.

#### F. Cut and fit for pipe, conduit and sleeves.

#### G. Grout base of shaft sections to achieve slope to exit piping, trowel smooth, and contour to form continuous drainage channel as indicated on Drawings.

#### H. Paint interior with two coats of interior coating at rate of 120 sq. ft. per gal. for each coat.

- I. Set cover frames and covers level to correct elevations without tipping.
- J. Precast Concrete Manholes and Structures:
  1. Lift precast components at lifting points designated by manufacturer.
  2. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure that interior of pipeline and structure remains clean.
  3. Set precast structures, bearing firmly and fully on Class 2 Permeable Material bedding, compacted as specified in [Section 31 23 16 – Utility Trenching](#) or on other support system as indicated on Drawings.
  4. Assembly:
    - a. Assemble multi-section manholes and structures by lowering each section into excavation.
    - b. Install rubber gasket joints between precast sections according to manufacturer's recommendations.
    - c. Lower, set level, and firmly position base section before placing additional sections.
  5. Remove foreign materials from joint surfaces and verify sealing materials are placed properly.
  6. Maintain alignment between sections by using guide devices affixed to lower section.
  7. Joint sealing materials should be installed on site.
  8. Verify that installed manholes and structures meet required alignment and grade.
  9. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe; fill annular spaces with mortar.
  10. Cut pipe flush with interior of structure.
  11. Install synthetic rubber water stop gasket at all pipe entries.
  12. Shape inverts through manhole and structures as indicated on Drawings.
- K. Cast-in-Place Concrete Manholes and Structures:
  1. Unless approved in writing by the City Engineer, Cast-in-Place Concrete Manholes shall only be constructed to retrofit existing sanitary sewer mains at locations without an existing manhole in place.
  2. Cast-in-Place Concrete Manholes shall be installed in accordance with Central San Standard Specifications for Design and Construction.
  3. Prepare Class 2 Permeable Material bedding or other support system as indicated on Drawings to receive base slab as specified for precast structures.



4. Erect and brace forms against movement, install reinforcing steel, place and cure concrete as specified in [Section 03 30 00 – Utility Cast-in-Place Concrete](#).

L. Sanitary Manhole Exterior Drop Connections:

1. CLSM Encasement: Minimum 2 feet outside of manhole.
2. Form channel from pipe drop to sweep into main channel at maximum angle of 30 degrees.

M. Castings:

1. Set frames using mortar and masonry as indicated on Drawings.

### 3.4 FIELD QUALITY CONTROL

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for testing, adjusting, and balancing.

- B. Test cast-in-place concrete as specified in [Section 03 30 00 – Utility Cast-in-Place Concrete](#).

- C. Test concrete manhole and structure sections prior to backfill according to ASTM C497 as specified in [Section 33 01 30 - Testing for Sanitary Sewer, Storm Drainage - Piping and Manholes](#).

D. Vertical Adjustment of Existing Manholes and Structures:

1. If required, adjust top elevation of existing manholes and structures to finished grades as indicated on Drawings.
2. Frames, Grates, and Covers:
  - a. Install a false bottom to prevent dirt getting into the structure. Carefully remove frames, grates, and covers cleaned of mortar fragments.
  - b. Reset to required elevation according to requirements specified for installation of castings.

3. Reinforcing Bars:

- a. Remove concrete without damaging existing vertical reinforcing bars if removal of existing concrete wall is required.
  - b. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement as indicated on Drawings.
4. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete as specified in [Section 03 30 00 – Utility Cast-in-Place Concrete](#).

### 3.5 REHABILITATION OF MANHOLES

- A. Contractor shall hire a certified Manhole Rehabilitation Inspector by NASSCO (National Association of Sewer Service Companies).
- B. Remove existing steps within manhole.
- C. Clean and prepare interior surface of manhole using a power wash with up to 5000 psi to remove all loose concrete to get to a good substrate.
- D. Repair any existing leaks considered as weepers using a fast setting blend of special cements and fillers that is used to stop leaks through cracks and holes on underground concrete and brick structures and remove any infiltrating roots. Manufacturer for fast setting blend of cement shall be Mainstay ML-10 or approved equal.
- E. Apply up to 3/4" of a Portland cement-based, microsilica-enhanced, high-strength structural restoration and resurfacing mortar designed to be applied at a minimum of 1/4", and up to 5" on vertical and overhead surfaces and trowel it to get a smooth finish. Manufacturers for Portland cement-based resurfacing mortar is Mainstay ML-72 or approved equal.
- F. Spray 100 mils of a 100% solids epoxy coating. Manufacturer is Mainstay DS-5, or approved equal.
- G. Finalize with at least 4" wide of a 100% solids flexible epoxy joint sealant that is applied by trowel to the joint between the chimney and the manhole frame, at a thickness of 1/4" to prevent premature cracks where the manhole frame and mortar meet. Manufacturer for this flexible epoxy joint sealant is Madewell 806, or approved equal.
- H. Create a smooth transition between the bench and the walls of the manhole to avoid debris accumulation.
- I. Seal, plug, patch and coat the manhole structure as specified in the specifications from bench up to the top of each manhole.
- J. Contractor shall provide a minimum one year guarantee of material from the manufacture company and one year on workmanship.

**END OF SECTION 33 05 13**

## SECTION 33 05 17 - PRECAST CONCRETE VALVE VAULTS AND METER BOXES

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Precast concrete valve vaults.
2. Precast concrete meter boxes.

B. Related Requirements:

1. [Section 33 11 13 - Water Distribution Piping](#): Execution requirements for piping Work as required by this Section.

#### 1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. [Section 01 29 00 - Payment Procedures](#): Contract Sum/Price modification procedures.

B. Precast Concrete Valve Vaults:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes sawcut, demolition, excavation, all utility trenching work as specified in Section 31 23 16 – Utility Trenching, protecting the excavation in compliance with Cal/OSHA, installing valve vault, accessories, tests, backfill and surface restoration.

C. Precast Concrete WATER Meter Boxes:

1. Basis of Measurement: By each.
2. Basis of Payment: Includes sawcut, demolition, excavation, water meter box, accessories, test, and backfill and surface restoration.

#### 1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM C33 - Standard Specification for Concrete Aggregates.
7. ASTM C150 - Standard Specification for Portland Cement.
8. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
9. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
10. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
11. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
12. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
14. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
15. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
16. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Tests).
17. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

#### 1.4 COORDINATION

- A. Coordinate Work with other utilities within construction area.

#### 1.5 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data: Submit data on valve vaults and meter boxes.
- C. Shop Drawings: Indicate plan, location, and inverts of connecting piping.
- D. Manufacturer's Certificate: Certify that precast concrete valve vaults and meter boxes meet or exceed ASTM standards and specified requirements.

- E. Manufacturer Instructions: Submit special procedures for precast concrete valve vaults and meter boxes installation.
- F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- G. Qualifications Statement:
  - 1. Submit qualifications for manufacturer.

## 1.6 CLOSEOUT SUBMITTALS

- A. [Section 01 78 00 - Closeout Submittals](#): Requirements for closeout procedures.
- B. Project Record Documents: Record actual locations and inverts of buried pipe, components, and connections.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. [Section 01 60 00 - Product Requirements](#): Requirements for transporting, handling, storing, and protecting products.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Transport and handle precast concrete units with equipment designed to protect units from damage.
- D. Storage:
  - 1. Store precast concrete valve vaults and meter boxes according to manufacturer instructions.
  - 2. Do not place concrete units in position to cause overstress, warping, or twisting.

## PART 2 - PRODUCTS

### 2.1 DESIGN REQUIREMENTS

- A. Performance and Design Criteria:
  - 1. Watertight, Precast, Reinforced, Air-Entrained Concrete Structures:
    - a. Design to ASTM C890 A16: equivalent to AASHTO HS20 - 16-kip wheel live loading and installation conditions.

- b. Manufactured to conform to ASTM C913.
2. Minimum 28-Day Compressive Strength: 5,000 psi
3. Honeycombed or re-tempered concrete is not permitted.

## 2.2 WATER METER BOXES

### A. Manufacturers:

1. Christy
    - a. B9X with FL9X lid for  $\frac{3}{4}$ " meter
    - b. B16 with FL16D lid for 1-inch meters.
    - c. B-36 (17  $\frac{1}{4}$ " X30") with FL36E lid for 1  $\frac{1}{2}$ " & 2" meter
    - d. R37 P36 Pit with R37-52HT lid for 3" thru 6" meters
    - e. For 4" meter and larger, install concrete water meter vaults. Submit detailed drawings.
  2. Or approved equal
- B. After payment of fees, water meter shall be furnished and installed by the city for new services.
- C. When meter box is to be located in an area subject to vehicular traffic loading, the permittee shall furnish a regular box for  $\frac{3}{4}$ " & 1" meters and a H/20 traffic rated box for 1  $\frac{1}{2}$ " & 2" meters. Traffic box cover shall be FL12 box with FL12D lid for  $\frac{5}{8}$ " x  $\frac{3}{4}$ " through 1-inch meters (or approved equal) and Christy B10" X 17" with B36-616 lid (or approved equal) for 1  $\frac{1}{2}$ " & 2" meters.
- D. For all types of pipes, service saddle shall be Mueller H-13000 series cc tapered thread (or approved equal). Saddles for PVC pipe shall be double or wide strap design.
- E. Corporation stop shall be 1" Mueller B-25008N (or approved equal) for  $\frac{3}{4}$ " & 1" meters and a 2" Mueller B-25008N (or approved equal) for 1  $\frac{1}{2}$ " & 2" meters.
- F. Angle meter stop shall be Mueller B-24258N (or approved equal) for  $\frac{3}{4}$ " & 1" meters and a 2" Mueller B-24276N (or approved equal) for 1  $\frac{1}{2}$ " & 2" meters.
- G. Water meter shall be located in the center of water meter box.
- H. Water lateral and services to be sized per the requirements of latest version of the California plumbing code.
- I. All water service fittings shall be lead-free
- J. Where the material for service fittings is specified to be bronze, brass fittings may be used.

- K. Minimum cover over building supply (yard piping) shall not be less than that specified in the plumbing code.
- L. 1" x 3/4" brass reducer shall be used for 5/8" x 3/4" meter.
- M. The meter box for a 1 1/2" turbine meter shall be a Christy B-30E lid (or B-30-61G for traffic areas), or approved equals. The meter box for a 2 in turbine shall be a Christy B-36 box with B-36E lid (or B-36-61G for traffic areas), or approved equals.
- N. 5lb minimum anode required on all copper service lines 2" and smaller unless geotechnical report stipulates, it is not necessary. Additional weight may be required by geotechnical report. Insulating coupling required between copper water lateral and water if main is metallic.
- O. Meter boxes, extensions, and covers shall be commercial products. Boxes shall be large enough to allow easy maintenance, testing, and removal meters.

## 2.3 PRECAST CONCRETE VALVES

### A. Manufacturers:

- 1. Oldcastle Precast, Inc.
- 2. Jensen Precast
- 3. Or approved equal

### B. Valve Vault and Covers:

- 1. Cast Iron Castings:
  - a. ASTM A48, Class 30 or better.
  - b. Free of bubbles, sand, air holes, and other imperfections.
  - c. Slip resistant coating.
  - d. ADA rated grating in pedestrian routes and pathways.
- 2. Christy G5 traffic valve box (or approved equal)

## 2.4 MATERIALS

### A. Portland Cement:

- 1. ASTM C150, Type II.

### B. Coarse Aggregates:

- 1. ASTM C33.
- 2. Graded 1 inch to No. 4 sieve.

### C. Sand:

1. ASTM C33.
2. Fineness Modulus: 2.35.

D. Water:

1. Potable.
2. Clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.

E. Air-Entraining Admixtures: ASTM C260.

F. Reinforcing Steel:

1. Deformed Bars: ASTM A615, Grade 60.
2. Welded Wire Fabric: ASTM A185.

G. Joint Sealant:

1. ASTM C990.

H. Bedding and Backfill:

1. Bedding: Bedding Type, as specified in [Section 31 23 16 – Utility Trenching](#).
2. Backfill: Backfill Type, as specified in [Section 31 23 16 – Utility Trenching](#).

## 2.5 FABRICATION

- A. Fabricate precast reinforced concrete structures according to ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

## 2.6 MIXES

- A. Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that piping connections, sizes, locations, and inverts are as indicated on Drawings.



### 3.2 PREPARATION

- A. [Section 01 70 00 - Execution](#): Requirements for installation preparation.
- B. Ream pipe ends and remove burrs.
- C. Remove scale and dirt from components before assembly.
- D. Establish invert elevations for each component in system.
- E. Hand trim excavation to suit valve vaults and meter boxes; remove stones, roots, and other obstructions.

### 3.3 INSTALLATION

- A. Bedding and Backfill:
  - 1. Excavate as specified in [Section 31 23 16 – Utility Trenching](#) for Work of this Section.
  - 2. Hand trim excavation for accurate placement of vaults and meter boxes to elevations indicated.
  - 3. Place bedding material level in one continuous layer and compacted depth and compact to percent maximum density as specified in [Section 31 23 16 – Utility Trenching](#).
  - 4. Backfill around sides of vaults and meter boxes, tamp in place, and compact to 95 percent maximum density.
  - 5. Maintain optimum moisture content of bedding material to attain required compaction density.
  - 6. Install vaults and meter boxes and related components on bedding.
- B. Connect piping.

### 3.4 FIELD QUALITY CONTROL

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for testing, adjusting, and balancing.
- B. Request inspection by Project Manager prior to placing aggregate cover over piping.
- C. Compaction Testing: Conform to ASTM D1557.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

**END OF SECTION 33 05 17**

**SECTION 33 05 26 - UTILITY IDENTIFICATION****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. The Contractor shall provide all materials, equipment, and labor necessary to furnish, install all utility identifications systems and appurtenances as required and as specified below:
1. Pipeline marker posts.
  2. Metal utility markers.
  3. Marking flags.
  4. Plastic warning tape for placement above direct-buried utility.
  5. Trace wire for placement above direct-buried utility.
- B. Related Requirements:
1. [Section 31 23 16 – Utility Trenching](#): Backfilling considerations for installation of underground pipe markers.
  2. [Section 33 11 13 - Water Distribution Piping](#): Piping, valves, and appurtenances requiring identification marking.
  3. [Section 33 31 13 - Sanitary Sewer Piping](#): Piping, valves, and appurtenances requiring identification marking.
  4. [Section 33 41 13 - Storm Drainage Piping](#): Piping, valves, and appurtenances requiring identification marking.

## 1.2 SUBMITTALS

- A. [Section 01 33 00 - Submittal Procedures](#): Requirements for submittals.
- B. Product Data: Submit manufacturer's catalog information for each product required.
- C. Samples: Submit one sample of pipeline marker post, utility marker, marking flag, 10 feet of warning tape, and 10 feet of trace wire.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Qualifications Statement: Submit qualifications for manufacturer.

1.3 CLOSEOUT SUBMITTALS

- A. [Section 01 78 00 - Closeout Submittals](#): Requirements for submittals.
- B. Project Record Documents: Record actual locations of tagged valves.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. [Section 01 77 00 - Closeout Requirements](#): Requirements for maintenance materials.

**PART 2 - PRODUCTS**

2.1 PIPELINE MARKER POSTS

- A. Manufacturers:
  - 1. Furnish above ground utility marker materials with visibility enhancer according to City standards.
    - a. Pro-Mark Utility Supply Inc,
    - b. Northtown Company
    - c. Bernsten
    - d. or approved equal.
- B. Description:
  - 1. Material: High Impact Fiberglass Reinforced Resins
  - 2. Width: 4 inches +/- 0.25 inches
  - 3. Length: 96 inches
  - 4. Color: Orange (Telecommunications, Fiber Optic cables or conduits), Yellow (Natural Gas, Oil, Steam, Petroleum Pipelines), Blue (Water lines), Red (Electric Power Lines, cables), Green (Sewer and Drain Lines), Purple (Reclaimed Water, Irrigation), White (Proposed excavation limits) and Pink (Temporary Survey Markings, Unknown/Unidentified facilities).
  - 5. Embedment: T-anchor.
  - 6. Technical Data:

Description	Test Spec. or Criteria	Test Result
Tensile Strength	ASTM D638	410 kg/cm <sup>2</sup>
Tensile Elongation	ASTM D638	35%
Tensile Modulus	ASTM D638	17,600 kg/cm <sup>2</sup>
Flexural Strength	ASTM D790	660 kg/cm <sup>2</sup>
Flexural Modulus	ASTM D790	19,500 kg/cm <sup>2</sup>
IZOD Impact Strength	ASTM D256	45 kg cm/cm
Heat Deflection Temp	ASTM D648	204.8°F

Vicat Softening Temp	ASTM D1525	201.2°F
Flammability	UL94	HB Class

## 2.2 UTILITY MARKERS

### A. Manufacturers:

1. Furnish materials according to City standards.
  - a. Bernsten
  - b. Rhino
  - c. or approved equal.

### B. Metal:

1. Material: Bronze
2. Diameter: 2 inches.
3. Stem: 3/4 by 2 inches
4. Text: "Warning Water Pipeline Caution Call 811 Before you dig" or "Stub for Pipeline".

## 2.3 MARKING FLAGS

### A. Manufacturers:

1. Furnish materials according to City standards.
  - a. Bernsten
  - b. Presco Products
  - c. or approved equal.

### B. Description:

1. Material: Polyethylene
2. Minimum Size: 2-1/2 by 3-1/2 inches.
3. Wire Stem: 21 inches
4. Color: Yellow, Orange, Blue, Green, Red, Pink and White.
5. Text: Blue (Buried Waterline), Red (Buried Electric Line), Pink (Survey Marker), Green (Buried Sewerline), Yellow (Buried Gas line) and Orange (Buried Fiber Optic conduits).

## 2.4 WARNING TAPE

### A. Warning Tape:

1. Warning Tape shall be installed on all pipes greater than 2 inches and the warning tape shall be placed above the centerline of the pipe, spanning the full length of the pipe, and be placed at a depth of 1-foot above top of pipe.
2. Furnish materials according to National Transportation Safety Board NTSB-PSS-73-1, GSA Public Buildings Service Guide, American Gas Association

72-D-56, API RP 1109, OSHA 1926.956 (c)(1), APWA Uniform Color Code, DOT Office of Pipeline Safety USAS B31.8, and Federal Gas Safety Regulations S 192-321 (e).

**3. Technical Data:**

Properties	Test Method	Value
Thickness	ASTM D2103	0.005" (5 mil)
Elongation	ASTM D882-75B	80%
Colors	APWA Coded	See below
Tensile Strength	ASTM D882	35 lbs/inch (15,000 psi)
Bond Strength	Boiling Water	5 Hours w/o Peel
Adhesives	Mfg. Specs	Morton 548 or Equivalent
Bottom Later	Mfg. Specs	Virgin PE
Top Later	Mfg. Specs	Virgin PET
Foil	Mfg. Specs	0.00035 (0.35 Mil)
Flexibility	ASTM 671-76	Pliable Hand
Message Repeat	Mfg. Specs	AXL II
Inks	Mfg. Specs	Varies per Legend
Printability	ASTM D2578	45 Dynes

**4. Manufacturers:**

- a. Northtown Company
- b. Christy's
- c. Bernsten
- d. or approved equal.

**B. Description:**

- 1. Material: Polyethylene
- 2. Brightly colored, continuously printed.
- 3. Minimum Size: 6 inches wide by 5 mils thick.
- 4. Manufactured for direct burial service.
- 5. Lettering Size: 1 inch
- 6. Color: All tape is APWA color coded and permanently printed
  - a. Red – Electric, Fire
  - b. Yellow – Gas, Oil
  - c. Blue – Water, Potable Water
  - d. Green – Sewer, Storm Drain
  - e. Orange – Fiber Optic, Telephone
  - f. Purple – Recycled Water, Non-Potable Water.
- 7. Standard Imprints: "CAUTION WATER LINE BURIED BELOW", "CAUTION SEWER LINE BURIED BELOW", "CAUTION SANITARY SEWER BURIED BELOW", "CAUTION GAS LINE BURIED BELOW", "CAUTION HIGH VOLTAGE ELECTRIC BURIED BELOW" or other custom utility legends in large letters.

## 2.5 TRACE WIRE

### A. Tracer Wire:

1. Tracer wire shall be used on all pressure piping (water, recycled water, irrigation water, sewer force main etc). Tracer wire shall be blue and suitable for direct burial and wet conditions.
2. Tracer wire shall be continuous and splices shall be made with two copper or brass split bolt fasteners without encapsulation in epoxy.
3. Contractor shall submit proof of continuity testing to the City in a written format.
4. Tracing wire through valve boxes shall be placed outside of riser but inside the valve box.
5. Tracer wire shall be UL listed, Standard 83, conforming to Federal Specification JC-30-B, ANSI-C 33.80 and the requirements of National Electric Code.
6. For all pressure piping systems (potable, recycled water, sewer force mains, irrigation system, and water valves), a No. 12 A.W.G. UF Insulated solid copper wire shall be attached to the pipeline.
7. The wire shall be taped to hold in place and the tape shall be 2 inches wide, 10 mil. thick. On mains the wire shall be held in place with tape spaced not more than 10 feet apart. On service laterals the wires shall be wrapped around the pipe.
8. Furnish materials according to City standards.
  - a. Northtown Company
  - b. Priority Wire and Cable, Inc.
  - c. or approved equal.
9. Description:
  - a. Wire: Unshielded 12-AWG THWN insulated copper.

## 2.6 RECYCLED WATER SIGNING

- A. Contractor shall provide all identification signs and stickers for irrigation controllers for recycled water systems in compliance with Delta Diablo Water District's requirements.
- B. Signs shall be measured no less than 8"x8" with white type against a purple background.

## **PART 3 - EXECUTION**

### 3.1 INSTALLATION

- A. Pipeline Marker Posts, Utility Markers, and Marking Flags: As recommended by manufacturer.
- B. Warning Tape and Tracer Wire:

1. Warning tape shall be continuous over top of pipe buried 12 inches above piping.
2. Tracer wire shall be taped to the pipe.
3. If multiple pipes occur in common trench, locate tape and wire above centerline of trench.
4. Coordinate with trench Work as specified in [Section 31 23 16 – Utility Trenching](#).

**END OF SECTION 33 05 26**

**SECTION 40 61 00****COMMON WORK RESULTS****INSTRUMENTATION AND CONTROLS FOR PROCESS SYSTEMS****PART 1 - GENERAL**

## 1.1 DESCRIPTION

- A. A single Process Control System Integrator (PCSI) shall furnish all services and materials for the City of Pittsburg, CA (Owner), WTP Genius Bus Replacement Project including control panel modifications and local communication networks as specified herein.
- B. The Contract Documents are a single integrated document, and as such all Divisions and Sections apply. It is the responsibility of the CONTRACTOR and Subcontractors to review all sections to insure a complete and coordinated project.
- C. The purpose of this project is to remove the existing obsolete GE Genius I/O modules, Genius bus controllers, Genius I/O adapters, and Genius bus cables and replace them with current Emerson VersaMax I/O modules and a Profinet remote I/O system, as shown on the Drawings.
- D. Programming and configuration of the Owner's Process Automation Controllers (PACs) and central SCADA HMI components located at the facility shall be performed by the Owner's programmer and is not included in this Contract. The PCSI shall coordinate closely with the programmer and provide a minimum of 2-week's notice for all cutovers and transitions that require PAC configuration or programming changes.
- E. Due to ongoing supply-chain issues, the City has pre-purchased some of the process control components to prevent delays in implementing this Project. These components shall be furnished to the PCSI during the initial submittal phase of the project. Owner-furnished components include I/O modules, I/O bases, I/O terminal assemblies, remote I/O network controllers, and remote I/O network adapters. The complete bill of materials for owner-furnished components is included in the Appendix.
- F. Equipment shall be fabricated, assembled, installed, and placed in proper operating condition in full conformity with the Contract Documents and drawings, engineering data, instructions, and recommendations of the equipment manufacturer as approved by Engineer.
- G. The work shall include furnishing, installing, and testing the equipment and materials detailed in the following Specification Sections:
  - 1. 40 61 00 – Common Work Results - Process Instrumentation and Controls
  - 2. 40 66 33 – Fiber Optic Cables and Equipment
  - 3. 40 67 00 – Control Panels and Hardware
- H. Where differences exist between the specific equipment Specification Sections of Division 40 and this general equipment Specification Section, the specific equipment Specifications shall govern.



## 1.2 SCOPE OF WORK

- A. The PCSI work shall include the following:
1. Provide all materials, equipment, labor, coordination, installation and testing services required to achieve a fully integrated and operational system. The PCSI shall design and coordinate the network and process control system for proper operation with related equipment and materials furnished under this Section and with related existing equipment.
  2. Field investigate installed conditions for each control panel. Some of the original as-built drawings from the 1989 plant expansion, including partial markups of modifications, will be made available for reference after the Contractor is given the Notice to Proceed.
  3. Develop control panel shop drawings for all control panels that are modified as part of this project. Shop drawings shall include dimensioned internal and external elevation drawings, terminal block layout drawings, control power distribution drawings (AC and DC circuits), I/O wiring diagrams, electrical schematic diagrams, and process signal loop diagrams.
  4. Perform field modifications of the existing control panels as shown on the Drawings.
  5. Auxiliary and accessory devices necessary for system operation or performance, such as transducers or relays to interface with existing equipment whether they are shown on the Drawings or not.
  6. All programming for the existing facility SCADA system components shall be performed by the Owner's programmer. However, PCSI shall be responsible for implementing the upgrades to the hardware and networking. PCSI shall coordinate with Owner's programmer for the work to be performed by the Owner at the facility, implementing the system switchover (including data addressing coordination) between new and old equipment with the platforms at central Control Room, and implementing successful delivery of process control and diagnostic data.
  7. Facilitate, coordinate, and take full responsibility for integration of equipment resident on the control system network that is provided under other Sections of these Contract Documents.
- B. The PCSI shall use the equipment, instrument, and loop numbering scheme that has been developed and shown on the Drawings. The PCSI shall not deviate from or modify said numbering scheme or process control logic without Engineer's approval.
- C. The following is a list of facilities where work will be performed. All work shall be coordinated with its operating personnel to minimize impact on operation. The existing facilities are as follows:
1. Various locations throughout the Pittsburg Water Treatment Plant including but not limited to:
    - a. Plant Control Room
    - b. Filter Control Building

- c. Raw Water Pump Station
- d. Chemical Control Building
- e. Chlorine Dioxide Control Building
- f. High Level Pump Station
- g. Solids Control Building

D. Related Work

1. Control System Network Diagram is included in the Drawings.
2. Appendix 40 61 00-A: Owner-furnished components Bill of Materials.
3. Appendix 40 61 00-B: Control System Input/Output (I/O) List. The I/O List is included for reference only.
4. Appendix 40 61 00-C: Sample Installation Sequence. The installation sequence details are included for reference only.

1.3 SUBMITTALS

A. General

1. Shop drawings shall be submitted as specified in Section 01 33 00. Submittals files shall be organized, bookmarked, and annotated to clearly present the specific materials and components being proposed by the PCSI. They shall be complete; giving equipment specifications, details of connections, wiring, ranges, installation requirements, and specific dimensions. Submittals consisting of only general sales literature will not be acceptable.
2. Check shop drawings for accuracy and contract requirements prior to submittal. Shop drawings shall be stamped with the date checked and a statement indicating that the shop drawings conform to Specifications and Drawings. This statement shall also list all exceptions to the Specifications and Drawings. Shop drawings not so checked and noted shall be returned unreviewed.
3. Engineer's review of submittals shall be for conformance with the design concept of the project and compliance with the Specifications and Drawings. Errors and omissions on approved shop drawings shall not relieve the Contractor from the responsibility of providing materials and workmanship required by the Specifications and Drawings.
4. Field verify all dimensions at the Project site and coordinate with the work of all other trades and work being performed by the Owner.
5. Shop drawings shall fully demonstrate that the equipment and services to be furnished comply with the provisions of these Specifications and shall provide a true and complete record of the equipment as manufactured and delivered.

B. Submittal Requirements

1. Hard-copy submittals shall be bound in separate three-ring binders, with an index and sectional dividers, with all drawings provided in 11-inch by 17-inch format for inclusion within the binder.
2. The submittal drawings' title block shall include, as a minimum, the PCSI's registered business name and address, project name, drawing name, revision level, and personnel responsible for the content of the drawing.
3. Separate submittals shall be made for:
  - a. Project Plan, Deviation List, and Schedule
    - 1) Include a listing of all contract personnel that will perform work on-site at the WTP. Include their first and last name and job title.
  - b. Coordination Workshops Agendas
  - c. Control Panel Submittal
  - d. Testing Plan

C. Project Plan, Deviation List, and Schedule

1. The PCSI Project Plan shall be submitted and favorably reviewed before any further submittals will be accepted or reviewed. Any and all project submittals received prior to submittal and favorable review of the Project Plan shall be returned to the Contractor with a "Not Reviewed" status.
2. Project Plan shall, at a minimum, contain the following:
  - a. Overview of the proposed implementation in clear text format describing the PCSI's understanding of the project work, schedule, startup, and coordination.
  - b. Approach describing how the PCSI intends to execute the work written in clear text format. Approach shall include a discussion of procurement, fabrication, testing, installation, switchover, startup, replacement of existing equipment with new, interim operations, etc. as applicable for this Project.
  - c. A review of the owner-furnished components bill of materials and confirmation of the quantities and part numbers required to implement the Project.
  - d. Proposed list of anticipated shop drawings and submittals.
  - e. Project personnel and organization including the PCSI project manager, project engineer, and lead project technicians. Include resumes of each key individual including the registered engineer in responsible charge for the project. Submit confirmation in writing the commitment to this project for all key staff.
  - f. Preliminary coordination workshop agendas as specified herein.
3. Exceptions to the Specifications or Drawings shall be clearly defined by the PCSI in a separate Deviation List. The Deviation List shall consist of a paragraph-by-paragraph review of the Division 40 Specifications indicating conformance or any

proposed deviations, the reason for exception, the exact nature of the exception and the proposed substitution so that a proper evaluation may be made by Engineer. The acceptability of any device or methodology submitted as an "or equal" or "exception" to the specifications shall be at the sole discretion of Engineer.

4. Project schedule shall be prepared and submitted using Microsoft Project scheduling software or similar. Schedule shall be prepared in Gantt chart format clearly showing all major tasks, task dates and durations, milestone dates, linkages between tasks, and identification of critical path elements. At a minimum, the project schedule included in the project work plan for the control system work specified in Division 40 shall include:
  - a. Demonstration of coordination with the overall project plan provided by the General Contractor under Special Provisions.
  - b. All subsequent control system project submittals. Include in the scheduled time durations the time required for PCSI submittal preparation and submittal review. Include provision for a minimum of two complete review cycles.
  - c. Proposed dates for all project Coordination Workshops.
  - d. Hardware purchasing, fabrication, and assembly (following approval of related submittals)
  - e. Shipment of all network and control system equipment
  - f. Installation of all network and control system equipment.
  - g. Testing: Schedule for all testing including at a minimum the testing sequence as specified under Part 3. Testing schedule shall include submittal of test procedures a minimum of 30 days prior to commencement of testing. Schedule shall also include submittal of completed test procedure forms for review and approval by Engineer and Owner prior to shipment, startup, or subsequent project work.
  - h. Schedule for system cutover, startup, and/or going on-line for each major system. At a minimum include the schedule for each control panel modified under this Contract.
- D. Coordination Workshops Agendas: Agendas shall be submitted for the Coordination Workshops as specified herein. Submit proposed Control System Coordination Workshop Agendas a minimum of four weeks prior to the scheduled workshop dates for review and comment by Engineer and modification by the PCSI as required.
- E. Control Panel Submittal: Submittals and drawings shall be furnished for all panels, consoles, and equipment enclosures specified in Section 40 67 00. Panel assembly and elevation drawings shall be drawn to scale and detail all equipment in or on the panel. As a minimum, the panel drawings shall include the following:
  1. Panel elevation drawings to scale.
  2. Panel total weight including all components.
  3. Nameplate schedule.

4. Cabinet assembly and layout drawings to scale. The assembly drawing shall include a comprehensive bill of material on the drawing with each panel component clearly defined. The bill of material shall be cross-referenced to the assembly drawing so that a non-technical person can readily identify any component of the assembly by manufacturer and model number.
5. Fabrication and painting specifications including color (or color samples).
6. Panel control schematics and interconnection diagrams detailing the electrical connections of all equipment in and on the panel. Diagrams shall include at a minimum power and signal connections; UPS, critical (battery), and non-critical (normal) power sources; all panel ancillary equipment; protective devices; wiring and wire numbers; and terminal blocks and numbering.
7. Control panel component catalog data and cut sheets for all control panel equipment provided.

F. Testing Plan

1. Test Procedure Submittals: Submit the procedures proposed to be followed for each test. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests. Include sign-off forms for each testing phase or loop (per the Specifications) with sign-off areas for the PCSI, the Owner, and the Engineer. Refer to Part 3 of this Section for testing requirements. Submit separate procedures for each specified test phases including:
  - a. Operational Readiness Test (ORT)
  - b. Functional Acceptance Test (FAT)
  - c. 30-Day Acceptance Test.
2. Test Documentation: Upon completion of each required test, document the test by submitting a copy of the signed off test procedures. Testing shall not be considered complete until the signed-off test procedures have been submitted and favorably reviewed. Submittal of other test documentation, including "highlighted" I/O electrical schematic wiring diagrams with field technician notes are not acceptable substitutes for the formal test documentation.

1.4 REFERENCE STANDARDS

- A. Publications are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition in effect at the time of bid opening shall apply.
- B. American Society for Testing and Materials (ASTM).
  1. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- C. American National Standards Institute (ANSI)
  1. ANSI X3.5 - Flowchart Symbols and Their Usage in Information Processing

- D. International Electrotechnical Commission (IEC)
  - 1. IEC 61131 – 3 – International Standards, Programmable Controllers – Part 3 Programming Languages
- E. Institute of Electrical and Electronic Engineers (IEEE)
  - 1. IEEE Standard C2 – National Electrical Safety Code (NEESC)
  - 2. IEEE Standard 472 - Electrical Surge Protection
  - 3. IEEE Standard 802.X – LAN/MAN Standards
- F. Electronic Industries Alliance (EIA)
  - 1. EIA Standard RS-232-C – Interface between data terminal equipment and data communication equipment employing serial binary data interchange.
  - 2. EIA Standard RS-422-A – Electrical characteristics of balanced voltage digital interface circuits
- G. Instrumentation, Systems, and Automation Society (ISA)
  - 1. ISA S5.2 - Binary Logic Diagrams for Process Operations
  - 2. ISA S5.3 - Graphic Symbols for Distributed Control/Shared Display Instrumentation Logic and Computer Systems.
  - 3. ISA S5.4 - Instrument Loop Diagrams
  - 4. ISA S20 - Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
  - 5. ISA RP60.3 - Human Engineering for Control Centers
  - 6. ISA RP60.6 - Nameplates, Labels, and Tags for Control Centers
  - 7. ISA 101.01 – Human Machine Interfaces for Process Automation Systems
- H. National Fire Protection Agency (NFPA)
  - 1. NFPA 70 - National Electrical Code.
- I. National Electrical Manufacturers Associations (NEMA)
  - 1. NEMA ICS6 - Enclosures for Industrial Controls and Systems
- J. Underwriters Laboratories, Inc. (UL)
  - 1. UL 508 – Industrial Control Equipment
- K. PROFIBUS and PROFINET International (PI)
  - 1. PI – PROFINET Design Guideline – Order 8.062
  - 2. PI - Functional Bonding and Shielding of PROFIBUS and PROFINET – Order 8.102

## 1.5 QUALITY ASSURANCE

- A. Refer to Section 01 43 00.
- B. The equipment and components specified herein were current products at the time of the design. Should the specified equipment become unavailable during construction, due to obsolescence or loss of commercial availability, the contractor shall provide the latest product within the product line for approval or equivalent that meets the technical requirements of the specification.
- C. The PCSI shall be a "systems house" regularly engaged in the design and the installation of instrumentation systems and their associated subsystems as they are applied to the municipal water and wastewater industry.
  - 1. For the purposes of this Specification Section, a "systems house" shall be interpreted to mean an organization that complies with all of the following criteria:
    - a. Employs a professional Control Systems Engineer or Electrical Engineer registered in the State of California to supervise or perform the work required by this Specification Section.
    - b. Employs personnel on this project who have successfully completed ISA or manufacturers' training courses on general process instrumentation and configuration and implementation of the specific process controllers, computers, and software proposed for this project.
    - c. Has performed work of similar or greater complexity on at least five previous projects.
    - d. Has been actively engaged in the type of work specified in this Specification Section for a minimum of five years.
    - e. Has been actively engaged in industrial process control programming and system integration for a minimum of ten years.
    - f. Has been actively engaged in HMI configuration and system integration for a minimum of five years.
  - 2. The PCSI shall maintain a permanent, fully staffed and equipped service facility within 4 hours travel time of the project site with full time employees capable of designing, fabricating, installing, calibrating, and testing the systems specified herein. At a minimum, the PCSI shall be capable of responding to on-site problems within 12 hours of notice.
  - 3. Actual installation of the instrumentation system need not be performed by the PCSI's employees; however, the PCSI as a minimum shall be responsible for the technical supervision of the installation by providing on site supervision to the installers of the various components.
  - 4. The PCSI shall furnish equipment that is the product of one manufacturer to the maximum practical extent. Where this is not practical, all equipment of a given type shall be the product of one manufacturer.
  - 5. The PCSI shall be one of the following or equal as approved by the Owner.
    - a. Technical Systems, Inc., Dixon, California (707-678-1111)

- b. Telstar Inc., Concord, California (925-671-2888)
  - c. Primex Controls, Vacaville, California (707-449-0341)
6. Only approved suppliers will be accepted. The Contractor shall name the proposed system supplier per the requirements of the Special Provisions.
- a. Cover Letter:
    - 1) Company name, contact name, address, fax number and email address
  - b. PCSI Qualifications:
    - 1) The PCSI shall provide responses to all items listed in Section 40 61 00, Article 1.5 - Quality Assurance"
7. Being listed in this Section does not relieve any potential PCSI from meeting the qualifications specified in this Section. However, listed suppliers will not be required to submit a qualifications proposal. Suppliers interested in being listed as an equal to the above listed suppliers shall submit three copies of a qualifications proposal to the Owner no later than four weeks before the bid opening date. Based on a review of the contents and completeness of the submitted data, a list of any approved equals shall be issued by the Owner no later than five days before the bid opening date.

#### 1.6 SYSTEM DESCRIPTION

- A. The City's water treatment plant (WTP) control system uses programmable automation controllers (PACs) to provide automatic and operator guided control of the WTP processes. Data from the PACs provides round-the-clock monitoring of the WTP operations. The system of PAC-based control contains obsoleted I/O module hardware and RS-485 based fieldbus technology that are an integral part of the existing plant's control system, but due for replacement. The existing Genius Bus components including the bus controllers and related I/O modules and cabling will be replaced under this contract with current technology. The existing Genius I/O modules will be replaced with current I/O modules compatible with the existing plant PAC system. The Genius I/O system including controllers and cabling will be replaced with Ethernet-based PROFINET I/O network controllers and scanners and cabling compatible with the existing plant PAC system.
- B. Unless otherwise specified, all existing plant instrumentation, associated wiring and control functionality will remain unchanged under this contract. A few obsoleted control elements will be replaced with a hardware/software solution and some power supplies will be replaced with current technology as specified by this contract. Specific modifications are shown on the Drawings.
- C. One of the primary goals of this project is to successfully replace the obsolete Genius I/O system with minimal disruptions to plant operations. As control panels are taken out of service so that the Genius blocks can be replaced with VersaMax I/O, the equipment and processes that are monitored and controlled from those control panels will not be under the automatic control of the PAC system.
  - 1. Demolition and installation work shall be limited to one panel at a time. When a control panel is completed, the contractor shall fully test the control panel and ensure proper operation before work begins at the next control panel on the same



network until the entire network is cutover before moving to panels on a different network.

2. The schedule will accommodate a maximum of five scheduled full plant shutdowns, with a maximum duration of two hours each. Plant shutdowns shall be scheduled at least 14 days apart.
3. A maximum of two filters may be taken out of service for two weeks to allow for FCC modifications. While two filters are out of service, the contractor shall ensure that the plant has six available filters for treatment plant operations, and equipment associated with backwashing the filters shall be always available for manual operation.
  - a. The filter backwash flow control is hosted in FCC 6/8.
4. Shutdowns of process areas that require Local/Manual operation of equipment shall be limited to the 8-hours of day shift operation, between 7:00 and 15:00, Monday through Friday.
5. Shutdowns of individual process equipment shall be limited to the 8-hours of day shift operation, between 7:00 and 15:00, Monday through Friday.

#### 1.7 DELIVERY, STORAGE AND HANDLING

##### A. Shipping Precautions

1. After completion of shop assembly, factory test and approval of all equipment, cabinets, panels and consoles shall be packed in protective crates and enclosed in heavy duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust and moisture. Dehumidifiers shall be placed inside the polyethylene coverings. The equipment shall then be skid-mounted for final transport. Lifting rings shall be provided for moving enclosures without removing protective covering. Boxed weights shall be shown on shipping tags together with instructions for unloading, transporting, storing and handling at the job site.
2. Special instructions for proper field handling, storage and installation required by the manufacturer for proper protection, shall be securely attached to the packaging for each piece of equipment prior to shipment. The instructions shall be stored in resealable plastic bags or other acceptable means of protection.

##### B. Shipping Coordination

1. Coordinate shipping and installation of panel with phased construction sequence including demolition of existing panels and installation new VFDs. As specified in the Contract Documents.

##### C. Identification During Shipping and Storage

1. Each component shall be tagged to identify its location, tag number and function in the system. Identification shall be prominently displayed on the outside of the package.

##### D. Storage

1. Equipment shall not be stored out-of-doors. Equipment shall be stored in dry permanent shelters including in-line equipment and shall be adequately protected

against mechanical damage. Equipment stored in untreated spaces shall have condensation space heaters installed to prevent moisture condensing on or within the equipment. Provide suitable power source for space heaters as required.

2. If any apparatus has been damaged, such damage shall be repaired by the PCSI at his/her own cost and expense. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such tests as directed by Engineer. This shall be at the cost and expense of the PCSI, or the apparatus shall be replaced by the PCSI at no additional cost.

#### 1.8 PROJECT/SITE REQUIREMENTS

- A. Elevation: Equipment shall be designed to operate at a ground elevation of approximately 25 feet above mean sea level.
- B. Temperature:
  1. Outdoor area equipment shall be suitable for operation at temperatures from -10° to +50° C degrees ambient.
  2. Interior area equipment shall be suitable for operation in conditioned spaces from +10° to +40° C degrees ambient.
  3. Storage temperatures shall range from -10° to 50° C degrees ambient minimum.
  4. Additional cooling or heating shall be furnished by the PCSI under the Contract Bid Price if required to conform to the indicated operating or storage temperatures as specified herein.
- C. Relative Humidity. Air-conditioned area equipment shall be suitable for 20 to 95 percent relative, non-condensing humidity. All other equipment shall be suitable for 0 to 100 percent relative, condensing humidity.

#### 1.9 MAINTENANCE

- A. Test Equipment
  1. Additional test equipment as defined in the related technical Specification Sections of Division 40.
- B. Spare Parts
  1. Provide spare parts of the type and quantity as specified herein and as specified in the related technical specifications of Division 40.
  2. All spare parts shall be carefully packed in cartons, labeled with indelible markings, and shall be adequately treated for a long period of storage. Complete ordering information including manufacturer's part number, part ordering information including manufacturer, part number, part name, and equipment name and number(s) for which the part is to be used shall be supplied with the required spare parts. The spare parts shall be delivered and stored in a location directed by Owner.

1.10 WARRANTY

- A. The monitoring and control system, including all materials, shall be warrantied against defects in materials, workmanship and functionality for a period of 12 months from the date of shipment, or one year from start-up, whichever occurs first.

1.11 COORDINATION WORKSHOPS

- A. The PCSI shall schedule and hold two mandatory control system Coordination Workshops during the Project. The Coordination Workshops shall include as a minimum the Owner, the Engineer, the Contractor, the PCSI's Project engineer, and electrical subcontractor. Owner staff shall include construction managers, technicians, operators, and maintenance staff as required. The Owner shall determine which staff members will attend each workshop. Workshops shall all be held at the Pittsburg WTP.

- B. Schedule the Coordination Workshops a minimum of two weeks prior to the workshop date and include a draft agenda at the time of the request for review. Within one week subsequent to each workshop, submit draft workshop minutes for review and comment; submit final minutes incorporating any comments as necessary. The PCSI shall be responsible for facilitating the workshop and providing presentation material to all participants. The PCSI and Contractor shall document the proceedings of the Coordination Workshops and submit along with all materials used at the workshop.

C. Workshops

- 1. Electrical, I&C and Mechanical Workshop: A minimum of two weeks prior to any submittals being sent in for review PCSI shall lead and facilitate a 4-hour workshop to review the preliminary Electrical and I&C submittals & schedules. The preliminary submittals should include the following:
  - a. Identify any long lead items with submittals that need to be prepared expeditiously.
  - b. Review overall Contractor's schedule and identify how the PCSI schedule submitted under the project workplan specified herein has been integrated into it. As specified, the PCSI schedule shall include all major milestones including submittals, field fabrication, testing, installation, field testing & training.
  - c. Review how the PCSI will phase the installation of the new equipment into the system while maintaining operations throughout the construction cycle. Describe panel installation, migration of control schemes, wiring modifications, and other requirements to implement the new control system without impacting existing system operations.
- 2. As required workshops: One additional workshop shall be included for this project over and above the workshops defined above.
  - a. Topics and scheduling of this additional workshop shall be solely at the discretion of the Owner to address additional project requirements that may arise during construction.
  - b. Attendance at the additional workshop shall include at a minimum the Contractor, electrical subcontractor, PCSI, and Owner representatives.

- c. Duration of each workshop shall be determined by the topic and discussion points but assume each additional workshop shall be no more than 4 hours in length.
- d. Specific personnel required for the workshops shall be determined based on the workshop topics to be addressed.
- e. Owner shall provide a minimum of 2 weeks' notice to the PCSI of the need for the workshop after which the PCSI shall prepare a workshop agenda, coordinate workshop schedule, and facilitate the workshop.

#### 1.12 FINAL SYSTEM DOCUMENTATION

- A. Submit operation and maintenance manuals covering instruction and maintenance on each type of equipment in accordance with the General Conditions.
- B. The instructions shall be bound in three-ring binders with drawings reduced or folded for inclusion and shall provide at least the following as a minimum.
  - 1. A comprehensive index.
  - 2. A complete "As Built" set of the PCSI approved hardware and panel fabrication shop drawings.
  - 3. A complete list and data sheets of the equipment supplied, including serial numbers, ranges and pertinent data.
  - 4. Full specifications on each item.
  - 5. System schematic drawings "As Built" and "As-Left" details illustrating all components and final condition of each.
  - 6. Detailed service, maintenance and operation instructions for each item supplied.
  - 7. Special maintenance requirements particular to these systems shall be clearly defined, along with special calibration and test procedures.
  - 8. Complete parts lists with stock numbers and name, address and telephone number of the local Supplier.
- C. The PCSI's final documentation shall be new documentation written specifically for this project, but may include standard and modified standard documentation. Modifications to existing hardware or software manuals shall be made on the respective pages or inserted adjacent to the modified pages. All standard documentation furnished shall have all portions that apply clearly indicated. All portions that do not apply shall be lined out.
- D. The requirements for the PCSI's final documentation are as follows:
  - 1. As built documentation shall include information from submittals, as described in this Specification, updated to reflect the as-built system. Any errors in or modifications to the system resulting from the Factory and/or Functional Acceptance Tests shall be incorporated in this documentation.

### 1.13 CODES, INSPECTION AND FEES

- A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.
- B. Obtain all necessary permits and pay all fees required for permits and inspections.

## **PART 2 - PRODUCTS**

### 2.1 GENERAL REQUIREMENTS

#### A. General

1. Substitutions on functions or type of equipment specified will not be acceptable unless specifically noted. In order to ensure the interchangeability of parts, the maintenance of quality, the ease of interfacing between the various subsystems and the establishment of minimums with regard to ranges and accuracy, strict compliance with the above requirements shall be maintained. In order to ensure compatibility between all equipment, it shall be the responsibility of the PCSI to coordinate all interface requirements with mechanical and electrical systems and furnish any signal isolation devices that might be required.
2. To facilitate the Owner's future operation and maintenance, products shall be of the same major instrumentation manufacturer, with panel mounted devices of the same type and model as far as possible.

#### B. Physical

1. All instrumentation supplied shall be of the manufacturer's latest design and shall produce or be activated by signals that are established standards for the water industry.
2. Wetted components of the instrument for each installation shall be made of materials that are abrasion-resistant and corrosion-resistant to the process (e.g. sodium hydroxide, aluminum sulfate, cationic polyelectrolytes, etc.) as shown on the Drawings and as appropriate for the installation. The wetted components material(s) shall exhibit excellent or good abrasion and corrosion resistance to the chemical in service as rated by the material manufacturer. The final approval of material selection shall rest with the Engineer.
3. All electronic instrumentation shall be of the solid-state type and shall utilize either linear transmission signals of isolated 4 to 20 mA dc (milliampere direct current) or digital protocol where specified. However, signals between instruments within the same panel or cabinet may be 1-5V dc (volts direct current).
4. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission. No zero-based signals will be allowed.
5. Provide mounting hardware and floor stands, wall brackets, or instrument racks. Fasteners for securing control panels and enclosures to walls and floors shall be either hot-dipped galvanized after fabrication or stainless steel. Provide stainless steel fasteners only in corrosive areas rated NEMA 4X. Provide and size anchors in accordance with Special Provisions and Division 5 as required per the seismic calculations. Provide minimum size anchor of 3/8-inch.

6. All indicators shall be linear in engineering process units unless otherwise noted.
7. All transmitters shall be provided with either integral indicators or conduit mounted indicators in process units, accurate to two percent or better.
8. Electronic equipment shall be of the manufacturer's latest design, utilizing printed circuitry and suitably coated to prevent contamination by dust, moisture and fungus. Solid state components shall be conservatively rated for their purpose, to assure optimum long-term performance and dependability over ambient atmosphere fluctuations and 0 to 100 percent relative humidity. The field mounted equipment and system components shall be designed for installation in dusty, humid and slightly corrosive service conditions.
9. All equipment, cabinets and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The system shall contain products of a single manufacturer, and shall consist of equipment models that are currently in production. All equipment provided shall be of modular construction and shall be capable of field expansion.
10. All electronic/digital equipment shall be provided with radio frequency interference protection.
11. Provide heating, cooling, dehumidifying, and filtering devices in control panel, enclosures, and cabinets as required to maintain internal ambient conditions within the most restrictive requirements of the equipment housed. Submit calculations as part of the panel fabrication submittal process verifying these requirements.

C. Electrical

1. Equipment shall be designed to operate on a 60 Hertz alternating current power source at a nominal 120 volts, plus or minus 10 percent, except where specifically noted. Where possible, all field instruments shall be 24 VDC loop fieldbus powered as specified. Regulators and power supplies required for compliance with the above shall be provided between power supply and interconnected instrument loop or fieldbus link. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.
2. Materials and equipment used shall be U.L. approved wherever such approved equipment and materials are available.
3. Equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall resume normal operation without manual resetting when power is restored unless otherwise noted.
4. All transmitter output signals shall include signal and power source isolation.

D. Nameplates

1. General: Provide nameplates as specified below unless specified otherwise in the detailed technical Specifications of related Sections of Division 40.
2. All panels and field instruments shall be supplied with suitable nameplates that identify the panel and individual devices as required.

3. Nameplates shall be a 3/32-inch thick, black and white, laminated Bakelite or Lamecoid with engraved inscriptions. The letters shall be white against a black background. Edges of the nameplates shall be beveled and smooth. Nameplates with chipped or rough edges will not be acceptable.
4. Orient nameplates to facilitate reading the device identifier from a cursory inspection. Do not mount nameplates behind or under equipment.
5. Nameplate fasteners and mounting shall be:
  - a. Stainless steel wire, 0.048-inch diameter with stainless steel crimped clamps for hanging nameplates.
  - b. Stainless steel screws for cabinet mounted nameplates
6. Nameplates shall be as recommended by ISA Recommended Practice RP60.6.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL INSTALLATION**

- A. Equipment shall be installed in accordance with the manufacturer's instructions. The locations of equipment, transmitters, alarms and similar devices are diagrammatic only. Exact locations shall be as determined by the PCSI during development and fabrication of systems.
- B. The drawings indicate the intent and not the precise nature of the interconnection between the individual instruments. Exact nature of the final equipment interconnections shall be as determined by the PCSI during development and fabrication of systems.
- C. Where specific installation details are not specified or shown on the Drawings, installation recommendations from the equipment manufacturers or ISA shall be followed as applicable.
- D. The shield on each communication cable shall be continuous from source to destination and be grounded in accordance with the manufacturer's recommendations or as directed by the Engineer.
- E. Once installed, remove lifting rings from cabinets/assemblies. Permanent plugs shall be provided for the holes of the same material and color as the cabinet.
- F. All work shall be executed in full accordance with codes and local rulings. Should any work be performed contrary to said rulings, ordinances and regulations, the Contractor shall bear full responsibility for such violations and assume all costs arising therefrom.
- G. Unless specifically shown in the Drawings, direct reading or electrical transmitting instrumentation shall not be mounted on process piping. Instrumentation shall be mounted on instrument racks or stands as detailed on the installation detail drawings. All instrumentation connections shall be provided with shutoff and drain valves. For differential pressure transmitters, valve manifolds for calibration, testing and blowdown service shall also be provided. For slurries, chemical or corrosive fluids, diaphragm seals with flushing connections shall be provided.

- H. All piping and tubing to and from field instrumentation shall be provided with necessary unions, calibrations and test tees, couplings, adaptors, and shut-off valves. Process tubing shall be installed to slope from the instrument toward process for gas measurement service and from the process toward the instrument for liquid measurement service. Provide drain/vent valves or fittings at any process tubing points where the required slopes cannot be maintained.
- I. Provide local electrical shutoffs and disconnects for all 4-wire field instruments requiring 120 VAC power. Electrical disconnects shall be suitably rated disconnect switches or manual motor starters as specified under Division 26.
- J. Provide all brackets, hangers, and miscellaneous metals required for mounting of equipment. Mounting hardware shall be installed in a workmanlike manner and not interfere with any other equipment.
- K. The PCSI shall investigate each space in the building through which equipment must pass to reach its final location. If necessary, the PCSI shall be required to ship his/her material in sections sized to permit passing through restricted areas in the building. The PCSI shall also investigate, and make any field modifications to the allocated space for each cabinet, enclosure and panel to assure proper space and access (front, rear, side).
- L. The PCSI shall provide on-site service to oversee the installation, the placing and location of system components, their connections to the process equipment panels, cabinets and devices, subject to Engineer's approval. The PCSI shall certify that all field wiring for power and signal circuits are correctly done in accordance with best industry practice and provide for all necessary system grounding to insure a satisfactory functioning installation. The PCSI shall schedule and coordinate work under this Section with that of the electrical work specified under applicable Sections of Division 26.

### 3.2 TESTING

#### A. General

- 1. As part of the requirement of this Specification Section it is the responsibility of the PCSI to provide a complete operational control system. Confirmation of an operational control system is dependent upon results derived from test procedures as specified in this Section.
- 2. Perform testing of the equipment once installed in the field. Once the system is in operation an additional 30-Day Acceptance Test is required.
- 3. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and upon the system's or subsystem's producing the correct result (effect), the specific test requirement will have been satisfied.
- 4. All tests shall be conducted in accordance with prior Engineer approved procedures, forms and checklist all as submitted by the PCSI under Part 1 of this Specification. Each test to be performed shall be described and a space provided after it for signoff by the appropriate parties after its satisfactory completion. Include "punchlist" forms with the test procedure to document issues that arise during the testing. Punchlist forms shall include a resolution section that allows a description of the correction and signoff areas for PCSI and Engineer.



5. Copies of the sign off test procedures, forms and checklists will constitute the required test documentation. The test result forms shall be submitted to Engineer for approval at the completion of each test.
6. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment and data, provide suitable means of simulation. Define these simulations techniques in the test procedures.
7. The PCSI shall coordinate all required testing with the Contractor, all affected Subcontractors, the Engineer, and the Owner.
8. The PCSI shall furnish the services of field service engineers, all special calibration and test equipment and labor to perform the field tests.
9. Engineer reserves the right to test or retest all specified functions, whether or not explicitly stated on the Test Procedures, as required to determine compliance with the functional requirements of the overall system. Such testing required to determine compliance with the Specified requirements shall be performed at no additional cost to Owner. Engineer's decision shall be final regarding the acceptability and completeness of all testing.
10. No equipment shall be shipped until Owner and Engineer have received all test results and approved the system is ready for shipment.

B. Testing Sequence

1. General: Control system testing sequence shall be coordinated panel by panel and network by network.
2. Factory Testing shall be performed at the PCSI fabrication shop facility or at a local facility provided under this Contract within 120 miles of the Owner's headquarters, whichever is closer. Contractor shall refer to the Special Provisions for travel expense information and coverage.
3. The PCSI shall coordinate shipping or storage of the system elements as required by the Contractor and as specified to coordinate delivery of control system equipment to the Project site with the installation and commissioning of the new equipment and as physical space is made available due to modification or demolition of existing equipment as shown on the Drawings.
4. Operational Readiness Test (ORT) and Functional Acceptance Test (FAT) shall be completed through the FAT on the system. Successful FAT control system field testing shall be completed prior to any control system operation of re-connected equipment. ORT shall include full confirmation of successful communication to and from the Owner's PAC on all communication channels and media as well as signal verification of each re-terminated field device and instrument. Testing shall include verification by the PCSI of all SCADA HMI addressing changes by Owner staff. Testing shall be scheduled and coordinated with Owner staff as specified herein. Testing shall include 100% checking all remapped to and from the Owner central HMI system.
5. Individual panels shall be tested and the FAT successfully completed prior to startup of its respective process. Each FAT shall include verification of equipment monitoring networks, communication to all connected ancillary equipment, and full functional testing of control, monitoring, and alarm logic. Testing shall include

verification by the PCSI of all SCADA HMI addressing changes by Owner staff. Testing shall be scheduled and coordinated with Owner staff as specified herein. Testing shall include 100% checking all remapped and new data points to and from the Owner central HMI system.

6. The 30-day Acceptance Test shall apply to each new panel as they are brought online.
- C. Factory Testing: Prior to shipment of the equipment the following tests are required:
1. Unwitnessed Factory Test (UFT).
    - a. Panel-mounted sub-systems shall be tested for completeness and proper electrical terminations.
    - b. All panels, consoles and assemblies shall be inspected and tested to verify that they are in conformance with related submittals, Specifications and Drawings.
    - c. Tests to be performed shall include but not be limited to the following. Each of these tests shall be specifically addressed in the Test Procedure submittal.
      - 1) 100% wiring verification of panel components and process controller I/O as applicable.
      - 2) Other tests as necessary to verify complete functionality of the entire control system.
    - d. Submit summary results of UFT including certified statement of successful completion of all UFT tasks.
- D. Field Testing - Following installation of the process control system components and conforming to the testing sequence described above perform the following:
1. Operational Readiness Test (ORT)
    - a. General: Prior to startup and the Functional Acceptance Test, the indicated system elements shall be certified (inspected, wired, calibrated, tested, and documented) that it is installed and ready for the ORT as defined below.
    - b. Loop/Component Inspections and Tests: System shall be checked for proper installation, calibrated and adjusted on a loop-by-loop and component-by-component basis to ensure that it is in conformance with related submittals and these Specifications.
    - c. The Loop/Component Inspections and Tests shall be implemented using PCSI developed, Engineer-approved forms and checklists. Each loop of functionally related group of loops (subsystem) shall have a Loop/Subsystem Status Report to organize and track inspection, adjustment and calibration. These reports shall include the following information and checkoff items with spaces for sign off by the system supplier:
      - 1) Project Name, Test Date, PCSI Name, and Lead PCSI Technician Name
      - 2) Loop Number or Loops Numbers of a Tested Subsystem

- 3) Tag Number for each component.
  - 4) Checkoffs/signoffs for each component:
    - a) Tag/identification (Loop or Subsystem name)
    - b) Installation
    - c) Termination – wiring and tubing
    - d) Scale, Range, and Setpoint as applicable
  - 5) Checkoffs/signoffs for the loop
    - a) Panel interface terminations
    - b) I/O interface terminations
    - c) I/O signal operation
    - d) Inputs/outputs operational: received/sent, processed, adjusted
  - 6) Space for comments
- d. The PCSI shall maintain the Loop Status Reports sheets at the job site and make them available to the Engineer at any time.
  - e. These inspections, calibrations, and tests do not require witnessing. However, Engineer shall review Loop Status Sheets and spot-check the PCSI test process periodically. Any deficiencies found shall be corrected by the PCSI prior to commencement of the Functional Acceptance Test.
  - f. Submit ORT results for review by Engineer.
  - g. If a failure is detected during the ORT, the PCSI shall troubleshoot and replace hardware as required to remedy the failure. Replaced parts will be retested to confirm the remedy.
2. 30-Day Acceptance Test
- a. After completion of the Operational Readiness Tests, the PCSI shall be available for a period of 30 consecutive days, under conditions of the Operational Performance Test, without a single non-field repairable malfunction.
  - b. During this test, operations and PCSI personnel shall be present as required. The PCSI is expected to provide personnel for this test who have an intimate knowledge of the hardware and software of the system. Coordinate PCSI staffing requirements during the 30-day test to coincide with normal shift operations as much as possible.
  - c. While this test is proceeding, Owner shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes. Operations shall remain the responsibility of Owner and the decision of Owner’s operators regarding plant operations shall be

final. Only Owner operating personnel shall be allowed to operate equipment associated with live plant processes.

- d. Any malfunction during the tests shall be analyzed and corrections made by the PCSI. Engineer will determine whether any such malfunctions are critical and warrant a repeat of this test. Network performance excursions that exceed the maximum levels for errors developed by the PCSI and specified herein shall constitute a system malfunction.
- e. Any malfunction, during this 30 consecutive day test period, which cannot be corrected within 24 hours of occurrence by the PCSI's personnel, or more than two similar failures of any duration, will be considered as a non-field-repairable malfunction.
- f. Upon completion of repairs, by the PCSI, the test shall be repeated as specified herein.
- g. In the event of rejection of any part or function, the PCSI shall perform repairs or replacement within 10 days.
- h. All computer equipment, network equipment, controllers, data base, process controller logic, and graphical interface system errors must be functioning as required per the specifications prior to the start of each test period. The 30-day test will not be considered successful until all data base points and logic functions are tested and verified to be correct.
- i. The total availability of the system shall be greater than 99.5 percent during this test period. Availability shall be defined as:  
  
$$\text{AVAILABILITY} = (\text{TOTAL TIME} - \text{DOWN TIME}) / \text{TOTAL TIME}$$
- j. Down times due to power outages or other factors outside the normal protection devices or backup power supplies provided, shall not contribute to the availability test times above.
- k. The 30-day test shall be performed for each control panel as it is brought on line.

END OF SECTION

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July 2023

**APPENDIX 40 61 00-A**

**OWNER FURNISHED COMPONENTS BILL OF MATERIALS**

The attached bill of materials will be provided to the PCSI after approval of the Project Plan submittal.

**Bill of Materia**

Item	Description	Manufacturer	Part Number	QTY	Note
1	RX3i PROFINET RIO Controller, RJ45 Copper Ports, SFP Ports	Emerson	IC695PNC001	5	
2	RX3i PROFINET to Genius Bus Communications Gateway	Emerson	IC695CGC001	1	
3	VersaMax PROFINET Scanner Module, RJ45 Copper Ports	Emerson	IC200PNS001	14	
4	VersaMax Power Supply Module, 24VDC, Expanded	Emerson	IC200PWR012	14	
5	VersaMax Discrete Input Module, 24VDC, 32-pt	Emerson	IC200MDL650	11	
6	VersaMax Discrete Input Module, 120VAC, 16-pt	Emerson	IC200MDL240	2	
7	VersaMax Relay Output Module, 2A, 16-pt	Emerson	IC200MDL940	16	
8	VersaMax Discrete Output Module, 24VDC Sourced, 16-pt	Emerson	IC200MDL740	4	
9	VersaMax Analog Input Module, 4-20mA, 8-ch, 12-bit	Emerson	IC200ALG260	12	
10	VersaMax Analog Output Module, 4-20mA, 8-ch, 13-bit	Emerson	IC200ALG326	4	
11	VersaMax I/O Carrier, Box Vertical Style	Emerson	IC200CHS022	49	
	<b>SPARE PARTS</b>				
12	VersaMax PROFINET Scanner Module, RJ45 Copper Ports	Emerson	IC200PNS001	1	
13	VersaMax Power Supply Module, 24VDC, Expanded	Emerson	IC200PWR012	1	
14	VersaMax Discrete Input Module, 24VDC, 32-pt	Emerson	IC200MDL650	1	
15	VersaMax Relay Output Module, 2A, 16-pt	Emerson	IC200MDL940	1	
16	VersaMax Discrete Output Module, 24VDC Sourced, 16-pt	Emerson	IC200MDL740	1	
17	VersaMax Analog Input Module, 4-20mA, 8-ch, 12-bit	Emerson	IC200ALG260	1	
18	VersaMax Analog Output Module, 4-20mA, 8-ch, 13-bit	Emerson	IC200ALG326	1	
19	VersaMax I/O Carrier, Box Vertical Style	Emerson	IC200CHS022	1	

**APPENDIX 40 61 00-B**  
**PAC INPUT/OUTPUT (I/O) LIST**

The I/O List is included for reference only.





# IO LIST

PLC: High Level Pump Station 1 (HLPS1)										LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	LOW EGU	HIGH EGU	UNITS	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
LI1	Stoneman Park Reservoir Level	AI				HLPS1	%AI0001	4-20mA	0	7	1	
PM401_AUTO	Pump PS-401 in Auto	DI				HLPS1	%I00081	24VDC	0	2	1	
PM401_RUN	Pump PS-401 Running	DI				HLPS1	%I00082	24VDC	0	2	2	
PM401_TROUBLE	Pump PS-401 Trouble	DI				HLPS1	%I00083	24VDC	0	2	3	
PM402_AUTO	Pump PS-402 in Auto	DI				HLPS1	%I00085	24VDC	0	2	5	
PM402_RUN	Pump PS-402 Running	DI				HLPS1	%I00086	24VDC	0	2	6	
PM402_TROUBLE	Pump PS-402 Trouble	DI				HLPS1	%I00087	24VDC	0	2	7	
PM403_AUTO	Pump PS-403 in Auto	DI				HLPS1	%I00089	24VDC	0	2	9	
PM403_RUN	Pump PS-403 Running	DI				HLPS1	%I00090	24VDC	0	2	10	
PM403_TROUBLE	Pump PS-403 Trouble	DI				HLPS1	%I00091	24VDC	0	2	11	
PM404_AUTO	Pump PS-404 in Auto	DI				HLPS1	%I00093	24VDC	0	2	13	
PM404_RUN	Pump PS-404 Running	DI				HLPS1	%I00094	24VDC	0	2	14	
PM404_TROUBLE	Pump PS-404 Trouble	DI				HLPS1	%I00095	24VDC	0	2	15	
PM405_AUTO	Pump PS-405 in Auto	DI				HLPS1	%I00097	24VDC	0	3	1	
PM405_RUN	Pump PS-405 Running	DI				HLPS1	%I00098	24VDC	0	3	2	
PM405_TROUBLE	Pump PS-405 Trouble	DI				HLPS1	%I00099	24VDC	0	3	3	
ATS_STBY	ATS Switch in Standby	DI				HLPS1	%I00101	24VDC	0	3	5	
PS1_LOW	Pump Discharge Low Ppressure	DI				HLPS1	%I00102	24VDC	0	3	6	
PM401_CMD	Pump PS-401 Start Stop Command	DO				HLPS1	%Q00001	Relay	0	5	1	
PM402_CMD	Pump PS-402 Start Stop Command	DO				HLPS1	%Q00002	Relay	0	5	2	
PM403_CMD	Pump PS-403 Start Stop Command	DO				HLPS1	%Q00003	Relay	0	5	3	
PM404_CMD	Pump PS-404 Start Stop Command	DO				HLPS1	%Q00004	Relay	0	5	4	
PM405_CMD	Pump PS-405 Start Stop Command	DO				HLPS1	%Q00005	Relay	0	5	5	
LVLHI_ALM	High Level Alarm	DO				HLPS1	%Q00007	Relay	0	5	6	
PLCFAIL_ALM	PLC Failed Alarm	DO				HLPS1	%Q00008	Relay	0	5	7	
XI251	Sed Basin 1 Sludge Collector Running	DI	Off	Running		ST	%I00129	24VDC	A	1-1	1	
YI251	Sed Basin 1 Sludge Collector in Remote	DI	Local	Remote		ST	%I00130	24VDC	A	1-1	2	
UA251	Sed Basin 1 Sludge Collector Failure	DI	Okay	Failure		ST	%I00131	24VDC	A	1-1	3	
XI252	Sed Basin 2 Sludge Collector Running	DI	Off	Running		ST	%I00132	24VDC	A	1-1	4	
UA252	Sed Basin 2 Sludge Collector Failure	DI	Okay	Failure		ST	%I00134	24VDC	A	1-1	5	
YI252	Sed Basin 2 Sludge Collector in Remote	DI	Local	Remote		ST	%I00133	24VDC	A	1-1	6	
XI253	Sed Basin 3 Sludge Collector Running	DI	Off	Running		ST	%I00135	24VDC	A	1-1	7	
YI253	Sed Basin 3 Sludge Collector in Remote	DI	Local	Remote		ST	%I00136	24VDC	A	1-1	8	
UA253	Sed Basin 3 Sludge Collector Failure	DI	Okay	Failure		ST	%I00137	24VDC	A	1-1	9	
XI254	Sed Basin 4 Sludge Collector Running	DI	Off	Running		ST	%I00138	24VDC	A	1-1	10	
YI254	Sed Basin 4 Sludge Collector in Remote	DI	Local	Remote		ST	%I00139	24VDC	A	1-1	11	
UA254	Sed Basin 4 Sludge Collector Failure	DI	Okay	Failure		ST	%I00140	24VDC	A	1-1	12	
XI255	Sed Basin 5 Sludge Collector Running	DI	Off	Running		ST	%I00141	24VDC	A	1-1	13	
YI255	Sed Basin 5 Sludge Collector in Remote	DI	Local	Remote		ST	%I00142	24VDC	A	1-1	14	
UA255	Sed Basin 5 Sludge Collector Failure	DI	Okay	Failure		ST	%I00143	24VDC	A	1-1	15	
ZI261_O	Sed Basin 1 Sludge Discharge Valve Opened	DI		Opened		ST	%I00145	24VDC	A	1-1	17	
ZI261_C	Sed Basin 1 Sludge Discharge Valve Closed	DI		Closed		ST	%I00146	24VDC	A	1-1	18	
UA261	Sed Basin 1 Sludge Discharge Valve Failure	DI	Okay	Failure		ST	%I00147	24VDC	A	1-1	19	
ZI262_O	Sed Basin 2 Sludge Discharge Valve Opened	DI		Opened		ST	%I00148	24VDC	A	1-1	20	
ZI262_C	Sed Basin 2 Sludge Discharge Valve Closed	DI		Closed		ST	%I00149	24VDC	A	1-1	21	
UA262	Sed Basin 2 Sludge Discharge Valve Failure	DI	Okay	Failure		ST	%I00150	24VDC	A	1-1	22	
ZI263_O	Sed Basin 3 Sludge Discharge Valve Opened	DI		Opened		ST	%I00151	24VDC	A	1-1	23	
ZI263_C	Sed Basin 3 Sludge Discharge Valve Closed	DI		Closed		ST	%I00152	24VDC	A	1-1	24	



## IO LIST

PLC: High Level Pump Station 1 (HLP51)									LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	LOW EGU	HIGH EGU	UNITS	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
UA263	Sed Basin 3 Sludge Discharge Valve Failure	DI	Okay	Failure		ST	%I00153	24VDC	A	1 - 1	25
ZI264 O	Sed Basin 4 Sludge Discharge Valve Opened	DI		Opened		ST	%I00154	24VDC	A	1 - 1	26
ZI264 C	Sed Basin 4 Sludge Discharge Valve Closed	DI		Closed		ST	%I00155	24VDC	A	1 - 1	27
UA264	Sed Basin 4 Sludge Discharge Valve Failure	DI	Okay	Failure		ST	%I00156	24VDC	A	1 - 1	28
ZI265 O	Sed Basin 5 Sludge Discharge Valve Opened	DI		Opened		ST	%I00157	24VDC	A	1 - 1	29
ZI265 C	Sed Basin 5 Sludge Discharge Valve Closed	DI		Closed		ST	%I00158	24VDC	A	1 - 1	30
UA265	Sed Basin 5 Sludge Discharge Valve Failure	DI	Okay	Failure		ST	%I00159	24VDC	A	1 - 1	31
LAHH550	Settled Sludge Pump Station Wetwell High-High Level	DI	Okay	Alarm		ST	%I00161	24VDC	A	1 - 2	1
XI551	Settled Sludge Pump 1 Running	DI	Off	Running		ST	%I00162	24VDC	A	1 - 2	2
UA551	Settled Sludge Pump 1 Failure	DI	Okay	Failure		ST	%I00163	24VDC	A	1 - 2	3
XI552	Settled Sludge Pump 2 Running	DI	Off	Running		ST	%I00164	24VDC	A	1 - 2	4
UA552	Settled Sludge Pump 2 Failure	DI	Okay	Failure		ST	%I00165	24VDC	A	1 - 2	5
XI501	Sludge Thickener Running	DI	Off	Running		ST	%I00166	24VDC	A	1 - 2	6
YI501	Sludge Thickener in Remote	DI	Local	Remote		ST	%I00167	24VDC	A	1 - 2	7
UA501	Sludge Thickener Failure	DI	Okay	Failure		ST	%I00168	24VDC	A	1 - 2	8
WAH501	Sludge Thickener High Torque Warning	DI	Okay	Alarm		ST	%I00169	24VDC	A	1 - 2	9
WAHH501	Sludge Thickener High-High Torque Shutdown	DI	Okay	Alarm		ST	%I00170	24VDC	A	1 - 2	10
ZI531 C	Sludge Thickener Decant Valve 1 Closed	DI		Closed		ST	%I00171	24VDC	A	1 - 2	11
ZI531 O	Sludge Thickener Decant Valve 1 Opened	DI		Opened		ST	%I00172	24VDC	A	1 - 2	12
YI531	Sludge Thickener Decant Valve 1 in Remote	DI	Local	Remote		ST	%I00173	24VDC	A	1 - 2	13
UA531	Sludge Thickener Decant Valve 1 Failure	DI	Okay	Failure		ST	%I00174	24VDC	A	1 - 2	14
ZI532 C	Sludge Thickener Decant Valve 2 Closed	DI		Closed		ST	%I00175	24VDC	A	1 - 2	15
ZI532 O	Sludge Thickener Decant Valve 2 Opened	DI		Opened		ST	%I00176	24VDC	A	1 - 2	16
YI532	Sludge Thickener Decant Valve 2 in Remote	DI	Local	Remote		ST	%I00177	24VDC	A	1 - 2	17
UA532	Sludge Thickener Decant Valve 2 Failure	DI	Okay	Failure		ST	%I00178	24VDC	A	1 - 2	18
XI540	Decant Water Sample Pump Running	DI	Off	Running		ST	%I00179	24VDC	A	1 - 2	19
UA540	Decant Water Sample Pump Failure	DI	Okay	Failure		ST	%I00180	24VDC	A	1 - 2	20
UA543	Decant Water Turbidity Analyzer Failure	DI	Okay	Failure		ST	%I00181	24VDC	A	1 - 2	21
XI621	Thickened Sludge Pump 1 Running	DI	Off	Running		ST	%I00182	24VDC	A	1 - 2	22
YI621	Thickened Sludge Pump 1 in Remote	DI	Local	Remote		ST	%I00183	24VDC	A	1 - 2	23
UA621	Thickened Sludge Pump 1 Failure	DI	Okay	Failure		ST	%I00184	24VDC	A	1 - 2	24
XI622	Thickened Sludge Pump 2 Running	DI	Off	Running		ST	%I00185	24VDC	A	1 - 2	25
YI622	Thickened Sludge Pump 2 in Remote	DI	Local	Remote		ST	%I00186	24VDC	A	1 - 2	26
UA622	Thickened Sludge Pump 2 Failure	DI	Okay	Failure		ST	%I00187	24VDC	A	1 - 2	27
XI801	Sludge Polymer System Running	DI	Off	Running		ST	%I00193	24VDC	A	1 - 3	1
UA801	Sludge Polymer System Failure	DI	Okay	Failure		ST	%I00194	24VDC	A	1 - 3	2
FAH800	Sludge Polymer Area Eyewash/Shower Flow Detected	DI	Okay	Alarm		ST	%I00198	24VDC	A	1 - 3	6
XC251	Sed Basin 1 Sludge Collector Call to Run	DO	Off	Call		ST	%Q00033	Relay	A	1 - 4	1
XC252	Sed Basin 2 Sludge Collector Call to Run	DO	Off	Call		ST	%Q00034	Relay	A	1 - 4	2
XC253	Sed Basin 3 Sludge Collector Call to Run	DO	Off	Call		ST	%Q00035	Relay	A	1 - 4	3
XC254	Sed Basin 4 Sludge Collector Call to Run	DO	Off	Call		ST	%Q00036	Relay	A	1 - 4	4
XC255	Sed Basin 5 Sludge Collector Call to Run	DO	Off	Call		ST	%Q00037	Relay	A	1 - 4	5
XC501	Sludge Thickener Call to Run	DO	Off	Call		ST	%Q00038	Relay	A	1 - 4	6
ZC531 C	Sludge Thickener Decant Valve 1 Close Control	DO		Close		ST	%Q00039	Relay	A	1 - 4	7
ZC531 O	Sludge Thickener Decant Valve 1 Open Control	DO		Open		ST	%Q00040	Relay	A	1 - 4	8
ZC532 C	Sludge Thickener Decant Valve 2 Close Control	DO		Close		ST	%Q00041	Relay	A	1 - 4	9
ZC532 O	Sludge Thickener Decant Valve 2 Open Control	DO		Open		ST	%Q00042	Relay	A	1 - 4	10
XC540	Decant Water Sample Pump Call to Run	DO	Off	Call		ST	%Q00043	Relay	A	1 - 4	11
XC621	Thickened Sludge Pump 1 Call to Run	DO	Off	Call		ST	%Q00044	Relay	A	1 - 4	12



## IO LIST

PLC: High Level Pump Station 1 (HLPS1)									LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	LOW EGU	HIGH EGU	UNITS	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
XC622	Thickened Sludge Pump 2 Call to Run	DO	Off	Call		ST	%Q00045	Relay	A	1 - 4	13
SI251	Sed Basin 1 Sludge Collector Speed	AI	0.0	100.0	%	ST	%AI0017	4-20mA	A	2 - 1	1
SI252	Sed Basin 2 Sludge Collector Speed	AI	0.0	100.0	%	ST	%AI0018	4-20mA	A	2 - 1	2
SI253	Sed Basin 3 Sludge Collector Speed	AI	0.0	100.0	%	ST	%AI0019	4-20mA	A	2 - 1	3
SI254	Sed Basin 4 Sludge Collector Speed	AI	0.0	100.0	%	ST	%AI0020	4-20mA	A	2 - 1	4
SI255	Sed Basin 5 Sludge Collector Speed	AI	0.0	100.0	%	ST	%AI0021	4-20mA	A	2 - 1	5
LI550	Settled Sludge Pump Station Wetwell Level	AI	0.0	17.0	Feet	ST	%AI0022	4-20mA	A	2 - 1	6
PI570	Settled Sludge Pump Station Discharge Pressure	AI	0.00	30.00	PSI	ST	%AI0023	4-20mA	A	2 - 1	7
FI580	Settled Sludge Pump Station Discharge Flow	AI	0.0	500.0	gpm	ST	%AI0024	4-20mA	A	2 - 1	8
LI502	Sludge Thickener Level	AI	0.0	13.0	Feet	ST	%AI0025	4-20mA	A	2 - 2	1
SI501	Sludge Thickener Speed	AI	0.0	100.0	%	ST	%AI0026	4-20mA	A	2 - 2	2
FI540	Decant Water Sample Flow	AI				ST	%AI0027	4-20mA	A	2 - 2	3
AI543	Decant Water Turbidity	AI	0.00	10.00	NTU	ST	%AI0028	4-20mA	A	2 - 2	4
SI621	Thickened Sludge Pump 1 Speed	AI	0.0	100.0	%	ST	%AI0029	4-20mA	A	2 - 2	5
SI622	Thickened Sludge Pump 2 Speed	AI	0.0	100.0	%	ST	%AI0030	4-20mA	A	2 - 2	6
PI620	Thickened Sludge Discharge Pressure	AI	0.00	30.00	PSI	ST	%AI0033	4-20mA	A	2 - 3	1
AI630	Thickened Sludge Density	AI	0.0	100.0	%	ST	%AI0034	4-20mA	A	2 - 3	2
PI804	Sludge Polymer System Pressure	AI	0.0	150.0	PSI	ST	%AI0036	4-20mA	A	2 - 3	4
FI802	Sludge Polymer Flow	AI	0	11440	gph	ST	%AI0037	4-20mA	A	2 - 3	5
SC251	Sed Basin 1 Sludge Collector Speed Control	AO	0.0	100.0	%	ST	%AQ0017	4-20mA	A	2 - 4	1
SC252	Sed Basin 2 Sludge Collector Speed Control	AO	0.0	100.0	%	ST	%AQ0018	4-20mA	A	2 - 4	2
SC253	Sed Basin 3 Sludge Collector Speed Control	AO	0.0	100.0	%	ST	%AQ0019	4-20mA	A	2 - 4	3
SC254	Sed Basin 4 Sludge Collector Speed Control	AO	0.0	100.0	%	ST	%AQ0020	4-20mA	A	2 - 4	4
SC255	Sed Basin 5 Sludge Collector Speed Control	AO	0.0	100.0	%	ST	%AQ0021	4-20mA	A	2 - 4	5
SC501	Sludge Thickener Speed Control	AO	0.0	100.0	%	ST	%AQ0022	4-20mA	A	2 - 4	6
SC621	Thickened Sludge Pump 1 Speed Control	AO	0.0	100.0	%	ST	%AQ0023	4-20mA	A	2 - 4	7
SC622	Thickened Sludge Pump 2 Speed Control	AO	0.0	100.0	%	ST	%AQ0024	4-20mA	A	2 - 4	8
FC801	Sludge Polymer System Flow Pacing Control	AO	0.0	100.0	%	ST	%AQ0025	4-20mA	A	2 - 5	1
		PLC I/O COUNT - AI:		18	<b>NOTES:</b> 1. All I/O points existing. 2. Installed spare points are not shown.						
		DI:		60							
		DO:		13							
		AO:		9							



# IO LIST

PLC: Main Control Panel (MCP)							LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
LAL401	Low Level - N Clearwell Sump	DI	CB	%I00129	24VDC	A	19	1	
LAH401	Hi Level - N Clearwell Sump	DI	CB	%I00130	24VDC	A	19	2	
XI402_1	N Clearwell Pump 1	DI	CB	%I00131	24VDC	A	19	3	
XI402_2	N Clearwell Pump 2	DI	CB	%I00132	24VDC	A	19	4	
XI402_3	N Clearwell Pump 3	DI	CB	%I00133	24VDC	A	19	5	
LAL411	Low Level - S Clearwell Sump	DI	CB	%I00134	24VDC	A	19	6	
LAH411	Hi Level - S Clearwell Sump	DI	CB	%I00135	24VDC	A	19	7	
XI412_4	S Clearwell Pump 4	DI	CB	%I00136	24VDC	A	19	8	
XI412_5	S Clearwell Pump 5	DI	CB	%I00137	24VDC	A	19	9	
XI412_6	S Clearwell Pump 6	DI	CB	%I00138	24VDC	A	19	10	
XI761_2	Settled Water Sample Pump	DI	CB	%I00139	24VDC	A	19	11	
ZI911_1	Automatic Transfer Switch 1	DI	CB	%I00140	24VDC	A	19	12	
ZI911_2	Automatic Transfer Switch 2	DI	CB	%I00141	24VDC	A	19	13	
XI912_1	Generator 1	DI	CB	%I00142	24VDC	A	19	14	
UA912_1	Malfunction - Generator 1	DI	CB	%I00143	24VDC	A	19	15	
XI912_2	Generator 2	DI	CB	%I00144	24VDC	A	19	16	
UA912_2	Malfunction - Generator 2	DI	CB	%I00145	24VDC	A	19	17	
JS401_1	Clearwell Pump 1 Loadshed	DO	CB	%Q00545	Relay	A	20	1	
JS411_4	Clearwell Pump 4 Loadshed	DO	CB	%Q00546	Relay	A	20	2	
JS401_2	Clearwell Pump 2 Loadshed	DO	CB	%Q00547	Relay	A	20	3	
JS411_5	Clearwell Pump 5 Loadshed	DO	CB	%Q00548	Relay	A	20	4	
JS401_3	Clearwell Pump 3 Loadshed	DO	CB	%Q00549	Relay	A	20	5	
JS411_6	Clearwell Pump 6 Loadshed	DO	CB	%Q00550	Relay	A	20	6	
XC401_1	Clearwell Pump 1 Start Command	DO	CB	%Q00551	Relay	A	20	7	
XC401_2	Clearwell Pump 2 Start Command	DO	CB	%Q00552	Relay	A	20	8	
XC401_3	Clearwell Pump 3 Start Command	DO	CB	%Q00553	Relay	A	20	9	
XC411_4	Clearwell Pump 4 Start Command	DO	CB	%Q00554	Relay	A	20	10	
XC411_5	Clearwell Pump 5 Start Command	DO	CB	%Q00555	Relay	A	20	11	
XC411_6	Clearwell Pump 6 Start Command	DO	CB	%Q00556	Relay	A	20	12	
FI322	Master Backwash Flow	AI	MCP	%AI0001	4-20mA	A	2 - 1	1	
FI331	Surface Wash Flow	AI	MCP	%AI0002	4-20mA	A	2 - 1	2	
FI403	North Clearwell Flow	AI	MCP	%AI0005	4-20mA	A	2 - 1	5	
FI413	South Clearwell Flow	AI	MCP	%AI0006	4-20mA	A	2 - 1	6	
FI422	Hi Level Bstr Pump Sta Flow To E Zone II	AI	MCP	%AI0009	4-20mA	A	2 - 2	1	
FI424	Hi Level Bstr Sta Flow To Stoneman	AI	MCP	%AI0011	4-20mA	A	2 - 2	3	
FI441	Pressure Zone 1 Flow	AI	MCP	%AI0013	4-20mA	A	2 - 2	5	
FI442	Flow To West Leland	AI	MCP	%AI0014	4-20mA	A	2 - 2	6	
LI551	Stoneman Park Reservoir Level	AI	MCP	%AI0017	4-20mA	A	2 - 3	1	
LI552	Hillveiw Reservoir Level	AI	MCP	%AI0018	4-20mA	A	2 - 3	2	
AI604	Residual Chlorine	AI	MCP	%AI0022	4-20mA	A	2 - 3	5	
LI553	W Leland Reservoir Level	AI	MCP	%AI0023	4-20mA	A	2 - 3	6	
LI611	Ammonia Storage Tank Level	AI	MCP	%AI0025	4-20mA	A	2 - 4	1	
LI811_1	Liquid Alum Tank 1 Level	AI	MCP	%AI0026	4-20mA	A	2 - 4	2	



# IO LIST

PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
LI811_2	Liquid Alum Tank 2 Level	AI	MCP	%AI0029	4-20mA	A	2 - 4	5
LI821	Hydrofluosilicic Acid Tank Level	AI	MCP	%AI0030	4-20mA	A	2 - 4	6
LI831	Corrosion Control Tank Level	AI	MCP	%AI0033	4-20mA	A	2 - 5	1
LI841	Cationic Polymer Tank Level	AI	MCP	%AI0034	4-20mA	A	2 - 5	2
LI851	Spare Chemical Tank Level	AI	MCP	%AI0037	4-20mA	A	2 - 5	5
LI871	Powdered Activated Carbon Tank Level	AI	MCP	%AI0038	4-20mA	A	2 - 5	6
LI401	Noth Clear Well Level	AI	MCP	%AI0041	4-20mA	A	3 - 4	1
LI411	South Clear Well Level	AI	MCP	%AI0042	4-20mA	A	3 - 4	2
RSMR_PSI	Rossmore Pump Station Pressure	AI	MCP	%AI0043	4-20mA	A	3 - 4	3
BPRK_PSI	Ball Park Pump Station Pressure	AI	MCP	%AI0044	4-20mA	A	3 - 4	4
ROS_FLO	Rossmoor Flow	AI	MCP	%AI0121	4-20mA	A	3 - 5	1
ROS_FLO	Rossmoor Pressure	AI	MCP	%AI0122	4-20mA	A	3 - 5	2
FI851	Spare Chemical Flow	AI	MCP	%AI0123	4-20mA	A	3 - 5	3
FI814	Liquid Alum Flow	AI	MCP	%AI0124	4-20mA	A	3 - 5	4
FI847	Cationic Polymer Flow	AI	MCP	%AI0125	4-20mA	A	3 - 5	5
FI884	Potassium Permanganet	AI	MCP	%AI0126	4-20mA	A	3 - 5	6
FI821	Hydrofluosilicic Acid Flow	AI	MCP	%AI0127	4-20mA	A	3 - 5	7
FI833	Corrosion Control Flow	AI	MCP	%AI0128	4-20mA	A	3 - 5	8
FQI101_C	Total Raw Water Flow	AO	MCP	%AQ0001	4-20mA	A	2 - 6	1
ZC602_1	Chlorinator 1 Flow Pacing	AO	MCP	%AQ0002	4-20mA	A	2 - 6	2
ZC602_2	Chlorinator 2 Flow Pacing	AO	MCP	%AQ0005	4-20mA	A	2 - 6	5
ZC602_3	Chlorinator 3 Flow Pacing	AO	MCP	%AQ0006	4-20mA	A	2 - 6	6
ZC612_1	Ammoniator 1 Flow Pacing	AO	MCP	%AQ0009	4-20mA	A	2 - 7	1
ZC612_2	Ammoniator 2 Flow Pacing	AO	MCP	%AQ0010	4-20mA	A	2 - 7	2
AIR701_1	Raw Water Turbidity Recorder	AO	MCP	%AQ0013	4-20mA	A	2 - 7	5
AIR701_2	Settled Water Turbidity Recorder	AO	MCP	%AQ0014	4-20mA	A	2 - 7	6
AIR702_1	Treated Water Turbidity Recorder	AO	MCP	%AQ0017	4-20mA	A	3 - 1	1
AIR702_2	Finished Water Turbidity Recorder	AO	MCP	%AQ0018	4-20mA	A	3 - 1	2
FC814_1	LA Pump 1 Flow Pacing	AO	MCP	%AQ0021	4-20mA	A	3 - 1	5
FC814_2	LA Pump 2 Flow Pacing	AO	MCP	%AQ0022	4-20mA	A	3 - 1	6
FC823	HA Pump Flow Pacing	AO	MCP	%AQ0025	4-20mA	A	3 - 2	1
FC833	CC Pump Flow Pacing	AO	MCP	%AQ0026	4-20mA	A	3 - 2	2
FC847_1	CP Pump 1 Flow Pacing	AO	MCP	%AQ0029	4-20mA	A	3 - 2	5
FC847_2	CP Pump 2 Flow Pacing	AO	MCP	%AQ0030	4-20mA	A	3 - 2	6
UIR011_1	Trend Recorder Pen 1	AO	MCP	%AQ0031	4-20mA	A	3 - 2	7
UIR011_2	Trend Recorder Pen 2	AO	MCP	%AQ0032	4-20mA	A	3 - 2	8
FC855	SC Pump Flow Pacing	AO	MCP	%AQ0033	4-20mA	A	3 - 3	1
FC875	PAC Pump Flow Pacing	AO	MCP	%AQ0034	4-20mA	A	3 - 3	2
FQI170	West Flow	AO	MCP	%AQ0037	4-20mA	A	3 - 3	5
FQI180	East Flow	AO	MCP	%AQ0038	4-20mA	A	3 - 3	6
FC884	PP Pump Flow Pacing	AO	MCP	%AQ0039	4-20mA	A	3 - 3	7
LAM201_1	Near Hi Level - Sed Basin 1	DI	MCP	%I00001	24VDC	A	1 - 1	1
LAH201_1	Hi Level - Sed Basin 1	DI	MCP	%I00002	24VDC	A	1 - 1	2



# IO LIST

PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
LAM201_2	Near Hi Level - Sed Basin 2	DI	MCP	%I00003	24VDC	A	1 - 1	3
LAH201_2	Hi Level - Sed Basin 2	DI	MCP	%I00004	24VDC	A	1 - 1	4
LAM201_3	Near Hi Level - Sed Basin 3	DI	MCP	%I00005	24VDC	A	1 - 1	5
LAH201_3	Hi Level - Sed Basin 3	DI	MCP	%I00006	24VDC	A	1 - 1	6
LAM201_4	Near Hi Level - Sed Basin 4	DI	MCP	%I00007	24VDC	A	1 - 1	7
LAH201_4	Hi Level - Sed Basin 4	DI	MCP	%I00008	24VDC	A	1 - 1	8
LAM201_5	Near Hi Level - Sed Basin 5	DI	MCP	%I00009	24VDC	A	1 - 1	9
LAH201_5	Hi Level - Sed Basin 5	DI	MCP	%I00010	24VDC	A	1 - 1	10
XI421_1	E Hi Level Booster Pump 1	DI	MCP	%I00011	24VDC	A	1 - 1	11
XI421_2	E Hi Level Booster Pump 2	DI	MCP	%I00012	24VDC	A	1 - 1	12
XI421_3	E Hi Level Booster Pump 3	DI	MCP	%I00013	24VDC	A	1 - 1	13
XI421_4	E Hi Level Booster Pump 4	DI	MCP	%I00014	24VDC	A	1 - 1	14
XI421_5	E Hi Level Booster Pump 5	DI	MCP	%I00015	24VDC	A	1 - 1	15
UA423_1	Malfunction - Hi Level Booster Pump 1	DI	MCP	%I00016	24VDC	A	1 - 1	16
UA423_2	Malfunction - Hi Level Booster Pump 2	DI	MCP	%I00017	24VDC	A	1 - 1	17
UA423_3	Malfunction - Hi Level Booster Pump 3	DI	MCP	%I00018	24VDC	A	1 - 1	18
UA423_4	Malfunction - Hi Level Booster Pump 4	DI	MCP	%I00019	24VDC	A	1 - 1	19
UA423_5	Malfunction - Hi Level Booster Pump 5	DI	MCP	%I00020	24VDC	A	1 - 1	20
UA423_6	Hi Level Booster PS Generator Run	DI	MCP	%I00021	24VDC	A	1 - 1	21
UA423_7	Malfunction - Hi Level Booster PS Gen	DI	MCP	%I00022	24VDC	A	1 - 1	22
UA423_8	Low Suction Pressure - Hlbps	DI	MCP	%I00023	24VDC	A	1 - 1	23
UA423_9	PS PLC Malfunction	DI	MCP	%I00024	24VDC	A	1 - 1	24
UA423_10	Low Level - Day Tank	DI	MCP	%I00025	24VDC	A	1 - 1	25
UA423_11	Low Level - Main Fuel Tank	DI	MCP	%I00026	24VDC	A	1 - 1	26
UA423_12	Fuel Leak - Hi Level Booster Ps	DI	MCP	%I00027	24VDC	A	1 - 1	27
UA423_13	Stby - Ats At Hi Level Booster Ps	DI	MCP	%I00028	24VDC	A	1 - 1	28
UA423_14	Hi Sump Level - Hi Level Booster Ps	DI	MCP	%I00029	24VDC	A	1 - 1	29
XI501_A	Air Compressor 1	DI	MCP	%I00040	24VDC	A	1 - 2	8
XI501_B	Air Compressor 2	DI	MCP	%I00041	24VDC	A	1 - 2	9
UA501	Compressor System Malfunction	DI	MCP	%I00042	24VDC	A	1 - 2	10
JA561	Power Failure - Buchanan Ps	DI	MCP	%I00052	24VDC	A	1 - 2	20
PAL561	Pressure Low Suction - Buchanan Ps	DI	MCP	%I00053	24VDC	A	1 - 2	21
PAL601_1	Containers Empty - Cl Header 1	DI	MCP	%I00054	24VDC	A	1 - 2	22
PAL601_2	Containers Empty - Cl Header 2	DI	MCP	%I00055	24VDC	A	1 - 2	23
PAL601_3	Header Low Pressure - Chlorine	DI	MCP	%I00056	24VDC	A	1 - 2	24
PAL602_1	Low Vac - Chlorinator 1	DI	MCP	%I00057	24VDC	A	1 - 2	25
PAH602_1	High Vacuum - Chlorinator 1	DI	MCP	%I00058	24VDC	A	1 - 2	26
PAL602_2	Low Vac - Chlorinator 2	DI	MCP	%I00059	24VDC	A	1 - 2	27
PAH602_2	High Vacuum - Chlorinator 2	DI	MCP	%I00060	24VDC	A	1 - 2	28
PAL602_3	Low Vac - Chlorinator 3	DI	MCP	%I00061	24VDC	A	1 - 2	29
PAH602_3	High Vacuum - Chlorinator 3	DI	MCP	%I00062	24VDC	A	1 - 2	30
AAH605	Chlorine Leak	DI	MCP	%I00065	24VDC	A	1 - 3	1
UA605	Malfunction - Chlorine Scrubber	DI	MCP	%I00066	24VDC	A	1 - 3	2



# IO LIST

PLC: Main Control Panel (MCP)							LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
XI605	Chlorine Scrubber	DI	MCP	%I00067	24VDC	A	1 - 3	3	
PAL612_1	Lo Vacuum - Ammoniator 1	DI	MCP	%I00068	24VDC	A	1 - 3	4	
PAH612_1	Hi Vacuum - Ammoniator 1	DI	MCP	%I00069	24VDC	A	1 - 3	5	
PAL612_2	Lo Vacuum - Ammoniator 2	DI	MCP	%I00070	24VDC	A	1 - 3	6	
PAH612_2	Hi Vacuum - Ammoniator 2	DI	MCP	%I00071	24VDC	A	1 - 3	7	
PAL614	Low Pressure - Ammonia Gas	DI	MCP	%I00072	24VDC	A	1 - 3	8	
XI813_1	LA Metering Pump 1	DI	MCP	%I00073	24VDC	A	1 - 3	9	
XI813_2	LA Metering Pump 2	DI	MCP	%I00074	24VDC	A	1 - 3	10	
UA814	LA System Malfunction	DI	MCP	%I00075	24VDC	A	1 - 3	11	
XI822	HA Metering Pump	DI	MCP	%I00076	24VDC	A	1 - 3	12	
UA823	HA System Malfunction	DI	MCP	%I00077	24VDC	A	1 - 3	13	
XI832	CC Metering Pump	DI	MCP	%I00078	24VDC	A	1 - 3	14	
UA833	CC System Malfunction	DI	MCP	%I00079	24VDC	A	1 - 3	15	
XI842	CP Transfer Pump	DI	MCP	%I00080	24VDC	A	1 - 3	16	
XI844_1	CP Mixer 1	DI	MCP	%I00081	24VDC	A	1 - 3	17	
XI844_2	CP Mixer 2	DI	MCP	%I00082	24VDC	A	1 - 3	18	
XI845_1	CP Metering Pump 1	DI	MCP	%I00083	24VDC	A	1 - 3	19	
XI845_2	CP Metering Pump 2	DI	MCP	%I00084	24VDC	A	1 - 3	20	
XI846	CP Metering Pump 3	DI	MCP	%I00085	24VDC	A	1 - 3	21	
UA847	CP System Malfunction	DI	MCP	%I00086	24VDC	A	1 - 3	22	
XI853	SC Mixer	DI	MCP	%I00087	24VDC	A	1 - 3	23	
XI854	SC Metering Pump	DI	MCP	%I00088	24VDC	A	1 - 3	24	
UA855	SC System Malfunction	DI	MCP	%I00089	24VDC	A	1 - 3	25	
XI862	A/NP Transfer Pump	DI	MCP	%I00090	24VDC	A	1 - 3	26	
XI864_1	A/NP Mixer 1	DI	MCP	%I00091	24VDC	A	1 - 3	27	
XI864_2	A/NP Mixer 2	DI	MCP	%I00092	24VDC	A	1 - 3	28	
XI865_1	A/NP Metering Pump 1	DI	MCP	%I00093	24VDC	A	1 - 3	29	
XI865_2	A/NP Metering Pump 2	DI	MCP	%I00094	24VDC	A	1 - 3	30	
XI866	A/NP Metering Pump 3	DI	MCP	%I00095	24VDC	A	1 - 3	31	
UA867	A/NP System Malfunction	DI	MCP	%I00096	24VDC	A	1 - 3	32	
XI872	PAC Mixer Running	DI	MCP	%I00097	24VDC	A	1 - 4	1	
XI873_1	PAC Metering Pump 1	DI	MCP	%I00098	24VDC	A	1 - 4	2	
XI873_2	PAC Metering Pump 2	DI	MCP	%I00099	24VDC	A	1 - 4	3	
XI874	PAC Dust Collector	DI	MCP	%I00100	24VDC	A	1 - 4	4	
UA875	PAC System Malfunction	DI	MCP	%I00101	24VDC	A	1 - 4	5	
XI881	PP Dry Feeder	DI	MCP	%I00102	24VDC	A	1 - 4	6	
XI882	PP Mixer	DI	MCP	%I00103	24VDC	A	1 - 4	7	
XI883_1	PP Metering Pump 1	DI	MCP	%I00104	24VDC	A	1 - 4	8	
XI883_2	PP Metering Pump 2	DI	MCP	%I00105	24VDC	A	1 - 4	9	
UA884	PP System Malfunction	DI	MCP	%I00106	24VDC	A	1 - 4	10	
FA901	Emergency Shower - Operations Bldg	DI	MCP	%I00107	24VDC	A	1 - 4	11	
FA901	Emergency Shower - Tank Yard	DI	MCP	%I00108	24VDC	A	1 - 4	12	
UC931_A	Plant Shutdown	DO	MCP	%Q00513	Relay	A	1 - 5	1	



## IO LIST

PLC: Main Control Panel (MCP)							LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
UC931_B	Plant Shutdown	DO	MCP	%Q00514	Relay	A	1 - 5	2	
UC931_C	Plant Shutdown	DO	MCP	%Q00515	Relay	A	1 - 5	3	
	Rossmoor Pump Control	DO	MCP	%Q00517	Relay	A	1 - 5	5	
	Ballpark Pump Control	DO	MCP	%Q00518	Relay	A	1 - 5	6	
	Call PAC Mixer	DO	MCP	%Q00521	Relay	A	1 - 5	9	
	Alarm Horn	DO	MCP	%Q00522	Relay	A	1 - 5	10	
AQ005	RW6_VFDCMD	AO	RWCP	%AQ0054	4-20mA	A	25	2	
FI101_A	Raw Water Flow - 24 In. Line	AI	RWPS	%AI0049	4-20mA	A	24	1	
FI101_B	Raw Water Flow - 30 In. Line	AI	RWPS	%AI0050	4-20mA	A	24	2	
AI701_1	Raw Water Turbidity	AI	RWPS	%AI0051	4-20mA	A	24	3	
AI711_1	Raw Water pH	AI	RWPS	%AI0052	4-20mA	A	24	4	
TI721	Raw Water Temperature	AI	RWPS	%AI0053	4-20mA	A	25	1	
AI741	Streaming Current	AI	RWPS	%AI0054	4-20mA	A	25	2	
AI751	Raw Water Conductivity	AI	RWPS	%AI0055	4-20mA	A	25	3	
XI111_1	Raw Water Screen 1	DI	RWPS	%I00161	24VDC	A	21	1	
XI111_2	Raw Water Screen 2	DI	RWPS	%I00162	24VDC	A	21	2	
XI121	Flash Mixer	DI	RWPS	%I00163	24VDC	A	21	3	
XI131_1	Raw Water Pump 1	DI	RWPS	%I00164	24VDC	A	21	4	
XI131_2	Raw Water Pump 2	DI	RWPS	%I00165	24VDC	A	21	5	
XI131_3	Raw Water Pump 3	DI	RWPS	%I00166	24VDC	A	21	6	
XI132_4	Raw Water Pump 4	DI	RWPS	%I00167	24VDC	A	21	7	
XI132_5	Raw Water Pump 5	DI	RWPS	%I00168	24VDC	A	21	8	
XI132_6	Raw Water Pump 6	DI	RWPS	%I00169	24VDC	A	21	9	
LAL141	Lo Level South Sump-Reset Req @ Rwpscp	DI	RWPS	%I00170	24VDC	A	21	10	
LAL142	Lo Level North Sump-Reset Req @ Rwpscp	DI	RWPS	%I00171	24VDC	A	21	11	
XI511	Decant Pump	DI	RWPS	%I00172	24VDC	A	21	12	
XI761_1	Raw Water Sample Pump	DI	RWPS	%I00173	24VDC	A	21	13	
UC931_D	Plant Shutdown	DO	RWPS	%Q00561	Relay	A	22	1	
UC931_E	Plant Shutdown	DO	RWPS	%Q00562	Relay	A	22	2	
UC931_F	Plant Shutdown	DO	RWPS	%Q00563	Relay	A	22	3	
XC121_E	Flash Mixer Stop	DO	RWPS	%Q00564	Relay	A	22	4	
XC121_C	Flash Mixer Slow Start	DO	RWPS	%Q00565	Relay	A	22	5	
XC121_D	Flash Mixer Fast Start	DO	RWPS	%Q00566	Relay	A	22	6	
XC131_1B	Raw Water Pump 1 Stop	DO	RWPS	%Q00567	Relay	A	22	7	
XC131_1A	Raw Water Pump 1 Start	DO	RWPS	%Q00568	Relay	A	22	8	
XC131_2B	Raw Water Pump 2 Stop	DO	RWPS	%Q00569	Relay	A	22	9	
XC131_2A	Raw Water Pump 2 Start	DO	RWPS	%Q00570	Relay	A	22	10	
XC131_3B	Raw Water Pump 3 Stop	DO	RWPS	%Q00571	Relay	A	22	11	
XC131_3A	Raw Water Pump 3 Start	DO	RWPS	%Q00572	Relay	A	22	12	
XC132_4B	Raw Water Pump 4 Stop	DO	RWPS	%Q00577	Relay	A	23	1	
XC132_4A	Raw Water Pump 4 Start	DO	RWPS	%Q00578	Relay	A	23	2	
XC132_5B	Raw Water Pump 5 Stop	DO	RWPS	%Q00579	Relay	A	23	3	
XC132_5A	Raw Water Pump 5 Start	DO	RWPS	%Q00580	Relay	A	23	4	





# IO LIST

PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
XC132_6B	Raw Water Pump 6 Stop	DO	RWPS	%Q00581	Relay	A	23	5
XC132_6A	Raw Water Pump 6 Start	DO	RWPS	%Q00582	Relay	A	23	6
XC511_B	Decant Pump Stop	DO	RWPS	%Q00583	Relay	A	23	7
XC511_A	Decant Pump Start	DO	RWPS	%Q00584	Relay	A	23	8
FI303_1	Effluent Flow Filter 1	AI	FCC1/3	%AI0077	4-20mA	B	6	1
FI303_3	Effluent Flow Filter 3	AI	FCC1/3	%AI0078	4-20mA	B	6	2
PDI34_1	Headloss Filter 1	AI	FCC1/3	%AI0081	4-20mA	B	7	1
PDI34_3	Headloss Filter 3	AI	FCC1/3	%AI0082	4-20mA	B	7	2
AI703_1	Effluent Turbidity Filter 1	AI	FCC1/3	%AI0083	4-20mA	B	7	3
AI703_3	Effluent Turbidity Filter 3	AI	FCC1/3	%AI0084	4-20mA	B	7	4
FC303_1	Filter 1 Flow Setpoint	AO	FCC1/3	%AQ0077	4-20mA	B	6	1
FC303_3	Filter 3 Flow Setpoint	AO	FCC1/3	%AQ0078	4-20mA	B	6	2
FQC303_1	Filter 1 Flow	AO	FCC1/3	%AQ0081	4-20mA	B	7	1
FQC303_3	Filter 3 Flow	AO	FCC1/3	%AQ0082	4-20mA	B	7	2
ZI302_1A	Settled Water Valve Open - Filter 1	DI	FCC1/3	%I00193	24VDC	B	1	1
ZI302_1B	Settled Water Valve Closed - Filter 1	DI	FCC1/3	%I00194	24VDC	B	1	2
ZI302_3A	Settled Water Valve Open - Filter 3	DI	FCC1/3	%I00195	24VDC	B	1	3
ZI302_3B	Settled Water Valve Closed - Filter 3	DI	FCC1/3	%I00196	24VDC	B	1	4
ZI303_1A	Control Valve Open - Filter 1	DI	FCC1/3	%I00197	24VDC	B	1	5
ZI303_1B	Control Valve Closed - Filter 1	DI	FCC1/3	%I00198	24VDC	B	1	6
ZI303_3A	Control Valve Open - Filter 3	DI	FCC1/3	%I00199	24VDC	B	1	7
ZI303_3B	Control Valve Closed - Filter 3	DI	FCC1/3	%I00200	24VDC	B	1	8
ZI304_1A	BW Inlet Valve Open - Filter 1	DI	FCC1/3	%I00201	24VDC	B	1	9
ZI304_1B	BW Inlet Valve Closed - Filter 1	DI	FCC1/3	%I00202	24VDC	B	1	10
ZI304_3A	BW Inlet Valve Open - Filter 3	DI	FCC1/3	%I00203	24VDC	B	1	11
ZI304_3B	BW Inlet Valve Closed - Filter 3	DI	FCC1/3	%I00204	24VDC	B	1	12
ZI305_1A	WW Drain Gate Open - Filter 1	DI	FCC1/3	%I00205	24VDC	B	1	13
ZI305_1B	WW Drain Gate Closed - Filter 1	DI	FCC1/3	%I00206	24VDC	B	1	14
ZI305_3A	WW Drain Gate Open - Filter 3	DI	FCC1/3	%I00207	24VDC	B	1	15
ZI305_3B	WW Drain Gate Closed - Filter 3	DI	FCC1/3	%I00208	24VDC	B	1	16
ZI306_1A	Surface Wash Valve Open - Filter 1A	DI	FCC1/3	%I00209	24VDC	B	1	17
ZI306_1B	Surface Wash Valve Closed - Filter 1A	DI	FCC1/3	%I00210	24VDC	B	1	18
ZI306_2A	Surface Wash Valve Open - Filter 1B	DI	FCC1/3	%I00211	24VDC	B	1	19
ZI306_2B	Surface Wash Valve Closed - Filter 1B	DI	FCC1/3	%I00212	24VDC	B	1	20
ZI306_5A	Surface Wash Valve Open - Filter 3A	DI	FCC1/3	%I00213	24VDC	B	1	21
ZI306_5B	Surface Wash Valve Closed - Filter 3A	DI	FCC1/3	%I00214	24VDC	B	1	22
ZI306_6A	Surface Wash Valve Open - Filter 3B	DI	FCC1/3	%I00215	24VDC	B	1	23
ZI306_6B	Surface Wash Valve Closed - Filter 3B	DI	FCC1/3	%I00216	24VDC	B	1	24
ZI307_1A	Filtered Water Valve Open - Filter 1A	DI	FCC1/3	%I00217	24VDC	B	1	25
ZI307_1B	Filtered Water Valve Closed - Filter 1A	DI	FCC1/3	%I00218	24VDC	B	1	26
ZI307_2A	Filtered Water Valve Open - Filter 1B	DI	FCC1/3	%I00219	24VDC	B	1	27
ZI307_2B	Filtered Water Valve Closed - Filter 1B	DI	FCC1/3	%I00220	24VDC	B	1	28
ZI307_5A	Filtered Water Valve Open - Filter 3A	DI	FCC1/3	%I00221	24VDC	B	1	29



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PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
ZI307_5B	Filtered Water Valve Closed - Filter 3A	DI	FCC1/3	%I00222	24VDC	B	1	30
ZI307_6A	Filtered Water Valve Open - Filter 3B	DI	FCC1/3	%I00223	24VDC	B	1	31
ZI307_6B	Filtered Water Valve Closed - Filter 3B	DI	FCC1/3	%I00224	24VDC	B	1	32
ZI351_1C	All Switches Not @ Auto/Remote - 1	DI	FCC1/3	%I00234	24VDC	B	2	10
ZI351_3C	All Switches Not @ Auto/Remote - 3	DI	FCC1/3	%I00238	24VDC	B	2	11
KI351_13A	Filter 1/3 Backwash Time 0 Bit	DO	FCC1/3	%Q00247	24VDC	B	2	23
KI351_13B	Filter 1/3 Backwash Time 2 Bit	DO	FCC1/3	%Q00248	24VDC	B	2	24
KI351_13C	Filter 1/3 Backwash Time 4 Bit	DO	FCC1/3	%Q00249	24VDC	B	2	25
KI351_13D	Filter 1/3 Backwash Time 8 Bit	DO	FCC1/3	%Q00250	24VDC	B	2	26
KI351_1L	Filter 1 Backwash Time Low Strobe	DO	FCC1/3	%Q00251	24VDC	B	2	27
KI351_1M	Filter 1 Backwash Time Mid Strobe	DO	FCC1/3	%Q00252	24VDC	B	2	28
KI351_1H	Filter 1 Backwash Time High Strobe	DO	FCC1/3	%Q00253	24VDC	B	2	29
KI351_3L	Filter 3 Backwash Time Low Strobe	DO	FCC1/3	%Q00254	24VDC	B	2	30
KI351_3M	Filter 3 Backwash Time Mid Strobe	DO	FCC1/3	%Q00255	24VDC	B	2	31
KI351_3H	Filter 3 Backwash Time High Strobe	DO	FCC1/3	%Q00256	24VDC	B	2	32
XC302_1A	Filter 1 Settled Water Valve Open	DO	FCC1/3	%Q00593	Relay	B	3	1
XC302_1B	Filter 1 Settled Water Valve Close	DO	FCC1/3	%Q00594	Relay	B	3	2
XC302_3A	Filter 3 Settled Water Valve Open	DO	FCC1/3	%Q00595	Relay	B	3	3
XC302_3B	Filter 3 Settled Water Valve Close	DO	FCC1/3	%Q00596	Relay	B	3	4
FIC303_1	Filter 1 Remote SP Select	DO	FCC1/3	%Q00597	Relay	B	3	5
FIC303_3	Filter 3 Remote SP Select	DO	FCC1/3	%Q00598	Relay	B	3	6
XC304_1A	Filter 1 Backwash Valve Open	DO	FCC1/3	%Q00599	Relay	B	3	7
XC304_1B	Filter 1 Backwash Valve Close	DO	FCC1/3	%Q00600	Relay	B	3	8
XC304_3A	Filter 3 Backwash Valve Open	DO	FCC1/3	%Q00601	Relay	B	3	9
XC304_3B	Filter 3 Backwash Valve Close	DO	FCC1/3	%Q00602	Relay	B	3	10
XC305_1A	Filter 1 Washwater Drain Open	DO	FCC1/3	%Q00603	Relay	B	3	11
XC305_1B	Filter 1 Washwater Drain Close	DO	FCC1/3	%Q00604	Relay	B	3	12
XC305_3A	Filter 3 Washwater Drain Open	DO	FCC1/3	%Q00605	Relay	B	3	13
XC305_3B	Filter 3 Washwater Drain Close	DO	FCC1/3	%Q00606	Relay	B	3	14
XC306_1A	Filter 1A Surface Wash Open	DO	FCC1/3	%Q00609	Relay	B	4	1
XC306_1B	Filter 1A Surface Wash Close	DO	FCC1/3	%Q00610	Relay	B	4	2
XC306_2A	Filter 1B Surface Wash Open	DO	FCC1/3	%Q00611	Relay	B	4	3
XC306_2B	Filter 1B Surface Wash Close	DO	FCC1/3	%Q00612	Relay	B	4	4
XC306_5A	Filter 3A Surface Wash Open	DO	FCC1/3	%Q00613	Relay	B	4	5
XC306_5B	Filter 3A Surface Wash Close	DO	FCC1/3	%Q00614	Relay	B	4	6
XC306_6A	Filter 3B Surface Wash Open	DO	FCC1/3	%Q00615	Relay	B	4	7
XC306_6B	Filter 3B Surface Wash Close	DO	FCC1/3	%Q00616	Relay	B	4	8
XC307_1A	Filter 1A Filtered Water Open	DO	FCC1/3	%Q00617	Relay	B	4	9
XC307_1B	Filter 1A Filtered Water Close	DO	FCC1/3	%Q00618	Relay	B	4	10
XC307_2A	Filter 1B Filtered Water Open	DO	FCC1/3	%Q00619	Relay	B	4	11
XC307_2B	Filter 1B Filtered Water Close	DO	FCC1/3	%Q00620	Relay	B	4	12
XC307_5A	Filter 3A Filtered Water Open	DO	FCC1/3	%Q00621	Relay	B	4	13
XC307_5B	Filter 3A Filtered Water Close	DO	FCC1/3	%Q00622	Relay	B	4	14



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PLC: Main Control Panel (MCP)							LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
XC307_6A	Filter 3B Filtered Water Open	DO	FCC1/3	%Q00623	Relay	B	4	15	
XC307_6B	Filter 3B Filtered Water Close	DO	FCC1/3	%Q00624	Relay	B	4	16	
XA351_1	Filter 1 Backwash Malfunction	DO	FCC1/3	%Q00625	Relay	B	5	1	
XIC351_1	Filter 1 Backwash in Progress	DO	FCC1/3	%Q00626	Relay	B	5	2	
XA351_3	Filter 3 Backwash Malfunction	DO	FCC1/3	%Q00627	Relay	B	5	3	
XIC351_3	Filter 3 Backwash in Progress	DO	FCC1/3	%Q00628	Relay	B	5	4	
FI303_2	Effluent Flow Filter 2	AI	FCC2/4	%AI0085	4-20mA	B	13	1	
FI303_4	Effluent Flow Filter 4	AI	FCC2/4	%AI0086	4-20mA	B	13	2	
PDI34_2	Headloss Filter 2	AI	FCC2/4	%AI0089	4-20mA	B	14	1	
PDI34_4	Headloss Filter 4	AI	FCC2/4	%AI0090	4-20mA	B	14	2	
AI703_2	Effluent Turbidity Filter 2	AI	FCC2/4	%AI0091	4-20mA	B	14	3	
AI703_4	Effluent Turbidity Filter 4	AI	FCC2/4	%AI0092	4-20mA	B	14	4	
FC303_2	Filter 2 Flow Setpoint	AO	FCC2/4	%AQ0085	4-20mA	B	13	1	
FC303_4	Filter 4 Flow Setpoint	AO	FCC2/4	%AQ0086	4-20mA	B	13	2	
FQC303_2	Filter 2 Flow	AO	FCC2/4	%AQ0089	4-20mA	B	14	1	
FQC303_4	Filter 4 Flow	AO	FCC2/4	%AQ0090	4-20mA	B	14	2	
ZI302_2A	Settled Water Valve Open - Filter 2	DI	FCC2/4	%I00257	24VDC	B	8	1	
ZI302_2B	Settled Water Valve Closed - Filter 2	DI	FCC2/4	%I00258	24VDC	B	8	2	
ZI302_4A	Settled Water Valve Open - Filter 4	DI	FCC2/4	%I00259	24VDC	B	8	3	
ZI302_4B	Settled Water Valve Closed - Filter 4	DI	FCC2/4	%I00260	24VDC	B	8	4	
ZI303_2A	Control Valve Open - Filter 2	DI	FCC2/4	%I00261	24VDC	B	8	5	
ZI303_2B	Control Valve Closed - Filter 2	DI	FCC2/4	%I00262	24VDC	B	8	6	
ZI303_4A	Control Valve Open - Filter 4	DI	FCC2/4	%I00263	24VDC	B	8	7	
ZI303_4B	Control Valve Closed - Filter 4	DI	FCC2/4	%I00264	24VDC	B	8	8	
ZI304_2A	BW Inlet Valve Open - Filter 2	DI	FCC2/4	%I00265	24VDC	B	8	9	
ZI304_2B	BW Inlet Valve Closed - Filter 2	DI	FCC2/4	%I00266	24VDC	B	8	10	
ZI304_4A	BW Inlet Valve Open - Filter 4	DI	FCC2/4	%I00267	24VDC	B	8	11	
ZI304_4B	BW Inlet Valve Closed - Filter 4	DI	FCC2/4	%I00268	24VDC	B	8	12	
ZI305_2A	WW Drain Gate Open - Filter 2	DI	FCC2/4	%I00269	24VDC	B	8	13	
ZI305_2B	WW Drain Gate Closed - Filter 2	DI	FCC2/4	%I00270	24VDC	B	8	14	
ZI305_4A	WW Drain Gate Open - Filter 4	DI	FCC2/4	%I00271	24VDC	B	8	15	
ZI305_4B	WW Drain Gate Closed - Filter 4	DI	FCC2/4	%I00272	24VDC	B	8	16	
ZI306_3A	Surface Wash Valve Open - Filter 2A	DI	FCC2/4	%I00273	24VDC	B	8	17	
ZI306_3B	Surface Wash Valve Closed - Filter 2A	DI	FCC2/4	%I00274	24VDC	B	8	18	
ZI306_4A	Surface Wash Valve Open - Filter 2B	DI	FCC2/4	%I00275	24VDC	B	8	19	
ZI306_4B	Surface Wash Valve Closed - Filter 2B	DI	FCC2/4	%I00276	24VDC	B	8	20	
ZI306_7A	Surface Wash Valve Open - Filter 4A	DI	FCC2/4	%I00277	24VDC	B	8	21	
ZI306_7B	Surface Wash Valve Closed - Filter 4A	DI	FCC2/4	%I00278	24VDC	B	8	22	
ZI306_8A	Surface Wash Valve Open - Filter 4B	DI	FCC2/4	%I00279	24VDC	B	8	23	
ZI306_8B	Surface Wash Valve Closed - Filter 4B	DI	FCC2/4	%I00280	24VDC	B	8	24	
ZI307_3A	Filtered Water Valve Open - Filter 2A	DI	FCC2/4	%I00281	24VDC	B	8	25	
ZI307_3B	Filtered Water Valve Closed - Filter 2A	DI	FCC2/4	%I00282	24VDC	B	8	26	
ZI307_4A	Filtered Water Valve Open - Filter 2B	DI	FCC2/4	%I00283	24VDC	B	8	27	



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PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
ZI307_4B	Filtered Water Valve Closed - Filter 2B	DI	FCC2/4	%I00284	24VDC	B	8	28
ZI307_7A	Filtered Water Valve Open - Filter 4A	DI	FCC2/4	%I00285	24VDC	B	8	29
ZI307_7B	Filtered Water Valve Closed - Filter 4A	DI	FCC2/4	%I00286	24VDC	B	8	30
ZI307_8A	Filtered Water Valve Open - Filter 4B	DI	FCC2/4	%I00287	24VDC	B	8	31
ZI307_8B	Filtered Water Valve Closed - Filter 4B	DI	FCC2/4	%I00288	24VDC	B	8	32
ZI351_2C	All Switches Not @ Auto/Remote - 2	DI	FCC2/4	%I00298	24VDC	B	9	10
ZI351_4C	All Switches Not @ Auto/Remote - 4	DI	FCC2/4	%I00302	24VDC	B	9	14
KI351_24A	Filter 2/4 Backwash Time 0 Bit	DO	FCC2/4	%Q00311	24VDC	B	9	23
KI351_24B	Filter 2/4 Backwash Time 2 Bit	DO	FCC2/4	%Q00312	24VDC	B	9	24
KI351_24C	Filter 2/4 Backwash Time 4 Bit	DO	FCC2/4	%Q00313	24VDC	B	9	25
KI351_24D	Filter 2/4 Backwash Time 8 Bit	DO	FCC2/4	%Q00314	24VDC	B	9	26
KI351_2L	Filter 2 Backwash Time Low Strobe	DO	FCC2/4	%Q00315	24VDC	B	9	27
KI351_2M	Filter 2 Backwash Time Mid Strobe	DO	FCC2/4	%Q00316	24VDC	B	9	28
KI351_2H	Filter 2 Backwash Time High Strobe	DO	FCC2/4	%Q00317	24VDC	B	9	29
KI351_4L	Filter 4 Backwash Time Low Strobe	DO	FCC2/4	%Q00318	24VDC	B	9	30
KI351_4M	Filter 4 Backwash Time Mid Strobe	DO	FCC2/4	%Q00319	24VDC	B	9	31
KI351_4H	Filter 4 Backwash Time High Strobe	DO	FCC2/4	%Q00320	24VDC	B	9	32
XC302_2A	Filter 2 Settled Water Valve Open	DO	FCC2/4	%Q00641	Relay	B	10	1
XC302_2B	Filter 2 Settled Water Valve Close	DO	FCC2/4	%Q00642	Relay	B	10	2
XC302_4A	Filter 4 Settled Water Valve Open	DO	FCC2/4	%Q00643	Relay	B	10	3
XC302_4B	Filter 4 Settled Water Valve Close	DO	FCC2/4	%Q00644	Relay	B	10	4
FIC303_2	Filter 2 Remote SP Select	DO	FCC2/4	%Q00645	Relay	B	10	5
FIC303_4	Filter 4 Remote SP Select	DO	FCC2/4	%Q00646	Relay	B	10	6
XC304_2A	Filter 2 Backwash Valve Open	DO	FCC2/4	%Q00647	Relay	B	10	7
XC304_2B	Filter 2 Backwash Valve Close	DO	FCC2/4	%Q00648	Relay	B	10	8
XC304_4A	Filter 4 Backwash Valve Open	DO	FCC2/4	%Q00649	Relay	B	10	9
XC304_4B	Filter 4 Backwash Valve Close	DO	FCC2/4	%Q00650	Relay	B	10	10
XC305_2A	Filter 2 Washwater Drain Open	DO	FCC2/4	%Q00651	Relay	B	10	11
XC305_2B	Filter 2 Washwater Drain Close	DO	FCC2/4	%Q00652	Relay	B	10	12
XC305_4A	Filter 4 Washwater Drain Open	DO	FCC2/4	%Q00653	Relay	B	10	13
XC305_4B	Filter 4 Washwater Drain Close	DO	FCC2/4	%Q00654	Relay	B	10	14
XC306_3A	Filter 2A Surface Wash Open	DO	FCC2/4	%Q00657	Relay	B	11	1
XC306_3B	Filter 2A Surface Wash Close	DO	FCC2/4	%Q00658	Relay	B	11	2
XC306_4A	Filter 2B Surface Wash Open	DO	FCC2/4	%Q00659	Relay	B	11	3
XC306_4B	Filter 2B Surface Wash Close	DO	FCC2/4	%Q00660	Relay	B	11	4
XC306_7A	Filter 4A Surface Wash Open	DO	FCC2/4	%Q00661	Relay	B	11	5
XC306_7B	Filter 4A Surface Wash Close	DO	FCC2/4	%Q00662	Relay	B	11	6
XC306_8A	Filter 4B Surface Wash Open	DO	FCC2/4	%Q00663	Relay	B	11	7
XC306_8B	Filter 4B Surface Wash Close	DO	FCC2/4	%Q00664	Relay	B	11	8
XC307_3A	Filter 2A Filtered Water Open	DO	FCC2/4	%Q00665	Relay	B	11	9
XC307_3B	Filter 2A Filtered Water Close	DO	FCC2/4	%Q00666	Relay	B	11	10
XC307_4A	Filter 2B Filtered Water Open	DO	FCC2/4	%Q00667	Relay	B	11	11
XC307_4B	Filter 2B Filtered Water Close	DO	FCC2/4	%Q00668	Relay	B	11	12



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PLC: Main Control Panel (MCP)							LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
XC307_7A	Filter 4A Filtered Water Open	DO	FCC2/4	%Q00669	Relay	B	11	13	
XC307_7B	Filter 4A Filtered Water Close	DO	FCC2/4	%Q00670	Relay	B	11	14	
XC307_8A	Filter 4B Filtered Water Open	DO	FCC2/4	%Q00671	Relay	B	11	15	
XC307_8B	Filter 4B Filtered Water Close	DO	FCC2/4	%Q00672	Relay	B	11	16	
XA351_2	Filter 2 Backwash Malfunction	DO	FCC2/4	%Q00673	Relay	B	12	1	
XIC351_2	Filter 2 Backwash in Progress	DO	FCC2/4	%Q00674	Relay	B	12	2	
XA351_4	Filter 4 Backwash Malfunction	DO	FCC2/4	%Q00675	Relay	B	12	3	
XIC351_4	Filter 4 Backwash in Progress	DO	FCC2/4	%Q00676	Relay	B	12	4	
FI303_5	Effluent Flow Filter 5	AI	FCC5/7	%AI0093	4-20mA	B	20	1	
FI303_7	Effluent Flow Filter 7	AI	FCC5/7	%AI0094	4-20mA	B	20	2	
PDI34_5	Headloss Filter 5	AI	FCC5/7	%AI0097	4-20mA	B	21	1	
PDI34_7	Headloss Filter 7	AI	FCC5/7	%AI0098	4-20mA	B	21	2	
AI703_5	Effluent Turbidity Filter 5	AI	FCC5/7	%AI0099	4-20mA	B	21	3	
AI703_7	Effluent Turbidity Filter 7	AI	FCC5/7	%AI0100	4-20mA	B	21	4	
FC303_5	Filter 5 Flow Setpoint	AO	FCC5/7	%AQ0093	4-20mA	B	20	1	
FC303_7	Filter 7 Flow Setpoint	AO	FCC5/7	%AQ0094	4-20mA	B	20	2	
FQC303_5	Filter 5 Flow	AO	FCC5/7	%AQ0097	4-20mA	B	21	1	
FQC303_7	Filter 7 Flow	AO	FCC5/7	%AQ0098	4-20mA	B	21	2	
ZI302_5A	Settled Water Valve Open - Filter 5	DI	FCC5/7	%I00321	24VDC	B	15	1	
ZI302_5B	Settled Water Valve Closed - Filter 5	DI	FCC5/7	%I00322	24VDC	B	15	2	
ZI302_7A	Settled Water Valve Open - Filter 7	DI	FCC5/7	%I00323	24VDC	B	15	3	
ZI302_7B	Settled Water Valve Closed - Filter 7	DI	FCC5/7	%I00324	24VDC	B	15	4	
ZI303_5A	Control Valve Open - Filter 5	DI	FCC5/7	%I00325	24VDC	B	15	5	
ZI303_5B	Control Valve Closed - Filter 5	DI	FCC5/7	%I00326	24VDC	B	15	6	
ZI303_7A	Control Valve Not Open - Filter 7	DI	FCC5/7	%I00327	24VDC	B	15	7	
ZI303_7B	Control Valve Not Closed - Filter 7	DI	FCC5/7	%I00328	24VDC	B	15	8	
ZI304_5A	BW Inlet Valve Open - Filter 5	DI	FCC5/7	%I00329	24VDC	B	15	9	
ZI304_5B	BW Inlet Valve Closed - Filter 5	DI	FCC5/7	%I00330	24VDC	B	15	10	
ZI304_7A	BW Inlet Valve Open - Filter 7	DI	FCC5/7	%I00331	24VDC	B	15	11	
ZI304_7B	BW Inlet Valve Closed - Filter 7	DI	FCC5/7	%I00332	24VDC	B	15	12	
ZI305_5A	WW Drain Gate Open - Filter 5	DI	FCC5/7	%I00333	24VDC	B	15	13	
ZI305_5B	WW Drain Gate Closed - Filter 5	DI	FCC5/7	%I00334	24VDC	B	15	14	
ZI305_7A	WW Drain Gate Open - Filter 7	DI	FCC5/7	%I00335	24VDC	B	15	15	
ZI305_7B	WW Drain Gate Closed - Filter 7	DI	FCC5/7	%I00336	24VDC	B	15	16	
ZI306_9A	Surface Wash Valve Open - Filter 5A	DI	FCC5/7	%I00337	24VDC	B	15	17	
ZI306_9B	Surface Wash Valve Closed - Filter 5A	DI	FCC5/7	%I00338	24VDC	B	15	18	
ZI306_10A	Surface Wash Valve Open - Filter 5B	DI	FCC5/7	%I00339	24VDC	B	15	19	
ZI306_10B	Surface Wash Valve Closed - Filter 5B	DI	FCC5/7	%I00340	24VDC	B	15	20	
ZI306_13A	Surface Wash Valve Open - Filter 7A	DI	FCC5/7	%I00341	24VDC	B	15	21	
ZI306_13B	Surface Wash Valve Closed - Filter 7A	DI	FCC5/7	%I00342	24VDC	B	15	22	
ZI306_14A	Surface Wash Valve Open - Filter 7B	DI	FCC5/7	%I00343	24VDC	B	15	23	
ZI306_14B	Surface Wash Valve Closed - Filter 7B	DI	FCC5/7	%I00344	24VDC	B	15	24	
ZI307_9A	Filtered Water Valve Open - Filter 5A	DI	FCC5/7	%I00345	24VDC	B	15	25	



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PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
ZI307_9B	Filtered Water Valve Closed - Filter 5A	DI	FCC5/7	%I00346	24VDC	B	15	26
ZI307_10A	Filtered Water Valve Open - Filter 5B	DI	FCC5/7	%I00347	24VDC	B	15	27
ZI307_10B	Filtered Water Valve Closed - Filter 5B	DI	FCC5/7	%I00348	24VDC	B	15	28
ZI307_13A	Filtered Water Valve Open - Filter 7A	DI	FCC5/7	%I00349	24VDC	B	15	29
ZI307_13B	Filtered Water Valve Closed - Filter 7A	DI	FCC5/7	%I00350	24VDC	B	15	30
ZI307_14A	Filtered Water Valve Open - Filter 7B	DI	FCC5/7	%I00351	24VDC	B	15	31
ZI307_14B	Filtered Water Valve Closed - Filter 7B	DI	FCC5/7	%I00352	24VDC	B	15	32
ZI351_5C	All Switches Not @ Auto/Remote - 5	DI	FCC5/7	%I00362	24VDC	B	16	10
ZI351_7C	All Switches Not @ Auto/Remote - 7	DI	FCC5/7	%I00366	24VDC	B	16	14
KI351_57A	Filter 5/7 Backwash Time 0 Bit	DO	FCC5/7	%Q00375	24VDC	B	16	23
KI351_57B	Filter 5/7 Backwash Time 2 Bit	DO	FCC5/7	%Q00376	24VDC	B	16	24
KI351_57C	Filter 5/7 Backwash Time 4 Bit	DO	FCC5/7	%Q00377	24VDC	B	16	25
KI351_57D	Filter 5/7 Backwash Time 8 Bit	DO	FCC5/7	%Q00378	24VDC	B	16	26
KI351_5L	Filter 5 Backwash Time Low Strobe	DO	FCC5/7	%Q00379	24VDC	B	16	27
KI351_5M	Filter 5 Backwash Time Mid Strobe	DO	FCC5/7	%Q00380	24VDC	B	16	28
KI351_5H	Filter 5 Backwash Time High Strobe	DO	FCC5/7	%Q00381	24VDC	B	16	29
KI351_7L	Filter 7 Backwash Time Low Strobe	DO	FCC5/7	%Q00382	24VDC	B	16	30
KI351_7M	Filter 7 Backwash Time Mid Strobe	DO	FCC5/7	%Q00383	24VDC	B	16	31
KI351_7H	Filter 7 Backwash Time High Strobe	DO	FCC5/7	%Q00384	24VDC	B	16	32
XC302_5A	Filter 5 Settled Water Valve Open	DO	FCC5/7	%Q00689	Relay	B	17	1
XC302_5B	Filter 5 Settled Water Valve Close	DO	FCC5/7	%Q00690	Relay	B	17	2
XC302_7A	Filter 7 Settled Water Valve Open	DO	FCC5/7	%Q00691	Relay	B	17	3
XC302_7B	Filter 7 Settled Water Valve Close	DO	FCC5/7	%Q00692	Relay	B	17	4
FIC303_5	Filter 5 Remote SP Select	DO	FCC5/7	%Q00693	Relay	B	17	5
FIC303_7	Filter 7 Remote SP Select	DO	FCC5/7	%Q00694	Relay	B	17	6
XC304_5A	Filter 5 Backwash Valve Open	DO	FCC5/7	%Q00695	Relay	B	17	7
XC304_5B	Filter 5 Backwash Valve Close	DO	FCC5/7	%Q00696	Relay	B	17	8
XC304_7A	Filter 7 Backwash Valve Open	DO	FCC5/7	%Q00697	Relay	B	17	9
XC304_7B	Filter 7 Backwash Valve Close	DO	FCC5/7	%Q00698	Relay	B	17	10
XC305_5A	Filter 5 Washwater Drain Open	DO	FCC5/7	%Q00699	Relay	B	17	11
XC305_5B	Filter 5 Washwater Drain Close	DO	FCC5/7	%Q00700	Relay	B	17	12
XC305_7A	Filter 7 Washwater Drain Open	DO	FCC5/7	%Q00701	Relay	B	17	13
XC305_7B	Filter 7 Washwater Drain Close	DO	FCC5/7	%Q00702	Relay	B	17	14
XC306_9A	Filter 5A Surface Wash Open	DO	FCC5/7	%Q00705	Relay	B	18	1
XC306_9B	Filter 5A Surface Wash Close	DO	FCC5/7	%Q00706	Relay	B	18	2
XC306_10A	Filter 5B Surface Wash Open	DO	FCC5/7	%Q00707	Relay	B	18	3
XC306_10B	Filter 5B Surface Wash Close	DO	FCC5/7	%Q00708	Relay	B	18	4
XC306_13A	Filter 7A Surface Wash Open	DO	FCC5/7	%Q00709	Relay	B	18	5
XC306_13B	Filter 7A Surface Wash Close	DO	FCC5/7	%Q00710	Relay	B	18	6
XC306_14A	Filter 7B Surface Wash Open	DO	FCC5/7	%Q00711	Relay	B	18	7
XC306_14B	Filter 7B Surface Wash Close	DO	FCC5/7	%Q00712	Relay	B	18	8
XC307_9A	Filter 5A Filtered Water Open	DO	FCC5/7	%Q00713	Relay	B	18	9
XC307_9B	Filter 5A Filtered Water Close	DO	FCC5/7	%Q00714	Relay	B	18	10



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TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
XC307_10A	Filter 5B Filtered Water Open	DO	FCC5/7	%Q00715	Relay	B	18	11	
XC307_10B	Filter 5B Filtered Water Close	DO	FCC5/7	%Q00716	Relay	B	18	12	
XC307_13A	Filter 7A Filtered Water Open	DO	FCC5/7	%Q00717	Relay	B	18	13	
XC307_13B	Filter 7A Filtered Water Close	DO	FCC5/7	%Q00718	Relay	B	18	14	
XC307_14A	Filter 7B Filtered Water Open	DO	FCC5/7	%Q00719	Relay	B	18	15	
XC307_14B	Filter 7B Filtered Water Close	DO	FCC5/7	%Q00720	Relay	B	18	16	
XA351_5	Filter 5 Backwash Malfunction	DO	FCC5/7	%Q00721	Relay	B	19	1	
XIC351_5	Filter 5 Backwash in Progress	DO	FCC5/7	%Q00722	Relay	B	19	2	
XA351_7	Filter 7 Backwash Malfunction	DO	FCC5/7	%Q00723	Relay	B	19	3	
XIC351_7	Filter 7 Backwash in Progress	DO	FCC5/7	%Q00724	Relay	B	19	4	
LI301	Filter Applied Water Pipe Level	AI	FCC6/8	%AI0101	4-20mA	B	27	1	
FI303_6	Effluent Flow Filter 6	AI	FCC6/8	%AI0102	4-20mA	B	27	2	
FI303_8	Effluent Flow Filter 8	AI	FCC6/8	%AI0103	4-20mA	B	27	3	
PDI34_6	Headloss Filter 6	AI	FCC6/8	%AI0105	4-20mA	B	28	1	
PDI34_8	Headloss Filter 8	AI	FCC6/8	%AI0106	4-20mA	B	28	2	
AI703_6	Effluent Turbidity Filter 6	AI	FCC6/8	%AI0107	4-20mA	B	28	3	
AI703_8	Effluent Turbidity Filter 8	AI	FCC6/8	%AI0108	4-20mA	B	28	4	
AI701_2	Settled Water Turbidity	AI	FCC6/8	%AI0110	4-20mA	B	29	2	
AI702_1	Treated Water Turbidity	AI	FCC6/8	%AI0111	4-20mA	B	29	3	
AI702_2	Finished Water Turbidity	AI	FCC6/8	%AI0112	4-20mA	B	29	4	
AI711_2	Treated Water pH	AI	FCC6/8	%AI0113	4-20mA	B	30	1	
AY731	Finished Water Fluoride (Linear)	AI	FCC6/8	%AI0114	4-20mA	B	30	2	
FC303_6	Filter 6 Flow Setpoint	AO	FCC6/8	%AQ0101	4-20mA	B	27	1	
FC303_8	Filter 8 Flow Setpoint	AO	FCC6/8	%AQ0102	4-20mA	B	27	2	
FQC303_6	Filter 6 Flow	AO	FCC6/8	%AQ0105	4-20mA	B	28	1	
FQC303_8	Filter 8 Flow	AO	FCC6/8	%AQ0106	4-20mA	B	28	2	
LKC301	SW Pipe Level Setpoint	AO	FCC6/8	%AQ0109	4-20mA	B	29	1	
FIC321	Master Backwash Flow Setpoint	AO	FCC6/8	%AQ0110	4-20mA	B	29	2	
ZI302_6A	Settled Water Valve Open - Filter 6	DI	FCC6/8	%I00385	24VDC	B	22	1	
ZI302_6B	Settled Water Valve Closed - Filter 6	DI	FCC6/8	%I00386	24VDC	B	22	2	
ZI302_8A	Settled Water Valve Open - Filter 8	DI	FCC6/8	%I00387	24VDC	B	22	3	
ZI302_8B	Settled Water Valve Closed - Filter 8	DI	FCC6/8	%I00388	24VDC	B	22	4	
ZI303_6A	Control Valve Open - Filter 6	DI	FCC6/8	%I00389	24VDC	B	22	5	
ZI303_6B	Control Valve Closed - Filter 6	DI	FCC6/8	%I00390	24VDC	B	22	6	
ZI303_8A	Control Valve Open - Filter 8	DI	FCC6/8	%I00391	24VDC	B	22	7	
ZI303_8B	Control Valve Closed - Filter 8	DI	FCC6/8	%I00392	24VDC	B	22	8	
ZI304_6A	BW Inlet Valve Open - Filter 6	DI	FCC6/8	%I00393	24VDC	B	22	9	
ZI304_6B	BW Inlet Valve Closed - Filter 6	DI	FCC6/8	%I00394	24VDC	B	22	10	
ZI304_8A	BW Inlet Valve Open - Filter 8	DI	FCC6/8	%I00395	24VDC	B	22	11	
ZI304_8B	BW Inlet Valve Closed - Filter 8	DI	FCC6/8	%I00396	24VDC	B	22	12	
ZI305_6A	WW Drain Gate Open - Filter 6	DI	FCC6/8	%I00397	24VDC	B	22	13	
ZI305_6B	WW Drain Gate Closed - Filter 6	DI	FCC6/8	%I00398	24VDC	B	22	14	
ZI305_8A	WW Drain Gate Open - Filter 8	DI	FCC6/8	%I00399	24VDC	B	22	15	



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TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT	
ZI305_8B	WW Drain Gate Closed - Filter 8	DI	FCC6/8	%I00400	24VDC	B	22	16	
ZI306_11A	Surface Wash Valve Open - Filter 6A	DI	FCC6/8	%I00401	24VDC	B	22	17	
ZI306_11B	Surface Wash Valve Closed - Filter 6A	DI	FCC6/8	%I00402	24VDC	B	22	18	
ZI306_12A	Surface Wash Valve Open - Filter 6B	DI	FCC6/8	%I00403	24VDC	B	22	19	
ZI306_12B	Surface Wash Valve Closed - Filter 6B	DI	FCC6/8	%I00404	24VDC	B	22	20	
ZI306_15A	Surface Wash Valve Open - Filter 8A	DI	FCC6/8	%I00405	24VDC	B	22	21	
ZI306_15B	Surface Wash Valve Closed - Filter 8A	DI	FCC6/8	%I00406	24VDC	B	22	22	
ZI306_16A	Surface Wash Valve Open - Filter 8B	DI	FCC6/8	%I00407	24VDC	B	22	23	
ZI306_16B	Surface Wash Valve Closed - Filter 8B	DI	FCC6/8	%I00408	24VDC	B	22	24	
ZI307_11A	Filtered Water Valve Open - Filter 6A	DI	FCC6/8	%I00409	24VDC	B	22	25	
ZI307_11B	Filtered Water Valve Closed - Filter 6A	DI	FCC6/8	%I00410	24VDC	B	22	26	
ZI307_12A	Filtered Water Valve Open - Filter 6B	DI	FCC6/8	%I00411	24VDC	B	22	27	
ZI307_12B	Filtered Water Valve Closed - Filter 6B	DI	FCC6/8	%I00412	24VDC	B	22	28	
ZI307_15A	Filtered Water Valve Open - Filter 8A	DI	FCC6/8	%I00413	24VDC	B	22	29	
ZI307_15B	Filtered Water Valve Closed - Filter 8A	DI	FCC6/8	%I00414	24VDC	B	22	30	
ZI307_16A	Filtered Water Valve Open - Filter 8B	DI	FCC6/8	%I00415	24VDC	B	22	31	
ZI307_16B	Filtered Water Valve Closed - Filter 8B	DI	FCC6/8	%I00416	24VDC	B	22	32	
ZI351_6C	All Switches Not @ Auto/Remote - 6	DI	FCC6/8	%I00426	24VDC	B	23	10	
ZI351_8C	All Switches Not @ Auto/Remote - 8	DI	FCC6/8	%I00430	24VDC	B	23	14	
ZI321	Master Backwash Valve Open	DI	FCC6/8	%I00434	24VDC	B	23	18	
ZI321	Master Backwash Valve Closed	DI	FCC6/8	%I00435	24VDC	B	23	19	
KI351_68A	Filter 6/8 Backwash Time 0 Bit	DO	FCC6/8	%Q00439	24VDC	B	23	23	
KI351_68B	Filter 6/8 Backwash Time 2 Bit	DO	FCC6/8	%Q00440	24VDC	B	23	24	
KI351_68C	Filter 6/8 Backwash Time 4 Bit	DO	FCC6/8	%Q00441	24VDC	B	23	25	
KI351_68D	Filter 6/8 Backwash Time 8 Bit	DO	FCC6/8	%Q00442	24VDC	B	23	26	
KI351_6L	Filter 6 Backwash Time Low Strobe	DO	FCC6/8	%Q00443	24VDC	B	23	27	
KI351_6M	Filter 6 Backwash Time Mid Strobe	DO	FCC6/8	%Q00444	24VDC	B	23	28	
KI351_6H	Filter 6 Backwash Time High Strobe	DO	FCC6/8	%Q00445	24VDC	B	23	29	
KI351_8L	Filter 8 Backwash Time Low Strobe	DO	FCC6/8	%Q00446	24VDC	B	23	30	
KI351_8M	Filter 8 Backwash Time Mid Strobe	DO	FCC6/8	%Q00447	24VDC	B	23	31	
KI351_8H	Filter 8 Backwash Time High Strobe	DO	FCC6/8	%Q00448	24VDC	B	23	32	
XC302_6A	Filter 6 Settled Water Valve Open	DO	FCC6/8	%Q00737	Relay	B	24	1	
XC302_6B	Filter 6 Settled Water Valve Close	DO	FCC6/8	%Q00738	Relay	B	24	2	
XC302_8A	Filter 8 Settled Water Valve Open	DO	FCC6/8	%Q00739	Relay	B	24	3	
XC302_8B	Filter 8 Settled Water Valve Close	DO	FCC6/8	%Q00740	Relay	B	24	4	
FIC303_6	Filter 6 Remote SP Select	DO	FCC6/8	%Q00741	Relay	B	24	5	
FIC303_8	Filter 8 Remote SP Select	DO	FCC6/8	%Q00742	Relay	B	24	6	
XC304_6A	Filter 6 Backwash Valve Open	DO	FCC6/8	%Q00743	Relay	B	24	7	
XC304_6B	Filter 6 Backwash Valve Close	DO	FCC6/8	%Q00744	Relay	B	24	8	
XC304_8A	Filter 8 Backwash Valve Open	DO	FCC6/8	%Q00745	Relay	B	24	9	
XC304_8B	Filter 8 Backwash Valve Close	DO	FCC6/8	%Q00746	Relay	B	24	10	
XC305_6A	Filter 6 Washwater Drain Open	DO	FCC6/8	%Q00747	Relay	B	24	11	
XC305_6B	Filter 6 Washwater Drain Close	DO	FCC6/8	%Q00748	Relay	B	24	12	





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TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
XC305_8A	Filter 8 Washwater Drain Open	DO	FCC6/8	%Q00749	Relay	B	24	13
XC305_8B	Filter 8 Washwater Drain Close	DO	FCC6/8	%Q00750	Relay	B	24	14
XC306_11A	Filter 6A Surface Wash Open	DO	FCC6/8	%Q00753	Relay	B	25	1
XC306_11B	Filter 6A Surface Wash Close	DO	FCC6/8	%Q00754	Relay	B	25	2
XC306_12A	Filter 6B Surface Wash Open	DO	FCC6/8	%Q00755	Relay	B	25	3
XC306_12B	Filter 6B Surface Wash Close	DO	FCC6/8	%Q00756	Relay	B	25	4
XC306_15A	Filter 8A Surface Wash Open	DO	FCC6/8	%Q00757	Relay	B	25	5
XC306_15B	Filter 8A Surface Wash Close	DO	FCC6/8	%Q00758	Relay	B	25	6
XC306_16A	Filter 8B Surface Wash Open	DO	FCC6/8	%Q00759	Relay	B	25	7
XC306_16B	Filter 8B Surface Wash Close	DO	FCC6/8	%Q00760	Relay	B	25	8
XC307_11A	Filter 6A Filtered Water Open	DO	FCC6/8	%Q00761	Relay	B	25	9
XC307_11B	Filter 6A Filtered Water Close	DO	FCC6/8	%Q00762	Relay	B	25	10
XC307_12A	Filter 6B Filtered Water Open	DO	FCC6/8	%Q00763	Relay	B	25	11
XC307_12B	Filter 6B Filtered Water Close	DO	FCC6/8	%Q00764	Relay	B	25	12
XC307_15A	Filter 8A Filtered Water Open	DO	FCC6/8	%Q00765	Relay	B	25	13
XC307_15B	Filter 8A Filtered Water Close	DO	FCC6/8	%Q00766	Relay	B	25	14
XC307_16A	Filter 8B Filtered Water Open	DO	FCC6/8	%Q00767	Relay	B	25	15
XC307_16B	Filter 8B Filtered Water Close	DO	FCC6/8	%Q00768	Relay	B	25	16
XA351_6	Filter 6 Backwash Malfunction	DO	FCC6/8	%Q00769	Relay	B	26	1
XIC351_6	Filter 6 Backwash in Progress	DO	FCC6/8	%Q00770	Relay	B	26	2
XA351_8	Filter 8 Backwash Malfunction	DO	FCC6/8	%Q00771	Relay	B	26	3
XIC351_8	Filter 8 Backwash in Progress	DO	FCC6/8	%Q00772	Relay	B	26	4
UC931_J	Plant Shutdown	DO	FCC6/8	%Q00773	Relay	B	26	5
SV361_A	Multipoint Headloss Valve 1	DO	FCC6/8	%Q00777	Relay	B	26	6
SV361_B	Multipoint Headloss Valve 2	DO	FCC6/8	%Q00778	Relay	B	26	7
SV361_C	Multipoint Headloss Valve 3	DO	FCC6/8	%Q00779	Relay	B	26	8
SV361_D	Multipoint Headloss Valve 4	DO	FCC6/8	%Q00780	Relay	B	26	9
SV361_E	Multipoint Headloss Valve 5	DO	FCC6/8	%Q00781	Relay	B	26	10
SV361_F	Multipoint Headloss Valve 6	DO	FCC6/8	%Q00782	Relay	B	26	11
SV361_G	Multipoint Headloss Valve 7	DO	FCC6/8	%Q00783	Relay	B	26	12
SV361_H	Multipoint Headloss Valve 8	DO	FCC6/8	%Q00784	Relay	B	26	13
LI432	1 Mg Finished Water Reservoir Level	AI	RP-A	%AI0117	4-20mA	C	4	1
LI431	5 Mg Finished Water Reservoir Level	AI	RP-A	%AI0118	4-20mA	C	4	2
FI170	West Flow	AI	RP-A	%AI0119	4-20mA	C	4	3
FI180	East Flow	AI	RP-A	%AI0120	4-20mA	C	4	4
ZI451_C	1MG Reservoir Valve V-301 Closed	DI	RP-A	%I00449	24VDC	C	1	1
ZI451_O	1MG Reservoir Valve V-301 Opened	DI	RP-A	%I00450	24VDC	C	1	2
HS451_R	1MG Reservoir Valve V-301 In Remote	DI	RP-A	%I00451	24VDC	C	1	3
ZI452_C	5MG Reservoir Valve V-302 Closed	DI	RP-A	%I00452	24VDC	C	1	4
ZI452_O	5MG Reservoir Valve V-302 Opened	DI	RP-A	%I00453	24VDC	C	1	5
HS452_R	5MG Reservoir Valve V-302 In Remote	DI	RP-A	%I00454	24VDC	C	1	6
ZA432	1MG Reservoir Intrusion	DI	RP-A	%I00455	24VDC	C	1	7
ZI453_C	Reservoir Bypass Valve V-303 Closed	DI	RP-A	%I00456	24VDC	C	1	8



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TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
ZI453_O	Reservoir Bypass Valve V-303 Opened	DI	RP-A	%I00457	24VDC	C	1	9
HS453_R	Reservoir Bypass Valve V-303 In Remote	DI	RP-A	%I00458	24VDC	C	1	10
ZI454_C	Reservoir Drain Valve V-304 Closed	DI	RP-A	%I00459	24VDC	C	1	11
ZI454_O	Reservoir Drain Valve V-304 Opened	DI	RP-A	%I00460	24VDC	C	1	12
HS454_R	Reservoir Drain Valve V-304 In Remote	DI	RP-A	%I00461	24VDC	C	1	13
ZA431	5MG Reservoir Intrusion	DI	RP-A	%I00462	24VDC	C	1	14
ZC451_O	1 MG Reservoir Valve Open Control	DO	RP-A	%Q00785	Relay	C	3	1
ZC451_C	1 MG Reservoir Valve Close Control	DO	RP-A	%Q00786	Relay	C	3	2
ZC452_O	5 MG Reservoir Valve Open Control	DO	RP-A	%Q00787	Relay	C	3	3
ZC452_C	5 MG Reservoir Valve Close Control	DO	RP-A	%Q00788	Relay	C	3	4
ZC453_O	Reservoir Drain Valve Open Control	DO	RP-A	%Q00789	Relay	C	3	5
ZC453_C	Reservoir Drain Valve Close Control	DO	RP-A	%Q00790	Relay	C	3	6
ZC454_O	Reservoir Bypass Valve Open Control	DO	RP-A	%Q00791	Relay	C	3	7
ZC454_C	Reservoir Bypass Valve Close Control	DO	RP-A	%Q00792	Relay	C	3	8
YI154	Variable Position Mixer in Remote	DI	CDCT	%I00481	24VDC	D	1 - 1	1
XI154	Variable Position Mixer Running	DI	CDCT	%I00482	24VDC	D	1 - 1	2
UA154	Variable Position Mixer Fault	DI	CDCT	%I00483	24VDC	D	1 - 1	3
ZI210_O	Chlorine Dioxide Contact Tank 1 Influent Slide Gate Opened	DI	CDCT	%I00484	24VDC	D	1 - 1	4
ZI210_C	Chlorine Dioxide Contact Tank 1 Influent Slide Gate Closed	DI	CDCT	%I00485	24VDC	D	1 - 1	5
YI210	Chlorine Dioxide Contact Tank 1 Influent Slide Gate in Remote	DI	CDCT	%I00486	24VDC	D	1 - 1	6
UA210	Chlorine Dioxide Contact Tank 1 Influent Slide Gate Failure	DI	CDCT	%I00487	24VDC	D	1 - 1	7
ZI230_O	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate Opened	DI	CDCT	%I00488	24VDC	D	1 - 1	8
ZI230_C	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate Closed	DI	CDCT	%I00489	24VDC	D	1 - 1	9
YI230	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate in Remote	DI	CDCT	%I00490	24VDC	D	1 - 1	10
UA230	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate Failure	DI	CDCT	%I00491	24VDC	D	1 - 1	11
ZI220_O	Chlorine Dioxide Contact Tank 2 Influent Slide Gate Opened	DI	CDCT	%I00492	24VDC	D	1 - 1	12
ZI220_C	Chlorine Dioxide Contact Tank 2 Influent Slide Gate Closed	DI	CDCT	%I00493	24VDC	D	1 - 1	13
YI220	Chlorine Dioxide Contact Tank 2 Influent Slide Gate in Remote	DI	CDCT	%I00494	24VDC	D	1 - 1	14
UA220	Chlorine Dioxide Contact Tank 2 Influent Slide Gate Failure	DI	CDCT	%I00495	24VDC	D	1 - 1	15
ZI240_O	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate Opened	DI	CDCT	%I00497	24VDC	D	1 - 1	17
ZI240_C	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate Closed	DI	CDCT	%I00498	24VDC	D	1 - 1	18
YI240	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate in Remote	DI	CDCT	%I00499	24VDC	D	1 - 1	19
UA240	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate Failure	DI	CDCT	%I00500	24VDC	D	1 - 1	20
XIL250	Rapid Mixer Running in Low Speed	DI	CDCT	%I00501	24VDC	D	1 - 1	21
XIH250	Rapid Mixer Running in High Speed	DI	CDCT	%I00502	24VDC	D	1 - 1	22
YI250	Rapid Mixer in Remote	DI	CDCT	%I00503	24VDC	D	1 - 1	23
UA250	Rapid Mixer Fault	DI	CDCT	%I00504	24VDC	D	1 - 1	24
ZC210_O	Chlorine Dioxide Contact Tank 1 Influent Slide Gate Open Control	DO	CDCT	%Q00833	Relay	D	1 - 2	1
ZC210_C	Chlorine Dioxide Contact Tank 1 Influent Slide Gate Close Control	DO	CDCT	%Q00834	Relay	D	1 - 2	2
ZC220_O	Chlorine Dioxide Contact Tank 2 Influent Slide Gate Open Control	DO	CDCT	%Q00835	Relay	D	1 - 2	3
ZC220_C	Chlorine Dioxide Contact Tank 2 Influent Slide Gate Close Control	DO	CDCT	%Q00836	Relay	D	1 - 2	4
ZC230_O	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate Open Control	DO	CDCT	%Q00837	Relay	D	1 - 2	5
ZC230_C	Chlorine Dioxide Contact Tank 1 Effluent Slide Gate Close Control	DO	CDCT	%Q00838	Relay	D	1 - 2	6



# IO LIST

PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
ZC240_O	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate Open Control	DO	CDCT	%Q00839	Relay	D	1 - 2	7
ZC240_C	Chlorine Dioxide Contact Tank 2 Effluent Slide Gate Close Control	DO	CDCT	%Q00840	Relay	D	1 - 2	8
XCL250	Rapid Mixer Call in Low Speed	DO	CDCT	%Q00841	Relay	D	1 - 2	9
XCH250	Rapid Mixer Call in High Speed	DO	CDCT	%Q00842	Relay	D	1 - 2	10
ZC619	Ammonia Solenoid Open	DO	CDCT	%Q00843	Relay	D	1 - 2	11
ZC609	Chlorine 2W Water Solenoid Open	DO	CDCT	%Q00844	Relay	D	1 - 2	12
ZC829	HA Solenoid Open	DO	CDCT	%Q00845	Relay	D	1 - 2	13
ZC819	Liquid Alum Solenoid Open	DO	CDCT	%Q00846	Relay	D	1 - 2	14
ZC879	PAC Solenoid Open	DO	CDCT	%Q00847	Relay	D	1 - 2	15
ZC849	CP Solenoid Open	DO	CDCT	%Q00848	Relay	D	1 - 2	16
FI151	36" Influent Blending Flow	AI	CDCT	%AI00141	4-20mA	D	1 - 3	1
PI152	Influent Status Mixer Plate Pressure	AI	CDCT	%AI00142	4-20mA	D	1 - 3	2
PI155	Effluent Variable Position Mixer Pressure	AI	CDCT	%AI00143	4-20mA	D	1 - 3	3
ZI154	Variable Position Mixer Actual Position	AI	CDCT	%AI00144	4-20mA	D	1 - 3	4
LI205	Chlorine Dioxide Contact Tank 1 Level	AI	CDCT	%AI00145	4-20mA	D	1 - 3	5
ZC154	Variable Position Mixer Position Control	AO	CDCT	%AQ00129	4-20mA	D	1 - 4	1
FAH900	Ammonia Feeder Area Eyewash/Shower Flow	DI	CE	%I00513	24VDC	D	2 - 1	1
		DI	CE	%I00514	24VDC	D	2 - 1	2
		DI	CE	%I00515	24VDC	D	2 - 1	3
		DI	CE	%I00516	24VDC	D	2 - 1	4
FAH904	Ammonia Solution System Flow Switch	DI	CE	%I00517	24VDC	D	2 - 1	5
FAH905	LAS Area Eyewash/Shower Flow	DI	CE	%I00518	24VDC	D	2 - 1	6
PSH910	LAS Influent System 1 High Pressure	DI	CE	%I00519	24VDC	D	2 - 1	7
PSH920	LAS Effluent System 2 High Pressure	DI	CE	%I00520	24VDC	D	2 - 1	8
ZC980	Filtered Water Ammonia Feed Water Solenoid Control	DO	CE	%Q00849	Relay	D	2 - 2	1
ZC990	Chlorine Dioxide Contact Tank Ammonia Feed Water Solenoid Control	DO	CE	%Q00850	Relay	D	2 - 2	2
ZC933	Floc Basins Ammonia Feed Solenoid Control	DO	CE	%Q00851	Relay	D	2 - 2	3
XC910	LAS Pump 1 Call to Run	DO	CE	%Q00852	Relay	D	2 - 2	4
XC920	LAS Pump 2 Call to Run	DO	CE	%Q00853	Relay	D	2 - 2	5
XC930	LAS Pump 3 Call to Run	DO	CE	%Q00854	Relay	D	2 - 2	6
PI913	Filtered Water Ammonia Feed Pressure	AI	CE	%AI00149	4-20mA	D	2 - 3	1
PI914	CDCT & Floc Basin Ammonia Feed Pressure	AI	CE	%AI00150	4-20mA	D	2 - 3	2
		AI	CE	%AI00151	4-20mA	D	2 - 3	3
		AI	CE	%AI00152	4-20mA	D	2 - 3	4
		AI	CE	%AI00153	4-20mA	D	2 - 3	5
FI910	LAS Influent Feed Pump Flow	AI	CE	%AI00154	4-20mA	D	2 - 3	6
FI920	LAS Effluent Feed Pump Flow	AI	CE	%AI00155	4-20mA	D	2 - 3	7
LI900	LAS Storage Tank Level	AI	CE	%AI00156	4-20mA	D	2 - 3	8
PI910	LAS Influent Feed Pump Pressure	AI	CE	%AI00157	4-20mA	D	2 - 4	1
PI920	LAS Effluent Feed Pump Pressure	AI	CE	%AI00158	4-20mA	D	2 - 4	2
	Unknown Analog Input	AI		%AI0137	4-20mA			



# IO LIST

PLC: Main Control Panel (MCP)						LOCATION		
TAG NAME	DESCRIPTION	I/O TYPE	PANEL	I/O ADDRESS	SIGNAL	RACK / BUS	SLOT / BLOCK	POINT
		<b>PLC I/O COUNT - AI: 16</b> <b>DI: 30</b> <b>DO: 22</b> <b>AO: 1</b>						
						<b>NOTES:</b> 1. All I/O points existing. 2. Intalled spare points are not shown.		

**APPENDIX 40 61 00-C****SAMPLE INSTALLATION SEQUENCE**

Sample PCSI installation sequence is provided below. The plan is included for reference only. The general sequence of the implementation may be as follows:

- 1) Install new copper and fiber optic ethernet cables in the existing conduits with the Genius bus cables.
- 2) MCP PLC Replacement – Requires Plant Shutdown
  - a. Operations shall perform a full shutdown of the treatment plant.
  - b. Upload the MCP PLC program using Proficy ME and save a backup file of the current state of the processor.
  - c. Power down the MCP.
  - d. Remove the Genius Bus Controller (GBC) modules from the 90-30 rack and leave in the panel.
  - e. Disconnect the remaining wires and cables from the 90-30 PLC.
  - f. Remove the 90-30 rack.
  - g. Install the new RX3i rack.
  - h. Plug in the GBC modules to slot 2 through 5 of the RX3i rack. Install the PNC001 PROFINET controller in slot 6.
  - i. Connect the power cable and Ethernet cable to the RX3i.
  - j. Power up the MCP and the RX3i PAC.
  - k. Perform a point check for signals from each I/O module to confirm that the signals from the Genius bus are being loaded into the correct addresses in the new program.
  - l. Verify operational setpoints for the treatment processes with the operators.
  - m. Operations shall perform a restart of the treatment plant.
  - n. Verify operation of the new PAC and communications from the I/O modules through to the SCADA HMI
- 3) MCP I/O and CBCP Modifications (Bus A) – Requires temporary Local Manual operation of the RW pumps and chemical metering systems.
  - a. Temporarily install the Ethernet to Genius Bus Gateway at the CBCP.
  - b. Power down the MCP VersaMax I/O and the CBCP.
  - c. Disconnect the Genius bus from the VersaMax I/O in the MCP.

- d. Install the new VersaMax power supplies and PROFINET scanners at the MCP VersaMax racks.
  - e. Install the new Ethernet patch cables from the PROFINET controller to the VersaMax scanners, and between the MCP and the Gateway at the CBCP.
  - f. Download the new PAC configuration and restart the processor.
  - g. Confirm communications between the PAC, the VersaMax I/O at the MCP, and the Genius blocks at the RWPSCP, via the Gateway.
  - h. Perform demolition and installation work at the CBCP.
  - i. Confirm communications between the PAC and the new VersaMax I/O at the CBCP.
- 4) RWPSCP Modifications (Bus A) – Requires temporary Local Manual operation of the RW pumps and chemical metering systems.
- a. Power down the RWPSCP.
  - b. Perform demolition and installation work at the RWPSCP.
  - c. Remove the Ethernet to Genius Bus Gateway from the CBCP and install the fiber optic patch panel and fiber optic transceiver.
  - d. Connect the fiber optic cable to the fiber optic patch panels at both the RWPSCP and the CBCP, and the patch cables to the fiber optic transceivers.
  - e. Confirm Ethernet communications between the transceivers.
  - f. Install final Ethernet patch cables.
  - g. Confirm communications between the PAC and the RWPSCP VersaMax I/O.
- 5) CDTCP and CECP Modifications (Bus D) – Requires temporary Local Manual operation of the plant.
- a. Remove the GBC from slot 5 of the RX3i rack and install a PNC PROFINET controller module.
  - b. Download the new configuration to the PAC and restart the processor.
  - c. Perform the demolition and installation work at the CDCTCP and CECP.
  - d. Plug in the Ethernet cables between the PNC001 and the PROFINET scanners at each panel.
  - e. Confirm communications between the PAC and the VersaMax I/O modules.
- 6) RCP Modifications (Bus C) – Requires temporary Local Manual operation of the plant.
- a. Remove the GBC from slot 4 of the RX3i rack and install a PNC PROFINET controller module.
  - b. Download the new configuration to the PAC and restart the processor.

- c. Perform the demolition and installation work at the RCP.
  - d. Connect the fiber optic cable to the fiber optic patch panels at both the MCP and the RCP, and the patch cables to the fiber optic transceivers.
  - e. Confirm Ethernet communications between the transceivers.
  - f. Install final Ethernet patch cables.
  - g. Confirm communications between the PAC and the RCP VersaMax.
- 7) FCC Modifications (Bus B) – Requires temporary Local Manual operation of the plant. During demolition of FCC 6/8, the master backwash flow control functions in FCC 6/8 shall be maintained to continue backwash service to the in-service filters. Temporarily wiring these controls to another FCC may be required. Consult existing installation for details.
- a. Remove the GBC from slot 3 of the RX3i rack and install a PNC PROFINET controller module.
  - b. Perform the demolition and installation work at each FCC, one at a time, starting with FCC 1/3, then FCC 2/4, then FCC 5/7, then FCC 6/8.
  - c. As FCCs and filters are taken out of service, temporarily install the Ethernet to Genius Gateway in the FCC currently being modified to maintain communications between the PAC and the Genius blocks that are still operating at the remaining FCCs.
- 8) Once panel modifications have been completed, remove all remaining Genius bus cable from the control panels and terminal blocks. Genius bus cable installed in conduit shall be taped at both ends and marked with heat-shrink tubing as "ABANDONED".

**SECTION 40 66 33**

**FIBER OPTIC CABLES AND EQUIPMENT**

**PART 1 - GENERAL**

1.1 SCOPE OF WORK

- A. This section covers includes furnishing, installing, and testing of the fiber optic communication equipment as shown on the Contract Documents.
- B. The work of this Section includes providing and installing a fiber optic communications system including fiber optic cables, patch panels, splices, fiber optic transmitter and receiver, terminations, testing and implementation.

1.2 RELATED WORK

- A. Section 40 61 00 – Common Work Results - Process Instrumentation and Controls
- B. Section 26 05 00 – Common Work Results for Electrical

1.3 SUBMITTALS

- A. All submittals shall be in accordance with the Standard and Special Provisions and Section 26 05 00.
- B. Submit catalog data and characteristics of fiber optic system as specified in these Specifications including fiber, connectors, patch panels, converters, and other equipment.
  - 1. Submit Fiber optic cable descriptive product information and specifications including transmission parameters, jacket properties, and physical attributes (maximum short-term and long-term tensile loads).
  - 2. Submit fiber optic installation and pulling equipment methods proposed.
  - 3. Submit the cable identification approach and scheme. The cable identification shall match the Owner's existing identification scheme and shall be per EIA/TIA 606.
- C. Submit Fiber Allocation Table detailing the allocation and functionality of each strand and for each installed leg of the fiber cable routing.
- D. Submit completed fiber field testing forms and other results of field acceptance tests and installation tests. Submit separate fiber pre-installation tests, installation tests, and final acceptance tests in the order and in the sequence described in PART 3 of these specifications.

1.4 QUALITY ASSURANCE AND QUALITY CONTROL

- A. Products shall be manufactured by firms regularly engaged in manufacturing products described in this Section.
- B. Fiber optic cable splicing and terminating shall be performed by qualified electricians or technicians having at least 40 hours of formal training and a minimum of five years field experience in this type of work. Qualifications shall be submitted to the Engineer upon request.



- C. Field acceptance and installation tests shall be performed by qualified persons having at least 40 hours of formal cable testing training and a minimum of five years of relevant fiber optic testing experience. Qualifications shall be submitted to the Engineer upon request.

## 1.5 REFERENCES

- A. Electronics Industry Association/Telecommunications Industry Association (EIA/TIA):
  - 1. EIA/TIA 568B - Commercial Building Telecommunications Cabling Standard.
  - 2. EIA/TIA 569A - Commercial Building Standard for Telecommunications Pathways and Spaces
  - 3. EIA/TIA 598A - Optical Fiber Color Coding.
  - 4. EIA/TIA TSB-72 - Centralized Optical Fiber Cabling Guidelines.
  - 5. EIA/TIA 455 – Fiber Optic Test Procedures (FOTPs)
- B. Insulated Cable Engineers Association (ICEA)
  - 1. ANSI/ICEA-640 – Standard for Outside Fiber Outside Plant Communications Cable.
- C. National Electrical Contractors Association (NECA)
  - 1. NECA 301 – Standard for Installing and Testing Fiber Optic Cables
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 70 – National Electrical Code (NEC).

## PART 2 - PRODUCTS

### 2.1 FIBER OPTIC CABLE

- A. General Considerations and Cable Construction
  - 1. The cable shall be loose tube design. The loose buffer tube shall be a water-blocking material. The water blocking material shall be non-nutritive to fungus, electrically non-conductive and homogenous. It shall also be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.
  - 2. The cable shall be non-armored and stranded. The fibers shall not adhere to the inside of the buffer tube. The cable shall be gel-free design using water-swallowable yarns and tapes for easier cable termination and splicing. Each fiber shall be distinguishable by means of color coding according per TIA/EIA-598-A, "Fiber-Optic Color Code" Cable jackets shall be marked with manufacturers' name, sequential meter or foot markings, the year of manufacture, and a telecommunication handset symbol, as required by the National Electrical Safety Code (NEC). The actual length of the cable shall be within  $\pm 1$  % of the length markings.
  - 3. Buffer tubes shall be kink resistant within the specified minimum bend radius. The central anti-buckling member shall consist of a dielectric, glass reinforced plastic rod central member.

4. The cable shall be constructed with a protective coating surrounding the glass fiber.
  5. Fiber optic cable installed indoors shall be UL listed and plenum rated for flame resistance. The cable shall contain only glass fiber with no metal element as listed per NEC Article 770 as type OFNP (nonconductive fiber plenum cable). Fiber cable installed in outdoor areas shall contain only glass fiber with no metal element as listed per NEC Article 770 as type OFN (nonconductive fiber general purpose cable). The fiber optic cables shall be factory tested in accordance with the procedures per EIA-445 Fiber Optic Test Procedures (FOTP).
  6. The cable shall contain at least one ripcord under the sheath for easy sheath removal.
  7. The cable shall have an overall aramid yarn strength member added to the buffered fibers to provide mechanical protection.
- B. Fiber Characteristics - Multimode: Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be matched clad design and include a dielectric central member. The cable shall include the following specifications:
1. Fiber Category: OM3. Connector housing shall match fiber category.
  2. Core diameter:  $50.0 \pm 3.0 \mu\text{m}$ .
  3. Cladding diameter:  $125.0 \pm 2.0 \mu\text{m}$ .
  4. Core to Cladding Concentricity:  $\leq 1.5 \mu\text{m}$
  5. Wavelength: suitable for operation at 1300nm.
  6. Minimum Number of Tube Positions: 1
  7. Fibers/Tube: Minimum of 8 except where additional fibers are required per the Contract Documents
  8. Operating Temperature: -40 to 70 degrees C
  9. Maximum Attenuation: 2.3 dB/km for 850nm; 0.6 dB/km for 1300 nm
  10. Minimum OFL Bandwidth:
    - a. OM3: 1500 MHz-km at 850nm and 500 MHz-km at 1310nm
  11. Distance Capacity per IEEE 802.3:
    - a. 1 Gbit/sec Ethernet: 800m at 850nm and 550m at 1310nm
    - b. 10 Gbit/sec Ethernet: 300m at 850nm

12. Type 50/250 OM3 Underground Conduit and Building Riser Installation:

- a. Individual Fibers: 50/125/250 microns.
- b. Nonmetallic, gel-free, dry water blocked, loose-tube fiber core with dielectric strength member enclosed by nonmetallic cross-ply sheath; requires buffer tubing.
- c. Cable: Comply with ICEA S 104 696.
- d. NEC/UL Listing: OFNR
- e. Protective Covering: Black, Flame and UV-resistant, thermoplastic jacket with rip-cord.
- f. Minimum Short Term Pull Strength: 600 lbf.

13. Acceptable Manufactures:

- a. Corning
- b. Belden Cable
- c. Equa

2.2 CONNECTORS

- A. The fiber optic communications system shall utilize LC type connectors for fiber optic connections unless specified otherwise. The connectors shall be designed for use with multimode cables as specified in these specifications.
- B. Single-mode connectors shall have an insertion loss of 0.25dB with ceramic ferrule and plastic housing. Acceptable manufactures shall be Corning, General Cable, Belden, or Equal.
- C. In cases where specified or required equipment is not available with LC type connectors, the contractor shall provide fiber optic jumpers that have LC type connectors on one end and the type of connector necessary to connect to the equipment provided on the other end.

2.3 FIBER PATCH PANELS

- A. Provide patch panels for protection and termination of fiber optic cables.
- B. Suitable for accommodating up to eight configurable port connections.
- C. Connector panels shall be included and shall be provided by the same manufacturer of the patch panel. Connector panels shall be compatible with duplex LC type fiber connectors. Number of fiber connectors as required by cable type.
- D. Patch panels shall be DIN-rail mounted and made of high impact polycarbonate.
- E. Patch panels shall be Panduit model FDME8RG, or equal, with type LC connectors that are compatible with the cable connectors provided.

2.4 FIBER OPTIC TO COPPER CONVERTER

- A. Provide industrial grade media converter for conversion and connection of 10/100 Base to multimode fiber optics as shown on the Drawings. Unit shall be rated for temperatures from -10°C to +70°C and industrial levels of EMI/RFI emission and immunity conforming to FCC Class B rating.
- B. Converter shall be suitable for panel mounting and include RJ-45 (TP) shielded port, full or half duplex, with auto-negotiation and auto MDI/MDI-X cross over functions. Fiber port (FX) shall support multimode ST fiber terminations with 100 Mbps full or half duplex and far end fault indication support. Unit fiber port shall conform to the fiber cable as specified in these Specifications.
- C. Converter shall support IEEE 802.3x flow control with standard IEEE 802.3 Ethernet packet frames.
- D. Provide converter with integral diagnostic LEDs. At a minimum, provide unit power status, TP port status, FX port status, activity, speed, duplex port status and optical link status.
- E. Provide certification that the converter is fully compatible with the signals, protocols and other SFP transceivers required for the application.
- F. Provide 24VDC power supply.
- G. Fiber Optic to copper converter Versitron M7273 series or equal

2.5 DETECTABLE WARNING TAPE

- A. Tape shall be:
  - 1. Orange per APWA uniform color code labelled intended for direct burial.
  - 2. 5.0 mil overall thinness with a 0.35 mil solid aluminum foil core.
  - 3. Construction is 0.8 mil polythene clear film reverse printed with a repeating warning message and laminated to aluminum foil with a 3.75 mil polythene clear film backing.
  - 4. Lettering on all tapes is a minimum of 1" unless otherwise specified.
- B. Tape shall meet:
  - 1. Federal gas safety regulation S-192-321(E).
  - 2. OSHA regulation 1926-956 (C) (I) covering the location of underground utility lines.
- C. Acceptable Manufacturers:
  - 1. Proline
  - 2. Northtown

3. Omega Marking Co
4. Equal

### **PART 3 - EXECUTION**

#### **3.1 FIBER OPTIC CABLE INSTALLATION**

##### **A. General**

1. Install and terminate cables as shown on the Drawings.
2. Install in conformance with NECA 301 – Standard for Installing and Testing Fiber Optic Cables.
3. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii. Where pulling compound is used, use only UL listed compound compatible with the cable outer jacket, voltage rating, and with the raceway involved.
4. Monitor pulling tensions while pulling and record the maximum tensions used. Advise the Engineer of cases exceeding the manufacturer's recommendations and remove and replace cables subjected to tensions in excess of those recommended.
5. Pulling of cable shall be performed in such a manner that the cable outer jacket does not scrape against the edge of the conduit, at both the inlet and outlet ends of the conduit. Cable shall be free of sandy or gritty material during pulling. Cable shall be wiped free of dirt, sand, or grit prior to entry of cable into conduit and prior to application of any pulling compound.

##### **B. Installation**

1. Swab out conduits prior to installing new cables. Inspect raceways and boxes for allowable bending radius prior to installing cable and notify the Engineer of any condition which would prevent the proper installation of the cable.
2. Lubricate cables with lubricants specially formulated for fiber cabling jackets during installation.
3. Pulleys used to install fiber optic cable must be sized according to the minimum bending radius.
4. Terminate all cabling per the cable and termination device manufacturer's instructions.
5. Provide Kellems or similar crimp-on grips for pulling the fiber optic cable. Use correct sized grip for the cable being pulled.
6. When laying loops of fiber on a surface during a pull, use "figure-8" loops to prevent twisting of cable.
7. Install all fibers on this Project without splicing. Should specific installation requirements dictate a potential splice condition, immediately notify the Engineer regarding the specific requirements and need for a splice. Splicing shall not be allowed unless specifically approved by the Engineer.

## 3.2 FIBER OPTIC CABLE SYSTEM FIELD TESTS

### A. General

1. Field tests will be performed on each fiber. All fibers will be tested for breaks, abnormalities, and overall attenuation characteristics to ensure that the dB loss at each splice point and test location is in conformance with the requirements specified in these Specifications. Cables shall be tested per Standard NECA 301 where applicable and per the requirements of this Section.
2. Test jumpers (end-to-end attenuation) or test fiber box (OTDR) are of the same fiber core size and connector type as the cable system.
3. For multi-mode, optical sources shall be stabilized and have center wavelengths within  $\pm 20\text{nm}$  of the 1300nm multimode nominal wavelengths. In accordance with TIA/EIA-526-14-A, multimode LED sources shall have spectral widths from 30-60nm at 850nm and 100-140nm at 1300nm.
4. All system connectors, jumpers, and adapters used during the test procedures shall be properly cleaned prior to and during test measurements.
5. Test technicians shall use the same brand and model of test equipment using the same testing profile. Use of different test equipment and profiles may result in test reports being rejected by the Engineer.
6. Submit each set of test results separately and in sequence for review. Each set of test results shall be submitted and favorably reviewed prior to proceeding on to the next test in the sequence.

### B. Pre-Installation Test

1. Perform OTDR on-the-reel test for each fiber strand in cable with fiber optic components after delivery to the project site. Test results shall be submitted for review by the Engineer prior to cable installation.
2. Preparation: Assign a unique number to each reel. Record this reel number on the manufacturer's product test data shipped with the cable reel, and on each test report that references cable taken from the reel. Installed cable segments shall be traceable to the reel and thus the manufacturer's test data. If the manufacturer's product test data is not shipped with the cable reel, arrange for the cable distributor to provide a copy.
3. Performance Tests:
  - a. Verify that each reel holds one continuous cable.
  - b. Review factory-produced manufacturer's product test data to confirm conformance to the product specifications included in the Contract Documents.
  - c. Furnish a copy of the OTDR test equipment calibration certificate.
  - d. Verify cable length and attenuation is consistent with manufacturer's data sheet and reel identification.

- e. Test each multimode and single-mode fiber optic strand for continuity and loss in the units of dB/km using a recording OTDR.
  - 1) Multimode Fiber: Test each fiber at 850nm and 1300nm in one direction.
- 4. Test Report: Submit test reports for each reel of fiber optic cables. Reports shall include factory and field test results for each fiber.
  - a. Test Summary Report: The test report shall include the following:
    - 1) Assigned reel identification number.
    - 2) Copy of the OTDR calibration certificate.
    - 3) Manufacturer's product test data.
    - 4) Cable identification as it appears on the OTDR printout.
    - 5) Cable identification as it appears according to the Contract Documents.
    - 6) Pass or fail status for each strand.

C. Installation Test

- 1. Perform installation test after cable has been installed and prior to the final acceptance test.
- 2. Cable shall be tested after the cable is pulled through conduits prior to splicing to verify that there has been no damage to cable after installation. The cable shall be tested with an OTDR and signature traces documented indicating the cable type, length and cable number per the Fiber Allocation Table included under Appendix 40 66 33-A, as shown on the Drawings, or as directed by the Engineer.
- 3. An OTDR measurement shall be completed on each splice (if approved by the Engineer) and field installed connector. The measurement test shall be done after each splice and field connection to ensure that a clean, low-loss connection was made. Measurement shall be done in both directions.
- 4. Acceptable losses are as follows:
  - a. Splices:  $\leq 0.2$  dB
  - b. Field installed connectors:  $\leq .75$  dB.
- 5. If the measured splice or connector loss does not meet the specified levels, the splice or connector shall be replaced and retested until the measured loss values are below the acceptable limits as specified.
- 6. Provide a Certificate of Compliance for Connector and Splice Loss. Document each splice and field connector measurement. Indicate cable number and location of splice and field connection.

D. Final Acceptance Test

1. Perform final acceptance test after satisfactory results on the installation test.
2. After installation of fiber cables are complete, perform an end-to-end attenuation test from both directions for each fiber cable link or from patch panel to patch panel as shown on the Drawings. Test using the wavelengths as specified in these Specifications.
3. Use an OLTS power meter and source to test for attenuation losses.
4. Measured attenuation losses (dB) shall be documented for each fiber cable and compared to the link-loss budget.
5. If measured attenuation losses are greater than the maximum link-loss budget values, the fiber cable links in question will be required to have troubleshooting using an OTDR. The OTDR will be utilized to locate fault points in the cable system. Once the fault points are located and repaired the link shall be tested again with an OLTS to verify attenuation losses. This process will be repeated until the attenuation losses are below the maximum link-loss budget for that particular fiber link.
6. Once the dual end-to-end attenuation test is completed the results shall be submitted in a test report for review and approval by the Engineer.
  - a. Provide a brief explanation at the beginning of the report describing testing methods used.
  - b. In the report include the budget link-loss for each link and indicate criteria used for dB loss values. Label each link using the conduit number as provided in the Conduit Schedules as shown on the Drawings.
  - c. Measured test values shall be provided in one section with the budgeted link-loss values.

**END OF SECTION**



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**APPENDIX 40 66 33-A**  
**FIBER OPTIC ALLOCATION TABLE**

**FIBER OPTIC  
ALLOCATION TABLE**

CABLE (Note 3)	SUFFIX	STRAND	SOURCE	TX / RX	FUNCTION	DESTINATION	TX / RX	COMMENTS
FO-RWPSCP-MCP-MM	A	1	RWPSCP FO Patch Panel	TX	RIO NETWORK "A"	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	2	RWPSCP FO Patch Panel	RX	RIO NETWORK "A"	MCP FO Patch Panel	TX	
FO-RWPSCP-MCP-MM	A	3	RWPSCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	4	RWPSCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RWPSCP-MCP-MM	A	5	RWPSCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	6	RWPSCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RWPSCP-MCP-MM	A	7	RWPSCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	8	RWPSCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RWPSCP-MCP-MM	A	9	RWPSCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	10	RWPSCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RWPSCP-MCP-MM	A	11	RWPSCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RWPSCP-MCP-MM	A	12	RWPSCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
<b>FO-RCP-MCP-MM</b>								
FO-RCP-MCP-MM	A	1	RCP FO Patch Panel	TX	RIO NETWORK "C"	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	2	RCP FO Patch Panel	RX	RIO NETWORK "C"	MCP FO Patch Panel	TX	
FO-RCP-MCP-MM	A	3	RCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	4	RCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RCP-MCP-MM	A	5	RCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	6	RCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RCP-MCP-MM	A	7	RCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	8	RCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RCP-MCP-MM	A	9	RCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	10	RCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
FO-RCP-MCP-MM	A	11	RCP FO Patch Panel	TX	SPARE	MCP FO Patch Panel	RX	
FO-RCP-MCP-MM	A	12	RCP FO Patch Panel	RX	SPARE	MCP FO Patch Panel	TX	
<b>NOTES TO FIBER ALLOCATION TABLE:</b>								
<b>1. Provide suitable patch cords and attenuators as required for terminating each fiber at the required patch panel termination points.</b>								
<b>2. Fiber callouts shown refer to fiber allocations in main fiber trunk lines installed in conduit/duct banks and terminated in the indicated communication panels.</b>								
<b>3. Fiber optic cable tags follow the format FO-XXX-YYY-ZZ, where: FO = Fiber Optic, XXX = Source Area Code, YYY = Destination Area Code, and ZZ = Multimode (MM) or Singlemode (SM).</b>								

**SECTION 40 67 00**

**CONTROL PANELS AND HARDWARE**

**PART 1 - GENERAL**

1.1 SCOPE OF WORK

- A. Furnish and install process control panels as shown on the Drawings and specified herein.
- B. The Contract Documents are a single integrated document, and as such all Divisions and Sections apply. It is the responsibility of the CONTRACTOR and Subcontractors to review all sections to insure a complete and coordinated project.
- C. Related Work
  - 1. Section 40 61 00 – Common Work Results - Process Instrumentation and Controls
- D. The following panels and consoles shall be modified by the PCSI as shown on the Drawings.

Panel Designation	Overview of Modifications
Main Control Panel (MCP) – PLC Section only	<ul style="list-style-type: none"> <li>• Replace Genius modules with Profinet remote I/O components as shown on the drawings</li> <li>• Replace Genius cables with Ethernet cables/fiber</li> <li>• Install fiber optic termination/patch panel</li> </ul>
Control Building Control Panel (CBCP)	<ul style="list-style-type: none"> <li>• Replace Genius I/O with Versamax I/O as shown on the drawings</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> </ul>
Chlorine Dioxide Tank Control Panel (CDTCP)	<ul style="list-style-type: none"> <li>• Replace Genius I/O adapter and power supply with Profinet adapter and power supply</li> </ul>
Chemical Equipment Control Panel (CECP)	<ul style="list-style-type: none"> <li>• Replace Genius I/O adapter and power supply with Profinet adapter and power supply</li> </ul>
Reservoir Control Panel (RCP)	<ul style="list-style-type: none"> <li>• Replace Genius I/O with Versamax I/O as shown on the drawings</li> <li>• Install fiber optic termination/patch panel and ethernet transceiver</li> <li>• Add 24VDC linear power supply with redundant switching power supplies</li> </ul>

Panel Designation	Overview of Modifications
Filter Control Console 1/3 (FCC1/3)	<ul style="list-style-type: none"> <li>• Replace existing mounting panels with new Versamax mounting panels as shown on the Drawings</li> <li>• Wire new I/O modules to existing terminal blocks and internal signal and relay circuits as shown on the Drawings</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> <li>• Remove existing MicroDCI filter flow controllers and replace with manual loading stations</li> <li>• Remove existing dual bar graph displays showing backwash flow and surface wash flow rates and replace with two digital displays</li> </ul>
Filter Control Console 2/4 (FCC2/4)	<ul style="list-style-type: none"> <li>• Replace existing mounting panels with new Versamax mounting panels as shown on the Drawings</li> <li>• Wire new I/O modules to existing terminal blocks and internal signal and relay circuits as shown on the Drawings</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> <li>• Remove existing MicroDCI filter flow controllers and replace with manual loading stations</li> <li>• Remove existing dual bar graph displays showing backwash flow and surface wash flow rates and replace with two digital displays</li> </ul>
Filter Control Console 5/7 (FCC5/7)	<ul style="list-style-type: none"> <li>• Replace existing mounting panels with new Versamax mounting panels as shown on the Drawings</li> <li>• Wire new I/O modules to existing terminal blocks and internal signal and relay circuits as shown on the Drawings</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> <li>• Remove existing MicroDCI filter flow controllers and replace with manual loading stations</li> <li>• Remove existing dual bar graph displays showing backwash flow and surface wash flow rates and replace with two digital displays</li> </ul>

Panel Designation	Overview of Modifications
Filter Control Console 6/8 (FCC6/8)	<ul style="list-style-type: none"> <li>• Replace existing mounting panels with new Versamax mounting panels as shown on the Drawings</li> <li>• Wire new I/O modules to existing terminal blocks and internal signal and relay circuits as shown on the Drawings</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> <li>• Remove existing MicroDCI filter flow controllers and replace with manual loading stations</li> <li>• Remove existing MicroDCI master backwash flow controller and replace with manual loading station</li> <li>• Remove existing MicroDCI master settled water pipe level controller and replace with manual loading station</li> <li>• Remove existing dual bar graph displays showing backwash flow and surface wash flow rates and replace with two digital displays</li> </ul>
Raw Water Pump Station Control Panel (RWPSCP)	<ul style="list-style-type: none"> <li>• Replace Genius I/O with Versamax I/O as shown on the drawings</li> <li>• Install fiber optic termination/patch panel and ethernet transceiver</li> <li>• Replace existing 24VDC linear power supply with redundant switching power supplies</li> </ul>

1.2 SUBMITTALS

- A. Submittals shall be made in accordance with Section 40 61 00.

1.3 QUALITY ASSURANCE

- A. Refer to Section 40 61 00.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Control panels shall be shipped directly to the site from the factory. Before the control panels are shipped, remove all case-mounted instruments from the face of the panels, and repack in their original shipping cartons for shipment to the site with the control panel
- B. Throughout this Contract, the Contractor shall provide protection for materials and equipment against loss or damage and from the effects of weather. Prior to installation, store items in indoors in a dry location and follow all manufacturers' storage instructions. Provide heating in storage areas for items subject to corrosion under damp conditions. Provide covers for panels and other elements that may be exposed to dusty construction environments. Specific storage requirements shall be in accordance with the manufacturer's recommendations of the equipment being provided.

## 1.5 SPARES

### A. General:

1. In addition to the items noted below and in the other specification sections, the Contractor shall provide suitable spare parts and expendable items in sufficient quantities to sustain the SCADA system for a period of 1 year after final acceptance. All spare parts shall be delivered to the site before testing begins.
2. The following tabulation of spare parts and maintenance equipment is presented as a minimum of suitable types and quantities to be provided.
  - a. Provide the following spares:
    - 1) Fuses: 20 percent spares of each size and type used, but no less than 10 of each size and type.
    - 2) 24v Loop Dc Power Supplies: 20 percent spares of each size and type used, but no less than three of each size and type.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. The dimensions on the Drawings are for general reference only. The PCSI shall be responsible for ensuring final sizing and panel arrangements to accommodate all required equipment for a fully integrated and operational system as specified herein.
- B. Control panels shall conform to the requirements of the NEC Article 409.
- C. Where two or more units of the same class of materials or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.
- D. Standard products: Unless otherwise indicated, provide material and equipment that is the standard product of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to the specifications.
- E. The instruments designated for rear-of-panel mounting shall be arranged within the panel according to respective panel drawings and in a manner to allow for ease of maintenance and adjustment.
- F. All panel components shall be mounted in a manner that shall permit servicing, adjustment, testing and removal without disconnecting, moving or removing any other component. Components mounted on the inside of panels shall be mounted on removable plates and not directly to the enclosure. Mounting shall be rigid and stable unless shock mounting is required otherwise by the manufacturer to protect equipment from vibration. Components mounting shall be oriented in accordance the functional requirements of the panel. Individual components shall be identified with suitable plastic or metal engraved tags mounted adjacent to (not on) each component; tags shall identify each component in accordance with the drawing, specifications, and PCSI's data.

G. All exterior panel mounted equipment shall be installed with suitable gaskets, faceplates, etc. required to maintain the NEMA rating of the panel.

H. Nameplates

1. All panels and panel devices shall be supplied with suitable nameplates which identify the panel and individual devices as required. Each device nameplate shall include up to three lines with the first line containing the device tag number as shown on the drawings, the second line containing a functional description (e.g., Recirculation Pump No. 1), and the third line containing a functional control description (e.g., Start).
2. Unless escutcheon plates are specified or unless otherwise noted on the Drawings, nameplates shall be 3/32 inch thick, black and white, Lamicaid with engraved inscriptions. The letters shall be Black against a White background unless otherwise noted. Edges of the nameplates shall be beveled and smooth. Nameplates with chipped or rough edges will not be acceptable. Nameplates shall be affixed to the panels using 4-40 thread stainless steel button head hex screws or epoxy adhesive to maintain the integrity of the NEMA panel rating.
3. Provide legend plates or 1-in by 3-in engraved nameplates with 1/4-in lettering for identification of door mounted control devices, pilot lights and meters.

I. Mounting Elevations

1. ISA Recommended Practice RP60.3 shall be used as a guide in layout and arrangement of panels and panel mounted components. Dimensions shall account for all housekeeping pads that panels will sit on once they are installed.
2. Centerline of indicators and controllers shall be located no lower than 48 inches or higher than 66 inches above the floor on a panel face.
3. Centerline of lights, selector switches and pushbuttons shall be located no lower than 32 inches or higher than 70 inches above the floor on a panel face.
4. Tops of annunciators or monitoring lights shall be located no higher than 86 inches above the floor on a panel face.
5. Installation of panel components shall conform to component manufacturers' guidelines.

2.2 TYPICAL EQUIPMENT

A. Structure and Enclosure

1. The panels, including component parts, shall be constructed and assembled in a thoroughly workmanlike manner and shall be free from sharp edges and welding flaws. Wiring shall be free from kinks and sharp bends and shall be routed for easy access to other components for maintenance and inspection purposes.

2.3 CORROSION CONTROL

- A. Panels shall be protected from internal corrosion by the use of corrosion-inhibiting vapor capsules as manufactured by Northern Technologies International Corporation, Model Zerust VC; Hoffman Model A-HCI; or approved equal.



## 2.4 CONTROL PANEL – INTERNAL CONSTRUCTION

### A. Internal Electrical Wiring

1. All interconnecting wiring shall be stranded, type MTW, and shall have 600 volt insulation and be rated for not less than 90 degrees Celsius. Wiring for systems operating at voltages in excess of 120 VAC shall be segregated from other panel wiring either in a separate section of a multi-section panel or behind a removable Plexiglas or similar dielectric barrier. Panel layout shall be developed such that technicians shall have complete access to 120 VAC and lower voltage wiring systems without direct exposure to higher voltages.
2. Power distribution wiring on the line side of fuses or breakers shall be 12 AWG minimum. Control wiring on the secondary side of fuses shall be 14 AWG minimum. Electronic analog circuits shall utilize 26 AWG shielded, twisted pair, cable insulated for not less than 600 volts.
3. Power and low voltage DC wiring systems shall be routed in separate wireways. Crossing of different system wires shall be at right angles. Different system wires routed parallel to each other shall be separated by at least 6-inches. Different wiring systems shall terminate on separate terminal blocks. Wiring troughs shall not be filled to more than 60 percent visible fill.

### B. Terminations

1. All wiring shall terminate onto single tier terminal blocks, where each terminal is uniquely and sequentially numbered. Direct wiring between field equipment and panel components, or between panel components, is not acceptable. A maximum of two wires shall be installed in a single terminal point on both the internal and field wiring side of the terminal blocks.
2. Multi-level terminal blocks or strips are not acceptable.
3. Terminal blocks shall be arranged in rows and separated into groups (power, AC control, DC signal). Each group of terminal blocks shall have a minimum of 25 percent spares. Provide unique color coded terminal blocks for different voltages, functions, and signal types.
4. Terminal blocks shall be the compression type, fused, unfused, or switched as shown on the Drawings or specified elsewhere in Division 40.
5. Discrete inputs and outputs (DI and DO) shall have two terminals per point with adjacent terminal assignments. All active and spare points shall be wired to terminal blocks.
6. Analog inputs (AI) shall have five terminals per shielded pair connection with adjacent terminal assignments for each point. Terminals shall include a fused terminal block for powering loop powered devices, two terminals for connection of the analog input signal, and one terminal for DC common to be used for loop powered devices. The fifth terminal is for shielded ground connection for cable pairs. Note that additional terminals may be required for completion of a current loop of analog devices. Ground the shielded signal cable at the PAC cabinet. Provide additional fusing where required as specified under Division 40. Provide additional terminals to accommodate loops powering multiple devices such as isolators or indicators. All active and spare points shall be wired similarly with

circuit wiring completed to the field terminal blocks including all protective devices, circuit tagging, and bundling specified.

7. Analog outputs (AO) shall have three terminals per shielded pair connection with adjacent terminal assignments for each point. The third terminal is for shielded ground connection for cable pairs. Note that additional terminals may be required for completion of a current loop of analog devices. Ground the shielded signal cable at the PAC cabinet. Provide additional fusing where required as specified under Division 40. Provide additional terminals to accommodate loops powering multiple devices such as isolators or indicators. All active and spare points shall be wired similarly with circuit wiring completed to the field terminal blocks including all protective devices, circuit tagging, and bundling specified.
8. Wire and tube markers shall be the sleeve type with heat impressed letters and numbers.
9. Only one side of a terminal block row shall be used for internal wiring. The field wiring side of the terminal shall not be within 6-inches of the side panel or adjacent terminal or within 8-inches of the bottom of free standing panels, or within 3-inches of stanchion mounted panels, or 3-inches of adjacent wireway.
10. Terminal blocks shall be tubular clamp type rated 600 VAC/VDC minimum and as specified on drawings. If fuse terminal blocks are specified, they shall be with built-in puller and with fuse size as required. Provide 20% spare terminals for every terminal strip, space permitting. Terminals shall be clearly and permanently labeled with embossed numbers as shown on drawings. Provide raised and angled terminals for incoming field device circuits.
11. Terminal block jumpers: Where indicated on the drawings, terminal block jumpers shall be pre-made specifically designed for the application. Jumpers designed to screw in on top of terminal blocks are preferred.
12. Provide all necessary accessories, partition plates, separating plates, end cover, group markers, etc., as required for proper installation of the terminal blocks.
13. Control Wiring Terminal Blocks
  - a. Standard control terminal blocks shall be designed to accept No. 22 to No. 12 AWG wires. Terminal blocks shall be color coded for functionality as specified. Provide terminal blocks rated for 30 amperes, 600 VAC/VDC unless otherwise noted. Provide terminal blocks by the same manufacturer for all applications.
  - b. Provide Single Circuit Terminal Block unless otherwise specified. Provide Allen-Bradley 1492-J4; Phoenix Contact UT 4; or equal
  - c. Knife-Style Isolating Terminal Block: For analog 4-20mA or 1-5VDC applications. Provide fused terminal block/fuse insert plug with blown fuse LED indication. Provide Allen-Bradley 1492-JKD4; Phoenix Contact UDK 4-TG; or equal
  - d. Fused Terminal Block: Fused terminal blocks shall be designed to accept No. 22 to No. 12 AWG copper wires. Provide blown fuse LED indication, rated for 12A, 57VAC/VDC. Provide Allen-Bradley 1492-H5; Phoenix Contact UT4 HESILED; or equal

- e. Grounding Terminal Block: Provide Allen-Bradley 1492-JG3; Phoenix Contact UT 2,5-PE; or equal
  - f. Provide plug in jumper modules by the same manufacturer as the terminal blocks. Provide side or center jumpers with number of poles as required for the application. Provide Allen-Bradley; Phoenix Contact; or equal
  - g. Provide end anchor and end barriers/covers by the same manufacturer as the terminal blocks. Provide Allen Bradley; Phoenix Contact; or equal.
  - h. Provide terminal block marking systems using snap-in marker cards or premarked blocks. Marking system shall be the standard system from the manufacturer of the terminal blocks. Provide marking system, by Allen-Bradley; phoenix Contact; or equal.
14. Heavy Duty Terminal Block shall be designed to accept wires up to No. 10 AWG. Terminal blocks shall be gray colored and rated for 30 amperes, 600 VAC/VDC. Acceptable products: Allen Bradley 1492 W6, Phoenix Contact Universal "UK" Terminal Blocks, or approved equal.
- C. All wiring to circuits where foreign voltages are present (that is live circuits independent of the panel's normal circuit breaker protection) shall be clearly identified using yellow wiring insulation. The existence of foreign circuits shall also be indicated with yellow Phenolic nameplates with on the panel exterior with red engraved lettering reading "CAUTION FOREIGN VOLTAGES PRESENT".
- D. All wiring shall be clearly tagged on both ends of the wire and color coded. All tag numbers and color coding shall correspond to the panel wiring diagrams and electrical schematic drawings prepared by the PCSI. All power wiring, control wiring, grounding and DC wiring shall utilize different color insulation for each wiring system used. The color coding scheme shall be:
- 1. Incoming 120 VAC Hot – Black
  - 2. 120 VAC Hot wiring downstream of panel circuit breaker – Red
  - 3. 120 VAC Hot wiring derived from a UPS system – Red with Black stripe
  - 4. 240, 208 or 480 VAC wiring – as specified in Division 26
  - 5. 120 VAC neutral – White
  - 6. Ground – Green
  - 7. DC power or control wiring – Blue
  - 8. DC analog signal wiring – Black (-), White or Red (+)
  - 9. Foreign voltage – Yellow
- E. Power supplies and backup power:
- 1. Provide circuits for all internal panel power distribution including 120VAC utility power, 120VAC UPS power, and 24VDC instrument power, as shown on the drawings and specified herein. The PCSI shall be responsible for developing and

providing power supply circuitry that conforms to the Project specific requirements per the Contract Documents.

2. PCSI shall be responsible for the final power supply design approach, equipment selection, equipment ratings, wiring, protective devices, and all other elements of the control panel power supplies as specified and shown on the Drawings.
- F. All internal components in the control panels shall be fed from 24 VDC power supplies as required to power field instruments, panel devices, PAC's, switches, etc. 24 VDC power supplies shall be as specified. Internal panel components and control circuits shall have a separate power distribution circuits with a circuit breaker or fuse and blown fuse indication.
  - G. Wiring trough for supporting internal wiring shall be plastic type with snap on covers. The side walls shall be open top type to permit wire changing without disconnecting. Trough shall be supported to the subpanel by stainless steel screws. Trough shall not be bonded to the panel with glue or adhesives. Provide one-inch minimum wire bending radius to prevent wires from being kinked or stressed at the wiring duct junctions. Wiring duct sizes shall not exceed 50%.
  - H. Each panel shall be provided with an isolated copper grounding bus for all signal and shield ground connections. Shield grounding shall be in accordance with the instrumentation manufacturer's recommendations.
  - I. Each panel shall be provided with a separate copper power grounding bus (safety) in accordance with the requirements of the National Electrical Code.
  - J. Relays not provided under Division 26 and required for properly completing the control function specified in Division 40, Division 26, or shown on the Drawings shall be provided under this Section.

## 2.5 COMPONENTS

- A. Supplementary circuit breakers may be used for isolation and protection of control cable, coils, contacts and circuit elements within the control panel and tapped from the load side of branch circuit protective devices. Use of this type of breaker is in addition to the branch circuit overcurrent breaker.
- B. Control panels that contain only low voltage control circuits shall include a din rail mounted UL-489 Listed main circuit breaker for branch circuit overcurrent protection and disconnecting means of source power to the control panel.
- C. All components shall be provided with finger safe terminals. Where finger safe terminals are not available for a specific component, the panel shall include insulated barriers to prevent accidental contact with energized components.
- D. All operating control devices and instruments shall be securely mounted on the exterior door for panels installed in interior location, inner dead-front doors for panels installed in outdoor locations, or as shown on the Drawings. All controls shall be clearly labeled to indicate function and shall be in accordance with the electrical area classification indicated on the Electrical Drawings.
- E. Interposing Relays
  1. Interposing relays shall be provided where external signal voltages or contact ratings are not suitable for direct interface to control panel components, or as

shown on the Drawings. Interposing relays shall be DIN rail mounted, single pole type, with 6A, 120VAC rated contacts, and coils rated as required for the application. Interposing relays shall be Finder 38 Series, or approved equal.

#### F. Control Panel Circuit Breakers

1. Panel mounted main or branch circuit overcurrent protection breaker – Breaker shall be 120VAC, thermal magnetic type and be manufactured and tested per UL 489 standards. Short circuit rating shall be a minimum of 10kAIC. Breaker shall be suitable for panel mounting and include a through the door handle mechanism. Breaker shall be manufactured by Eaton, Square D, GE (ABB) or Equal.
2. DIN rail mounted main or branch circuit overcurrent protection breaker - Breaker shall be industrial, thermal magnetic type, 120VAC rated and be manufactured and tested per UL 489 standards. Short circuit rating shall be a minimum of 10kAIC. Breaker shall be manufactured by Eaton, Allen Bradley, Weidmuller or Equal,
3. Supplementary breakers – Supplementary breakers shall be DIN rail mounted high density, energy limiting type rated for the circuit voltage in which it is installed. Breaker shall be used per the exceptions of the NEC and as tested per UL 1077. Breakers shall be manufactured by Eaton, Allen Bradley, GE (ABB) or approved equal.

#### G. Instrument and Panel Power Supply (120VAC to 24VDC):

1. Single-phase DIN-rail mounted, switched-mode power supply with 120VAC input, 24VDC nominal output. Output shall be adjustable and regulated over the range 22.5 to 28.5 VDC. Power supplies shall be sized for their connected load plus 50% spare capacity unused for powering all the panel components provided under this Contract.
2. The power supply shall have an efficiency greater than 87% with maximum peak-to-peak voltage ripple of less than 100mV.
3. Where shown on the drawings, provide DC power supplies in a fully redundant configuration with a diode bridge redundancy module. The redundancy module shall be of the same manufacturer and series as the power supplies provided, and sized for the full capacity of each power supply. The redundancy module shall include a DC "OK" LED and an alarm contact output.
4. Power supply shall have the following status signals:
  - a. DC "OK" LED which remains lit during normal power supply operation, flashes when the output voltage has dropped by more than 10%, and is off when no input voltage is present.
  - b. An isolated DC "OK" relay contact rated 1A at 30V.
5. Acceptable products: Phoenix Contact, Sola Series, Allen Bradley, Weidmuller, or approved equal.

#### H. Manual Loading Station

1. The manual loading station shall be an electronic manual controller with input and output indicators, and an Auto/Manual switching selection.

2. The manual loading station shall have a 4-20mA input and a 4-20mA output. In Auto mode, the output shall follow the input signal. In Manual mode, the output shall be manually adjustable from the keypad.
  3. Physical specifications:
    - a. 24VDC Power Supply
  4. Acceptable products: M-Systems model ABF3, Moore Industries model 532, or approved equal.
- I. Digital Display
1. The process meter digital display shall be electronic with one input and a numerical display – LCD or LED.
  2. The digital display shall support one 4-20mA input and display in process value engineering units.
  3. Support four or more daisy-chained together on the same 4-20 mA signal.
  4. Physical specifications:
    - a. 24VDC Power Supply
  5. Acceptable products: Red Lion CUB5P, Simpson M245, or approved equal.
- J. Ground Bar
1. Ground bars shall be UL listed and have suitable number and size of terminals necessary for terminating stranded copper ground wires.
  2. Acceptable products: Square D Ground Bar Kits, or approved equal.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install equipment specified above as shown on the drawings. Follow all manufacturers' instructions when installing panel devices and accessories.
- B. Mount circuit breakers below 79-inches.
- C. Mount common switching power supplies on horizontal or vertical DIN rail per the equipment manufacturer's recommendation so that no de-rating is required.
- D. Mount terminal blocks on vertical wireways on the bottom of the panel, unless otherwise noted by the equipment manufacturer. Field and internal terminations shall be on opposite sides of the terminal block. Arrange terminals for segregation of field and internal wires, and segregation of 120VAC wires and signal wires.
- E. Mount PAC I/O modules near the terminal block area. Arrange the modules with 120VAC I/O and signal I/O on opposite sides.

F. Unless noted otherwise by the manufacturer's layout recommendations, layout the backpanel in the following arrangement, from top to bottom, with wireway in between each:

1. Network and communications equipment.
2. 24VDC power supply and DC distribution.
3. 120VAC power supply and AC distribution.
4. Relays and timers.
5. PAC racks.
6. I/O racks.
7. Terminal blocks.

### 3.2 FIELD QUALITY CONTROL

A. All control panel and documentation testing shall be in accordance with Sections 40 61 00.

**END OF SECTION**