

SPECIFICATION and CONTRACT DOCUMENTS
FOR
EAST FIFTH STREET SEWER MAIN
PROJECT



MORGAN HILL, CALIFORNIA
PUBLIC WORKS DEPARTMENT

PREPARED BY
PUBLIC WORKS DEPARTMENT

APRIL 2021

PROJECT LOCATION MAP

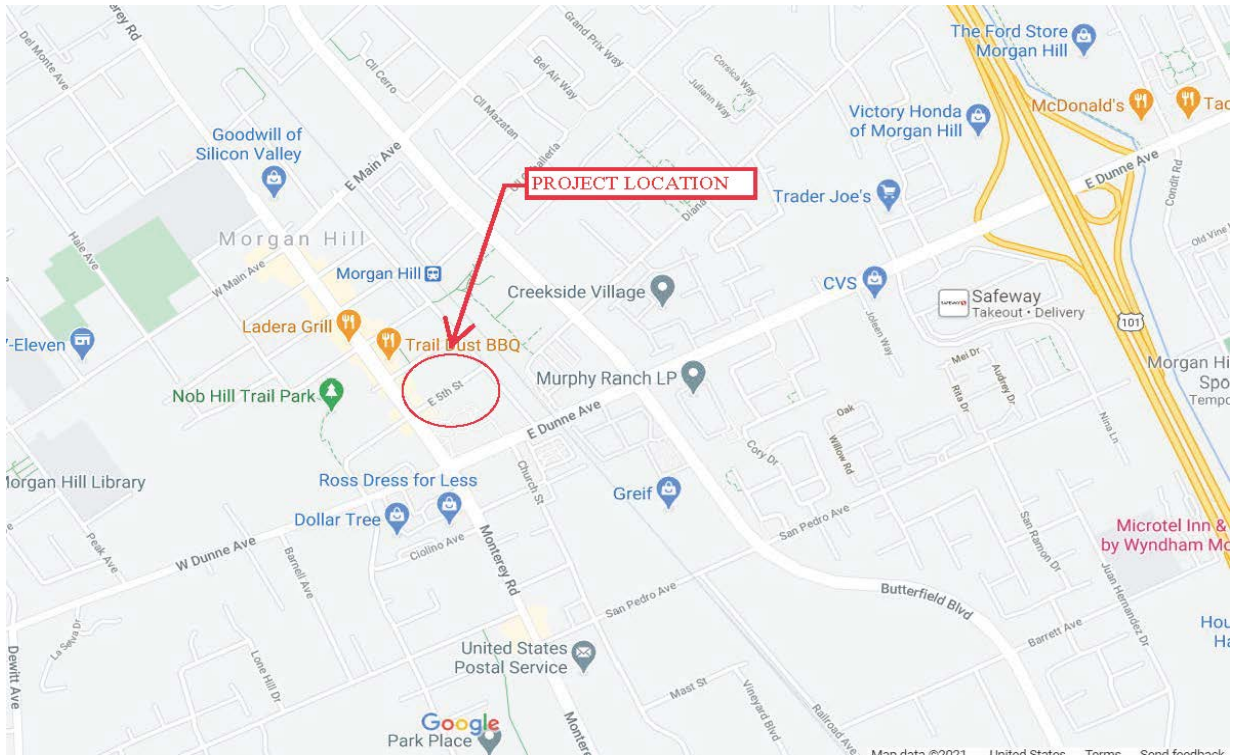


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NOTICE INVITING BIDS

- 1. Bid Submission.** The City of Morgan Hill ("City"), will accept sealed bids for its East Fifth Street Sewer Main Project ("Project"), by or before June 7, 2021 at 11:00 a.m., at its DEVELOPMENT SERVICES CENTER, located at 17575 PEAK AVENUE MORGAN HILL, California, at which time the bids will be publicly opened and read aloud.

Bids may be mailed or dropped off any time before 11:00 a.m. by the above date. The bid opening will be held on Zoom, see information below:

You are invited to a Zoom meeting.

When: Jun 7, 2021 11:00 AM Pacific Time (US and Canada)

Register in advance for this meeting:

https://us02web.zoom.us/meeting/register/tZAkdeipqzosEtbF7VtY3uxm8N_ydysRwnG

After registering, you will receive a confirmation email containing information about joining the meeting.

2. Project Information.

2.1 Location and Description. The Project is located along 5th Street in downtown Morgan Hill, CA 95037, and is described as follows:

- Furnish all labor, materials, equipment, fuel, tools, and transportation required to complete all the work as shown on the Plans & Specifications, including but not limited to:
- Install new 12" PVC and 16 inch Fusible PVC sanitary sewer pipe, including sewer lateral connections/stubs, excavation, backfill, compaction, shoring & trench restoration.
 - Perform auger bore under Union Pacific Railroad tracks, including steel casing, spacers and pipe, and backfill and compaction of bore pits.
 - Install new sanitary sewer manholes and/or modify existing sanitary sewer manholes.
 - Maintain sanitary sewer flows at all times for the project via temporary sewer bypass pumping system(s) & backup system as required.
 - Provide 2 inch asphalt overlay, including wedge grind and
 - Complete all other incidental work related to the above items.

2.2 Time for Final Completion. The Project must be fully completed within 120 calendar days from the start date set forth in the Notice to

Proceed. City anticipates that the Work will begin on or about July 2021, 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): A-General Engineering.

3.2 DIR Registration. City will not accept a Bid Proposal from or enter into the Contract with a bidder, without proof that the bidder and its Subcontractors are registered with the California Department of Industrial Relations ("DIR") to perform public work pursuant to Labor Code Section 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 obtained from the City of Morgan Hill, at 17575 Peak Avenue, Morgan Hill, CA, (408) 778-6480. Electronic copies of the Contract Documents are available on CD for ten dollars (\$10.00). If mailing by USPS, a five dollar (\$5.00) charge will be added. To download plans and specifications at no charge, register at www.publicpurchase.com.

5. Bid Proposal and Security.

5.1 Bid Proposal Form. Each Bid must be submitted using the Bid Proposal form provided with the Contract Documents.

5.2 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 of Morgan Hill, 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 (10) days after City issues the Notice of Award, the successful bidder will execute the Contract and submit payment and performance bonds and insurance certificates and endorsements as required by the Contract Documents and the Notice of Award.

6. Prevailing Wage Requirements.

6.1 General. Pursuant to California Labor Code Section 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. These prevailing rates 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 California Department of Industrial Relations, pursuant to Labor Code Section 1771.4.

- 7. Performance and Payment Bonds.** The successful bidder will be required to provide performance and payment bonds each for one hundred percent of the Contract Price as further described 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 Section 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 and DIR registration number and percentage of the Work to be performed (based on the base bid price) for each Subcontractor who will perform Work or service or fabricate or install Work for the prime contractor in excess of one-half (1/2) of one percent (1%) of the bid price, using the Subcontractor List form included with the Contract Documents. For street or highway construction, this requirement applies to any subcontract of \$10,000 or more.
- 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.
- 11. Estimated Cost.** The estimated construction cost is \$1.7 million.

By: Michelle Bigelow

Date: May 7, 2021

Publication Dates: 1) May 14, 2021

2) May 21, 2021

END OF NOTICE INVITING BIDS

INSTRUCTIONS TO BIDDERS

Each Bid Proposal submitted to the City of Morgan Hill ("City") for its 5th Street Sewer Main Project ("Project") must be submitted in accordance with the following instructions and requirements:

1. Bid Submission.

1.1 General. Each Bid Proposal must be signed, sealed and submitted to City, using the form provided in the Contract Documents, by or before the date and time set forth in Section 1 of the Notice Inviting Bids, or as amended by subsequent addendum. Faxed or emailed Bid Proposals will not be accepted, unless otherwise specified. Late submissions will be returned unopened. City reserves the right to postpone the date or time for receiving or opening bids. Each bidder is solely responsible for all of its costs to prepare and submit its bid and by submitting a bid waives any right to recover those costs from City. The bid price(s) must include all costs to perform the Work as specified, including all labor, materials, supplies, and equipment and all other direct or indirect costs such as applicable federal, state and local taxes, insurance and overhead.

1.2 Bid Envelope. The envelope containing the sealed Bid Proposal and all required forms and attachments must be clearly labeled and addressed as follows:

BID PROPOSAL
Morgan Hill Development Services Center
East Fifth Street Sewer Main Project
City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037
Attention: Bid Opening
Bid Date: _____
Bid Time: _____

The envelope must also be clearly labeled, as follows, with the bidder's name, address, and its registration number with the California Department of Industrial Relations ("DIR") for bidding on public works contracts (Labor Code sections 1725.5 and 1771.1):

[Contractor company name]
[Street address]
[City, state, zip code]
DIR Registration No. _____

1.3 DIR Registration. Subject to limited legal exceptions for joint venture bids and federally-funded projects, City will not accept a Bid Proposal from a bidder without proof that the bidder is registered with the DIR to perform public work under Labor Code Section 1725.5.

Please note: If City is unable to confirm that the bidder is currently registered with the DIR, City may disqualify the bidder and return its bid unopened (Labor Code Section 1725.5 and 1771.1(a)).

- 2. Bid Proposal Form and Enclosures.** Each Bid Proposal must be completed in ink using the Bid Proposal form included with the Contract Documents. The Bid Proposal form must be fully completed without interlineations, alterations, or erasures. Any necessary corrections must be clear and legible, and must be initialed by the bidder's authorized representative. A Bid Proposal submitted with exceptions or terms such as "negotiable," "will negotiate," or similar, will be considered nonresponsive. Each Bid Proposal must be accompanied by bid security, as set forth in Section 4 below, and by a completed Subcontractor List and Non-Collusion Declaration using the forms included with the Contract Documents.
- 3. Authorization and Execution.** Each Bid Proposal must be signed by the bidder's authorized representative. A Bid Proposal submitted by a partnership must be signed in the partnership name by a general partner with authority to bind the partnership. A Bid Proposal submitted by a limited liability company (LLC) must be signed in the name of the LLC by a member or manager with authority to bind the LLC. A Bid Proposal submitted by a corporation must be signed with the legal name of the corporation, followed by the signature and title of two officers of the corporation with full authority to bind the corporation to the terms of the Bid Proposal, under California Corporation Code Section 313.
- 4. Bid Security.** Each Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's check or certified check, made payable to the City, or bid bond using the form included in the Contract Documents and executed by a surety licensed to do business in the State of California. The bid security must guarantee that, within ten days after issuance of the Notice of Award, the bidder will: execute and submit the enclosed Contract for the bid price; submit payment and performance bonds for 100% of the maximum Contract Price; and submit the insurance certificates and endorsements and any other submittals, if any, required by the Contract Documents or the Notice of Award.

4.1 Withdrawal of Bid Proposals. A Bid Proposal may not be withdrawn for a period of 90 days after the bid opening without forfeiture of

the bid security, except as authorized for material error under Public Contract Code Section 5100 *et seq.*

- 5. Requests for Information.** Questions or requests for clarifications regarding the Project, the bid procedures, or any of the Contract Documents must be submitted in writing to David Gittleston, P.E., Project Engineer, at david.gittleston@morganhill.ca.gov. Oral responses are not authorized and are not binding on the City. Bidders should submit any such written inquiries at least five Working Days before the scheduled bid opening. Questions received any later might not be addressed before the bid deadline. An interpretation or clarification by City in response to a written inquiry will be issued in an addendum.

6. Pre-Bid Investigation.

6.1 General. Each bidder is solely responsible at its sole expense for diligent and thorough review of the Contract Documents, examination of the Project site, and reasonable and prudent inquiry concerning known and potential site and area conditions prior to submitting a Bid Proposal. Each bidder is responsible for knowledge of conditions and requirements which reasonable review and investigation would have disclosed. However, except for any areas that are open to the public at large, bidders may not enter property owned or leased by the City or the Project site without prior written authorization from City.

6.2 Document Review. Each bidder is responsible for review of the Contract Documents and any informational documents provided “For Reference Only,” e.g., as-builts, technical reports, test data, and the like. A bidder is responsible for notifying City of any errors or, omissions, inconsistencies, or conflicts it discovers in the Contract Documents prior to submitting a Bid Proposal, subject to the limitations of Public Contract Code Section 1104. Notification of any such errors, omissions, inconsistencies, or conflicts must be submitted in writing to the City no later than five Working Days before the scheduled bid opening. (See Section 5, above.) City expressly disclaims responsibility for assumptions a bidder might draw from the presence or absence of information provided by City.

6.3 Project Site. Questions regarding the availability of soil test data, water table elevations, and the like should be submitted to the City in writing, as specified in Section 5, above. Any subsurface exploration at the Project site must be done at the bidder’s expense, but only with prior written authorization from City. All soil data and analyses available for inspection or provided in the Contract Documents apply only to the test hole locations. Any water table elevation indicated by a soil test report existed on the date the test hole was drilled. The bidder is responsible for

determining and allowing for any differing soil or water table conditions during construction. Because groundwater levels may fluctuate, difference(s) in elevation between ground water shown in soil boring logs and ground water actually encountered during Project construction will not be considered changed Project site conditions. Actual locations and depths must be determined by bidder's field investigation. The bidder may request access to underlying or background information on the Project site in City's possession that is necessary for the bidder to form its own conclusions, including, if available, record drawings or other documents indicating the location of subsurface lines, utilities, or other structures.

6.4 Utility Company Standards. The Project must be completed in a manner that satisfies the standards and requirements of any affected utility companies or agencies (collectively, "utility owners"). The successful bidder may be required by the third-party utility owners to provide detailed plans prepared by a California registered civil engineer showing the necessary temporary support of the utilities during coordinated construction work. Bidders are directed to contact the affected third-party utility owners about their requirements before submitting a Bid Proposal.

7. **Bidders Interested in More Than One Bid.** No person, firm, or corporation may submit or be a party to more than one Bid Proposal unless alternate bids are specifically called for. However, a person, firm, or corporation that has submitted a subcontract proposal or quote to a bidder may submit subcontract proposals or quotes to other bidders.
8. **Addenda.** Any addenda issued prior to the bid opening are part of the Contract Documents. Subject to the limitations of Public Contract Code section 4104.5, City reserves the right to issue addenda prior to bid time. Each bidder is solely responsible for ensuring it has received and reviewed all addenda prior to submitting its bid. Bidders should check City's website periodically for any addenda or updates on the Project at: <http://www.morgan-hill.ca.gov/bids.aspx>
9. **Brand Designations and "Or Equal" Substitutions.** Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate quality and type of item desired, and bidders may request use of any equal material, product, thing, or service. All data substantiating the proposed substitute as an "equal" item must be submitted with the written request for substitution. This provision does not apply to materials, products, things, or services that may lawfully be designated by a specific brand or trade name under Public Contract Code Section 3400(c).

9.1 Pre-Bid Requests. Any request for submission made before the Contract is awarded must be submitted to the City Engineer at least ten

(10) days before the opening of bids so that all interested bidders may be notified of any approved alternative.

9.2 Post-Award Requests. After the Contract is awarded, Contractor may submit a substitution within fourteen (14) days after the date of award of the Contract, or as specified in the Special Conditions.

- 10. Bid Protest.** Any bid protest against another bidder must be submitted in writing and received by City at the City Attorney's Office at 17575 Peak Avenue, Morgan Hill, CA, (Fax: (408) 779-1592), before 5:00 p.m. no later than two Working Days following bid opening ("Bid Protest Deadline") and must comply with the following requirements:

10.1 General. Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest. If required by City, the protesting bidder must submit a non-refundable fee in the amount specified by City, based upon City's reasonable costs to administer the bid protest. Any such fee must be submitted to City no later than the Bid Protest Deadline, unless otherwise specified. For purposes of this Section 10, a "Working Day" means a day that City is open for normal business, and excludes weekends and holidays observed by City. Pursuant to Public Contract Code Section 4104, inadvertent omission of a Subcontractor's DIR registration number on the Subcontractor List form is not grounds for a bid protest, provided it is corrected within 24 hours of the bid opening or as otherwise provided under Labor Code Section 1771.1(b).

10.2 Protest Contents. The bid protest must contain a complete statement of the basis for the protest and must include all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the protesting bidder and any person submitting the protest on behalf of or as an authorized representative of the protesting bidder.

10.3 Copy to Protested Bidder. Upon submission of its bid protest to City, the protesting bidder must also concurrently transmit the protest and all supporting documents to the protested bidder, and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest, by email or hand delivery to ensure delivery before the Bid Protest Deadline.

10.4 Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by City before 5:00 p.m., within two Working Days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the “Response Deadline”). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person responding on behalf of or representing the protested bidder if different from the protested bidder.

10.5 Copy to Protesting Bidder. Upon submission of its response to the bid protest to City, the protested bidder must also concurrently transmit by email or hand delivery, by or before the Response Deadline, a copy of its response and all supporting documents to the protesting bidder and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

10.6 Exclusive Remedy. The procedure and time limits set forth in this Section are mandatory and are the bidder’s sole and exclusive remedy in the event of a bid protest. A bidder’s failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

10.7 Right to Award. City reserves the right, acting in its sole discretion, to reject any bid protest that it determines lacks merit, to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest responsive bid, and to issue a Notice to Proceed with the Work notwithstanding any pending or continuing challenge to its determination.

- 11. Reservation of Rights.** City reserves the unfettered right, acting in its sole discretion, to waive or to decline to waive any immaterial bid irregularities; to accept or reject any or all bids; to cancel or reschedule the bid; to postpone or abandon the Project entirely; or to perform all or part of the Work with its own forces. The Contract will be awarded, if at all, within ninety days after opening of bids or as otherwise specified in the Special Conditions, to the responsible bidder that submitted the lowest responsive bid. Any planned start date for the Project represents the City’s expectations at the time the Notice Inviting Bids was first issued. City is not bound to issue a Notice to Proceed by or before such planned start date, and it reserves the right to issue the Notice to Proceed when the City determines, in its sole discretion, the appropriate time for commencing the Work. The City expressly disclaims responsibility for any assumptions a bidder might draw from the presence or absence of information provided

by the City in any form. Each bidder is solely responsible for its costs to prepare and submit a bid, including site investigation costs.

- 12. Bonds.** Within ten calendar days following City's issuance of the Notice of Award to the apparent low bidder, the bidder must submit payment and performance bonds to City as specified in the Contract Documents using the bond forms included in the Contract Documents. All required bonds must be calculated on the maximum total Contract Price as awarded, including additive alternates, if applicable.
- 13. License(s).** The successful bidder and its Subcontractor(s) must possess the California contractor's license(s) in the classification(s) required by law to perform the Work. The successful bidder must also obtain a City business license within ten days following City's issuance of the Notice of Award. Subcontractors must also obtain a City business license before performing any Work.
- 14. Ineligible Subcontractor.** Any Subcontractor who is ineligible to perform work on a public works project under Labor Code Sections 1777.1 or 1777.7 is prohibited from performing work on this Project.
- 15. Evidence of Responsibility.** Within twenty four (24) hours following a request by City, a bidder must submit to City satisfactory evidence showing the bidder's financial resources, the bidder's experience in the type of work being required by City, the bidder's organization available for the performance of the Contract and any other required evidence of the bidder's qualifications to perform the proposed Contract. City may consider such evidence before making its decision awarding the proposed Contract.
- 16. Subcontractor Work Limits.** The prime contractor must perform at least **35 %** of the Work on the Project, calculated as a percentage of the base bid price, with its own forces, except for any Work identified as "Specialty Work" in the Contract Documents. The total bid amount for any such Specialty Work, as shown on the Bid Schedule, may be deducted from the base bid price before computing the 35% self-performance requirement. The remaining Work may be performed by qualified Subcontractor(s).
- 17. Bidder's Questionnaire.** A completed, signed Bidder's Questionnaire using the form provided with the Contract Documents and including all required attachments must be submitted within 48 hours following a request by City. A bid that does not fully comply with this requirement may be rejected as nonresponsive. A bidder who submits a Bidder's Questionnaire which is subsequently determined to contain false or misleading information, or material omissions, may be disqualified as non-responsible.

- 18. Bid Schedule.** Each bidder must complete the Bid Schedule form with unit prices as indicated, and submit the completed Bid Schedule with its Bid Proposal.
- 18.1 Incorrect Totals.** In the event a computational error for any bid item (base bid or alternate) results in an incorrect extended total for that item, the submitted base bid or bid alternate total will be adjusted to reflect the corrected amount as the product of the estimated quantity and the unit cost. In the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid, and the amount entered as the base bid on the Bid Proposal form, the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid will be deemed the base bid price. Likewise, in the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for any bid alternate, and the amount entered for the alternate on the Bid Proposal form, the actual total of the itemized prices shown on the Bid Schedule for that alternate will be deemed the alternate price. Nothing in this provision is intended to prevent a bidder from requesting to withdraw its bid for material error under Public Contract Code § 5100 et seq.
- 18.2 Estimated Quantities.** The quantities shown on the Bid Schedule are estimated and the actual quantities required to perform the Work may be greater or less than the estimated amount. The Contract Price will be adjusted to reflect the actual quantities required for the Work based on the itemized or unit prices provided in the Bid Schedule, with no allowance for anticipated profit for quantities that are deleted or decreased, and no increase in the unit price, and without regard to the percentage increase or decrease of the estimated quantity and the actual quantity.
- 19. Safety Orders.** If the Project includes construction of a pipeline, sewer, sewage disposal system, boring and jacking pits, or similar trenches or open excavations, which are five feet or deeper, each bid must include a bid item for adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb, which comply with safety orders as required by Labor Code Section 6707.

END OF INSTRUCTIONS TO BIDDERS

BID PROPOSAL

East Fifth Street Sewer Main Project

_____ (“Bidder”) hereby submits this Bid Proposal to the City of Morgan Hill (“City”) for the above-referenced project (“Project”) in response to the Notice Inviting Bids and in accordance with the Contract Documents referenced therein.

1. **Base Bid.** Bidder proposes to perform and fully complete the Work for the Project as specified in the Contract Documents, within the time required for full completion of the Work, including all labor, materials, supplies, and equipment and all other direct or indirect costs including, but not limited to, taxes, insurance and all overhead for the following price (“Base Bid”):
\$ _____.

2. **Addenda.** Bidder agrees that it has confirmed receipt of or access to, and reviewed, all addenda issued for this Bid. Bidder waives any claims it might have against the City based on its failure to receive, access, or review any addenda for any reason. Bidder specifically acknowledges receipt of the following addenda:

Addendum:	Date Received:	Addendum:	Date Received:
#01	_____	#05	_____
#02	_____	#06	_____
#03	_____	#07	_____
#04	_____	#08	_____

3. **Bidder’s Certifications and Warranties.** By signing and submitting this Bid Proposal, Bidder certifies and warrants the following:
 - 3.1 **Examination of Contract Documents.** Bidder has thoroughly examined the Contract Documents, and represents that, to the best of Bidder’s knowledge there are no errors, omissions, or discrepancies in the Contract Documents subject to the limitations of Public Contract Code Section 1104.
 - 3.2 **Examination of Worksite.** Bidder has had the opportunity to examine the Worksite and local conditions at the Project location.
 - 3.3 **Bidder Responsibility.** Bidder is a responsible bidder, with the necessary ability, capacity, experience, skill, qualifications, workforce, equipment, and resources to perform or cause the Work to be performed in accordance with the Contract Documents and within the Contract Time.

- 3.4 Responsibility for Bid.** Bidder has carefully reviewed this Bid Proposal and is solely responsible for any errors or omissions contained in its completed Bid. All statements and information provided in this Bid Proposal and enclosures are true and correct to the best of Bidder's knowledge.
- 3.5 Nondiscrimination.** In preparing this Bid, the Bidder has not engaged in discrimination against any prospective or present employee or Subcontractor on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status.
- 4. Award of Contract.** By signing and submitting this Bid Proposal, Bidder agrees that if Bidder is awarded the Contract for the Project, that within ten days following issuance of the Notice of Award to Bidder, Bidder will do all of the following:
- 4.1 Execute Contract.** Enter into the Contract with City in accordance with the terms of this Bid Proposal, by signing and submitting to City the Contract prepared by City using the form included with the Contract Documents;
- 4.2 Submit Required Bonds.** Submit to City a payment bond and a performance bond, each for one hundred percent (100%) of the Contract Price, using the bond forms provided and in accordance with the requirements of the Contract Documents; and
- 4.3 Insurance Requirements.** Submit to City the insurance certificate(s) and endorsement(s) as required by the Contract Documents.
- 5. Wage Theft Prevention.** All Bidders are expected to have read and understand the "Wage Theft Prevention Policy" adopted by the City Council on July 26, 2017.
- The undersigned Bidder certifies that neither Bidder nor its principals have been found by a final court judgement or final administrative action of an investigatory agency to have violated federal, state or local wage and hour laws within the past five years from the date of the submitted bid. Bidder or its principals who are unable to so certify, must disclose wage and hour violations, and shall provide a copy of (i) the court order and judgment and/or final administrative decision; and (ii) documents demonstrating either that the order/judgment has been satisfied, or if the order/judgment has not been fully satisfied, a written and signed description of Bidder's efforts to date to satisfy the order/judgment. Signing this bid shall constitute signature of this Certification.

The City, at its sole discretion, may disqualify a bidder based on one or more disclosed judgments consistent with the criteria set forth in the Policy.

6. **Iran Contracting Act.** Bidder certifies that it is not identified on a list created under the Iran Contracting Act, Public Contract Code Section 2200 *et seq.* (the "Act"), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.
7. **Bid Security.** As a guarantee that if awarded the Contract, Bidder will perform its obligations under Section 4 above Bidder is enclosing bid security in the amount of ten percent (10%) of its maximum bid amount in one of the following forms (check one):

_____ A cashier's check or certified check payable to City of Morgan Hill and issued by _____ Bank in the amount of \$ _____.

_____ A bid bond, using the Bid Bond form included with the Contract Documents, payable to City of Morgan Hill and executed by a surety licensed to do business in the State of California.

This Bid Proposal is hereby submitted on _____, 20__:

s/ _____

Name and Title [print]

Company Name

License # and Classification

DIR Registration #

Address

Phone

City, State, Zip

Fax

END OF BID PROPOSAL

BID SCHEDULE I – GENERAL

East Fifth Street Sewer Main Project

This Bid Schedule must be completed in ink and included with the sealed Bid Proposal. Pricing must be provided for each Bid Item as indicated. Items marked "(SW)" are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the "Extended Total Amount" column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal Form. Quantities shown are required for bid purposes and may or may not be final pay quantities. Actual quantities, if different, must be substantiated during the Project by the Contractor (either by field measurement, trucking tags, or other means acceptable to the Engineer).

AL = Allowance
LF = Linear Foot

CF = Cubic Feet
LS = Lump Sum

CY = Cubic Yard
SF = Square Feet

EA = Each
LB = Pounds
TON = Ton (2000 lbs)

Bid Item No.	Description of Bid Item	Estimated Quantity/Unit of Measure	Unit Price	Extended Total Amount
1	Mobilization	LS		
2	Stormwater Pollution Prevention Plan (SWPPP) (Not less than \$10,000)	LS		
3	Sheeting, Shoring & Bracing	LS		
4	Traffic Control	LS		
5	Trenchless Crossing (Auger Boring, Pits, 24" casing and 16" fusible pipe)	125 LF		
6	Sanitary Sewer Bypass	LS		
7	Remove Sanitary Sewer Manhole	3 EA		
8	New Sanitary Sewer Manhole	6 EA		
9	Rehabilitate Sanitary Sewer Manhole (Mortar Coating)	8 EA		
10	Connect to Existing Sanitary Sewer Manhole	2 EA		
11	New 15-inch SDR 26 PVC Sanitary Sewer with Sewer Lateral Stubs	320 LF		

12	Remove 8-inch Sanitary Sewer Main and replace with 12-inch SDR 26 PVC Sanitary Sewer	675 LF		
13	Video Inspection of Sanitary Sewer Laterals	12 EA		
14	Reconnect Sanitary Sewer Laterals	12 EA		
15	Post Construction CCTV	LS		
16	New Sanitary Sewer Laterals	8 EA		
17	6" Sewer Main Stub	10 LF		
18	Curb and Gutter	75 LF		
19	Sidewalk & Driveway Replacement	500 SF		
20	Pre-construction Potholes within UPRR	2 EA		
21	Utility Potholes	20 EA		
22	Striping (thermoplastic) and Pavement Markings	LS		
23	2" Asphalt Overlay with Wedge Grind and Conform Grind	1 LS		
24	Full Depth Asphalt Concrete (Revokable)	500 SF		
25	Monument Removal and Replacement	1 EA		
26	Supplemental (Revocable)	LS	\$40,000	\$40,000

Bid Schedule I Total	
----------------------	--

TOTAL BASE BID: Items 1 through ____ inclusive: \$_____

Note: The amount entered as the "Total Base Bid" should be identical to the Base Bid amount entered in Section 1 of the Bid Proposal form.

END OF BID SCHEDULE

SUBCONTRACTOR LIST

For each Subcontractor who will perform a portion of the Work in an amount in excess of one-half of 1% of the Bidder's total Contract Price,¹ the bidder must list a description of the Work, the name of the Subcontractor, its California contractor license number, the location of its place of business, its DIR registration number, and the portion of the Work that the Subcontractor is performing based on a percentage of the Base Bid price.

Bidders: Please print legibly. Illegible forms may be rejected.

DESCRIPTION OF WORK	SUBCONTRACTOR NAME	CALIFORNIA CONTRACTOR LICENSE NUMBER	DIR REG. NO.	LOCATION OF BUSINESS	LOCAL VENDOR ² YES/NO	PERCENT OF WORK

END OF SUBCONTRACTOR LIST

¹ For street or highway construction this requirement applies to any subcontract of \$10,000 or more.

² A Subcontractor is considered local if its principle place of business is within the city limits of Morgan Hill.

NONCOLLUSION DECLARATION

(To be executed by bidder and submitted with bid)

State of California)	ss.
)	
County of _____)	

The undersigned declares:

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

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

This declaration is intended to comply with California Public Contract Code Section 7106 and Title 23 U.S.C Section 112.

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].

s/ _____

Name [print]

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE ' 1189

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

State of **CALIFORNIA**)

County of **SANTA CLARA**)

On _____, before me,

a Notary Public in and for said County and State, personally appeared

proved to me on the basis of satisfactory evidence to be the person/s whose name/s is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity/ies, and that by his/her/their signature/s on the instrument the person/s, or the entity upon behalf of which the person/s acted, executed the instrument.

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

WITNESS my hand and official seal.

SIGNATURE OF NOTARY PUBLIC

Place Notary Seal Above

BID BOND

_____ (“Bidder”) has submitted a bid, dated _____, 20____ (“Bid”), to the City of Morgan Hill (“City”) for work on the **East Fifth Street Sewer Main Project** (“Project”). Under this duly executed bid bond (“Bid Bond”), Bidder as Principal and

_____, its surety (“Surety”), are bound to City as obligee in the penal sum of ten percent (10%) of the maximum amount of the Bid (the “Bond Sum”). Bidder and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, as follows:

1. **General.** If Bidder is awarded the Contract for the Project, Bidder will enter into the Contract with City in accordance with the terms of the Bid.
2. **Submittals.** Within ten days following issuance of the Notice of Award to Bidder, Bidder must submit to City the following:
 - 2.1 **Contract.** The executed Contract, using the form provided by City in the Project contract documents (“Contract Documents”);
 - 2.2 **Payment Bond.** A payment bond for one hundred percent (100%) of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Payment Bond form included with the Contract Documents;
 - 2.3 **Performance Bond.** A performance bond for one hundred percent (100%) of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Performance Bond form included with the Contract Documents; and
 - 2.4 **Insurance.** The insurance certificate(s) and endorsement(s) required by the Contract Documents, and any other documents required by the Instructions to Bidders.
3. **Enforcement.** If Bidder fails to execute the Contract and to submit the bonds and insurance certificates as required by the Contract Documents, Surety guarantees that Bidder forfeits the Bond Sum to City. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____

Fax: _____
Email: _____

- 4. Duration; Waiver.** If Bidder fulfills its obligations under Section 2, above, then this obligation will be null and void; otherwise it will remain in full force and effect for ninety days following the bid opening or until this Bid Bond is returned to Bidder, whichever occurs first. Surety waives the provisions of Civil Code Sections 2819 and 2845.

This Bid Bond is entered into and is effective on _____,
20____.

SURETY:

s/ _____

Name: _____

Title: _____

(Attach Acknowledgement, Notary Seal, and Attorney-In-Fact Certificate)

CONTRACTOR:

s/ _____

Name: _____

Title: _____

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

BIDDER'S QUESTIONNAIRE

East Fifth Street Sewer Main Project

Within forty-eight (48) hours following a request by City, a bidder must submit to City a completed, signed Bidder's Questionnaire using this form and all required attachments, including clearly labeled additional sheets as needed. City may request the Questionnaire from one or more of the apparent low bidders following the bid opening, and may use the completed Questionnaire as part of its investigation to evaluate a bidder's qualifications for this Project. The Questionnaire must be filled out completely, accurately, and legibly. Any errors, omissions, or misrepresentations in completion of the Questionnaire may be grounds for rejection of the bid or termination of a Contract awarded pursuant to the bid.

Part 1: General Information

Bidder Business Name: _____ ("Bidder")

Check One: ☐ Corporation State of Incorporation _____
☐ Partnership
☐ Sole Proprietorship
☐ Joint Venture of: _____
☐ Other: _____

Main Office Address:

Phone: _____

Fax: _____

Local Office Address and Phone: _____

Website address: _____

Owner of Business: _____

Contact Name and Title: _____

Contact phone and email:

Bidder's California Contractor's License Number(s):

Bidder's DIR Registration Number: _____

Part 2: Bidder Experience

1. How many years has Bidder been in business under its present business name? _____ years

2. Has Bidder completed projects similar in type and size to this Project as a general contractor? ____ Yes ____ No

3. Has Bidder ever been disqualified from a bid on grounds that it is not responsible, or otherwise disqualified or disbarred from bidding under state or federal law? ?

____ Yes ____ No

If yes, provide additional information on a separate sheet regarding the disqualification or disbarment, including the name and address of the agency or owner of the project, the type and size of the project, the reasons that Bidder was disqualified or disbarred, and the month and year in which the disqualification or disbarment occurred.

4. Has Bidder ever been terminated for cause, alleged default, or legal violation from a construction project, either as a general contractor or as a subcontractor?

____ Yes ____ No

If yes, provide additional information on a separate sheet regarding the termination, including the name and address of the agency or owner of the subject project, the type and size of the project, whether Bidder was under contract as a general contractor or a subcontractor, the reasons that Bidder was terminated, and the month and year in which the termination occurred.

5. Provide information about Bidder's past projects performed as general contractor as follows:

5.1 Six most recently completed public works projects within the last three years;

5.2 Three largest completed projects within the last three years; and

5.3 Any project which is similar to this Project including scope and character of the work.

6. Use separate sheets to provide all of the following information for each project identified in response to the above three categories:

- 6.1 Project name
- 6.2 Location
- 6.3 Owner
- 6.4 Owner contact (name, address, email, and phone number)
- 6.5 Prime contractor, if applicable (name, address, email, and phone number);
- 6.6 Architect or engineer name
- 6.7 Architect or engineer contact (name, email and phone number)
- 6.8 Project and/or construction manager (name and current phone number)
- 6.9 Description of project, scope of work performed
- 6.10 Initial contract value (at time of bid award)
- 6.11 Final cost of construction (including change orders)
- 6.12 Original scheduled completion date
- 6.13 Time extensions granted (number of days)
- 6.14 Actual date of completion
- 6.15 Number and amount of stop notices or mechanic's liens filed
- 6.16 Amount of liquidated damages assessed against Bidder
- 6.17 Nature and resolution of any project-related claim, lawsuit, mediation and/or arbitration involving Bidder.

Part 3: Safety

1. Provide Bidder's Experience Modification Rate (EMR) for the last three years:

Year	Mobilization
	Stormwater Pollution Prevention Plan (SWPPP) (Not less than \$10,000)
	Sheeting, Shoring & Bracing

2. Complete the following, based on information provided in Bidder's CalOSHA Form 300 or Form 300A, Annual Summary of Work-Related Illnesses and Injuries, from the most recent past calendar year:

2.1 Number of lost workday cases: _____

- 2.2 Number of medical treatment cases: _____
2.3 Number of deaths: _____

3. Has Bidder ever been cited, fined, or prosecuted by any local, state, or federal agency, including OSHA, CalOSHA, or EPA, for violation of any law, regulation, or requirements pertaining to health and safety?

_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding each such citation, fine, or prosecution, including the name and address of the agency or owner of the project, the type and size of the project, the reasons for and nature of the citation, fine, or prosecution, and the month and year in which the incident giving rise to the citation, fine, or prosecution occurred.

4. Name, title, and email for person responsible for Bidder's safety program:

_____	_____	_____
Name	Title	Email

_____	_____	_____
Name	Title	Email

Part 4: Verification

In signing this document, I, the undersigned, declare that I am duly authorized to sign and submit this Bidder's Questionnaire on behalf of the named Bidder, and that all responses and information set forth in this Bidder's Questionnaire and accompanying attachments are, to the best of my knowledge, true, accurate and complete as of the date of submission. **I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.**

Signature: _____ Date: _____

By [name, title]: _____

END OF BIDDER'S QUESTIONNAIRE

CONTRACT

This public works contract ("Contract") is entered into by and between the City of Morgan Hill ("City") and _____ ("Contractor") for work on the **East Fifth Street Sewer Main Project** ("Project").

The parties agree as follows:

1. **Award of Contract.** In response to the Notice Inviting Bids, Contractor has submitted a Bid Proposal to perform the Work to construct on the Project. On _____, 20____, City authorized award of this Contract to Contractor for the amount set forth in Section 4, below.
2. **Contract Documents.** The Contract Documents incorporated into this Contract include and are comprised of all of the documents listed below. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, including this Contract.
 - 2.1 Notice Inviting Bids;
 - 2.2 Instructions to Bidders;
 - 2.3 Addenda, if any;
 - 2.4 Bid Proposal and attachments thereto;
 - 2.5 Contract;
 - 2.6 Payment and Performance Bonds;
 - 2.7 General Conditions;
 - 2.8 Special Conditions;
 - 2.9 Project Plans and Specifications;
 - 2.10 Change Orders, if any;
 - 2.11 Notice of Award;
 - 2.12 Notice to Proceed; and
 - 2.13 The following: Geotechnical Investigation by Cornerstone Earth Group, date 2-26-21, Union Pacific Railroad Company Pipeline Crossing Agreement, Folder 03257-64.
3. **Contractor's Obligations.** Contractor will perform all of the Work required for the Project, as specified in the Contract Documents. Contractor must provide, furnish, and supply all things necessary and incidental for the timely performance and completion of the Work, including all necessary labor, materials, supplies, tools, equipment, transportation, onsite facilities, and utilities, unless otherwise specified in the Contract Documents. Contractor must use its best efforts to diligently prosecute and complete the Work in a professional and expeditious manner and to meet or exceed the performance standards required by the Contract Documents.

4. **Payment.** As full and complete compensation for Contractor's timely performance and completion of the Work in strict accordance with the terms and conditions of the Contract Documents, City will pay Contractor _____ Dollars (\$_____) (the "Contract Price"), for all of Contractor's direct and indirect costs to perform the Work, including all labor, materials, supplies, equipment, taxes, insurance, bonds and all overhead costs, in accordance with the payment provisions in the General Conditions.
5. **Time for Completion.** Contractor will fully complete the Work for the Project, meeting all requirements for Final Completion, within 120 calendar days from the commencement date given in the Notice to Proceed ("Contract Time"). By signing below, Contractor expressly waives any claim for delayed early completion.
6. **Liquidated Damages.** If Contractor fails to complete the Work within the Contract Time, City will assess liquidated damages in the amount of One Thousand Five Hundred Dollars (\$1,500) per day for each day of unexcused delay in achieving Final Completion, and such liquidated damages may be deducted from City's payments due or to become due to Contractor under this Contract Price will be reduced accordingly.
7. **Labor Code Compliance.**
- 7.1 **General.** This Contract is subject to all applicable requirements of Chapter 1 of Part 7 of Division 2 of the Labor Code, including requirements pertaining to wages, working hours and workers' compensation insurance, as further specified in Article 9 of the General Conditions.
- 7.2 **Prevailing Wages.** 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. Copies of these prevailing rates are available online at <http://www.dir.ca.gov/DLSR>.
- 7.3 **DIR Registration.** City will not enter into the Contract with a bidder without proof that the bidder and its Subcontractors are registered with the California Department of Industrial Relations to perform public work pursuant to Labor Code Section 1725.5, subject to limited legal exceptions.
8. **Workers' Compensation Certification.** Pursuant to Labor Code Section 1861, by signing this Contract, Contractor certifies as follows: "I am aware of the provisions of Labor Code Section 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work on this Contract."

- 9. Conflicts of Interest.** Contractor, its employees, Subcontractors and agents, may not have, maintain or acquire a conflict of interest in relation to this Contract in violation of any City ordinance or requirement, or in violation of any California law, including Government Code Section 1090 *et seq.*, or the Political Reform Act, as set forth in Government Code Section 81000 *et seq.* and its accompanying regulations. Any violation of this Section constitutes a material breach of the Contract.
- 10. Independent Contractor.** Contractor is an independent contractor under this Contract and will have control of the Work and the means and methods by which it is performed. Contractor and its Subcontractors are not employees of City and are not entitled to participate in any health, retirement, or any other employee benefits from City.
- 11. Notice.** Any notice required by the Contract Documents must be made in writing, signed, dated, and sent to the other party by personal delivery, U.S. Mail, a reliable overnight delivery service, or by email as a PDF (or comparable) file. Notice is deemed effective upon delivery unless otherwise specified. Notice for each party must be given as follows:

City:

City of Morgan Hill
17575 Peak Avenue
Morgan Hill, CA 95037
Phone: (409) 779-7259
Attn: City Clerk
Email: michelle.bigelow@morganhill.ca.gov
Copy to: David.gittleson@morganhill.ca.gov

Contractor:

Name: _____
Address: _____
City/State/Zip: _____
Phone: _____
Attn: _____
Email: _____
Copy to: _____

12. General Provisions.

- 12.1 Assignment and Successors.** Contractor may not assign its rights or obligations under this Contract, in part or in whole, without City's written

consent. This Contract is binding on Contractor's and City's lawful heirs, successors and permitted assigns.

12.2 Third Party Beneficiaries. There are no intended third-party beneficiaries to this Contract.

12.3 Governing Law and Venue. This Contract will be governed by California law and venue will be in the Superior Court of Santa Clara County, and no other place. Contractor waives any right it may have pursuant to Code of Civil Procedure Section 394, to file a motion to transfer any action arising from or relating to this Contract to a venue outside of Santa Clara County, California.

12.4 Amendment. No amendment or modification of this Contract will be binding unless it is in a writing duly authorized and signed by the parties to this Contract.

12.5 Integration. This Contract and the Contract Documents incorporated herein, including authorized amendments or Change Orders thereto, constitute the final, complete, and exclusive terms of the agreement between City and Contractor.

12.6 Severability. If any provision of the Contract Documents, is determined to be illegal, invalid, or unenforceable, in whole or in part, the remaining provisions of the Contract Documents will remain in full force and effect.

12.7 Iran Contracting Act. If the Contract Price exceeds \$1,000,000, Contractor certifies, by signing below, that it is not identified on a list created under the Iran Contracting Act, Public Contract Code Section 2200 *et seq.* (the "Act"), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.

12.8 Authorization. Each individual signing below warrants that he or she is authorized to do so by the party that he or she represents, and that this Contract is legally binding on that party. If Contractor is a corporation, signatures from two officers of the corporation are required pursuant to California Corporation Code Section 313. If Contractor is a partnership, signature by a general partner with authority to bind the partnership is required. If Contractor is a limited liability company (LLC), a signature by a member or manager with authority to bind the LLC is required.

[Signatures are on the following page.]

AS SET FORTH IN CA. CORP. CODE § 313, TWO SIGNATURES ARE REQUIRED FOR CALIFORNIA CORPORATIONS:
(1) CHAIRPERSON OF THE BOARD, PRESIDENT, OR VICE PRESIDENT; AND
2) SECRETARY, ASSISTANT SECRETARY, CHIEF FINANCIAL OFFICER OR ASSISTANT TREASURER.

The parties agree to this Contract as witnessed by the signatures below:

CITY OF MORGAN HILL:

Christina J. Turner
City Manager

Date: _____

Attest:

Michelle Bigelow
City Clerk

Date: _____

Approved as to Form:

Donald A. Larkin
City Attorney

Date: _____

CONTRACTOR:

[NAME OF CONTRACTOR]

Signature

Name/Title [print]

Date: _____

Corporate entities must provide a second signature:

Signature

Name/Title [print]

Date: _____

Contractor's License Number(s)

Expiration Date(s)

Seal:

Contractor's DIR Registration Number(s)

Expiration Date

END OF CONTRACT

PAYMENT BOND

The City of Morgan Hill ("City") and _____ ("Contractor") have entered into a contract for work on the **East Fifth Street Sewer Main Project** ("Project"). The Contract is incorporated by reference into this Payment Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee in an amount not less than _____ Dollars (\$_____) ("Bond Sum"), under California Civil Code Sections 9550, *et seq.*, to ensure payment to authorized claimants. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor
2. **Surety's Obligation.** If Contractor or any of its Subcontractors fails to pay a person authorized in California Civil Code Section 9100 to assert a claim against a payment bond, any amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of Contractor and its Subcontractors, under California Unemployment Insurance Code Section 13020, with respect to the work and labor, then Surety will pay the obligation.
3. **Beneficiaries.** This Bond inures to the benefit of any of the persons named in California Civil Code Section 9100, so as to give a right of action to those persons or their assigns in any suit brought upon this Bond. Contractor must promptly provide a copy of this Bond upon request by any person with legal rights under this Bond.
4. **Duration.** If Contractor promptly makes payment of all sums for all labor, materials, and equipment furnished for use in the performance of the Work required by the Contract, in conformance with the time requirements set forth in the Contract and as required by California law, Surety's obligations under this Bond will be null and void. Otherwise, Surety's obligations will remain in full force and effect.
5. **Waivers.** Surety waives any requirement to be notified of alterations to the Contract or extensions of time for performance of the Work under the Contract. Surety waives the provisions of Civil Code Sections 2819 and 2845. City waives the requirement of a new bond for any supplemental contract under Civil Code Section 9550. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____
Email: _____

- 6. Law and Venue.** This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Superior Court of Santa Clara County, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.
- 7. Effective Date; Execution.** This Bond is entered into and is effective on _____, 20__.

SURETY:

s/ _____

Name: _____

Title: _____

CONTRACTOR:

s/ _____

Name: _____

Title: _____

(Attach Acknowledgment with Notary
Seal and Power of Attorney)

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

END OF PAYMENT BOND

PERFORMANCE BOND

The City of Morgan Hill ("City") and _____ ("Contractor") have entered into a contract for work on the **East Fifth Street Sewer Main Project** ("Project"). The Contract is incorporated by reference into this Performance Bond ("Bond").

1. **General.** Under this Bond, Contractor as Principal and _____, its surety ("Surety"), are bound to City as obligee for an amount not less than _____ Dollars (\$ _____) (the "Bond Sum"). By executing this Bond, Contractor and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, to the provisions of this Bond.
2. **Surety's Obligations.** Surety's obligations are co-extensive with Contractor's obligations under the Contract. If Contractor fully performs its obligations under the Contract, including its warranty obligations under the Contract, Surety's obligations under this Bond will become null and void. Otherwise, Surety's obligations under this bond will remain in full force and effect.
3. **Waiver.** Surety waives any requirement to be notified of and further consents to any alterations to the Contract made under the applicable provisions of the Contract Documents, including changes to the scope of Work or extensions of time for performance of Work under the Contract. Surety waives the provisions of Civil Code Sections 2819 and 2845.
4. **Application of Contract Balance.** Upon making a demand on this Bond for completion of the Work prior to acceptance of the Project, City will make the Contract Balance available to Surety for completion of the Work under the Contract. For purposes of this provision, the Contract Balance is defined as the total amount payable by City to Contractor as the Contract Price minus amounts already paid to Contractor, and minus any liquidated damages, credits, or backcharges to which City is entitled under the terms of the Contract.
5. **Contractor Default.** Upon written notification from City that Contractor is in default under Article 13 of the Contract General Conditions, time being of the essence, Surety must act within the time specified in Article 13 to remedy the default through one of the following courses of action:
 - 5.1 Arrange for completion of the Work under the Contract by Contractor, with City's consent, but only if Contractor is in default solely due to its financial inability to complete the Work;

5.2 Arrange for completion of the Work under the Contract by a qualified contractor acceptable to City, and secured by performance and payment bonds issued by an admitted surety as required by the Contract Documents, at Surety's expense, or

5.3 Waive its right to complete the Work under the Contract and reimburse City the amount of City's costs to have the remaining Work completed.

6. Surety Default. If Surety defaults on its obligations under the Bond, City will be entitled to recover all costs it incurs due to Surety's default, including legal, design professional, or delay costs.

7. Notice. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____

8. Law and Venue. This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Superior Court of Santa Clara County, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

9. Effective Date; Execution. This Bond is entered into and effective on _____, 20____.

[Signatures are on the following page.]

SURETY:

s/ _____

Name: _____

Title: _____

(Attach Acknowledgment with Notary
Seal and Power of Attorney)

CONTRACTOR:

s/ _____

Name: _____

Title: _____

APPROVED AS TO FORM:

By: _____
Donald A. Larkin, City Attorney

Date: _____

END OF PERFORMANCE BOND

GENERAL CONDITIONS

Article 1 - Definitions

1.1 Definitions. The following definitions apply to all of the Contract Documents unless otherwise indicated, e.g., additional definitions that apply solely to the Specifications or other technical documents. Defined terms and titles of documents are capitalized in the Contract Documents, with the exception of the following (in any tense or form): “day,” “furnish,” “including,” “install,” “work day” or “working day.”

Allowance means a specific amount that must be included in the Bid Proposal for Work that may or may not be included in the Project, depending on conditions that will not become known until after bids are opened. If the Contract Price includes an Allowance and the cost of performing the Work covered by that Allowance is greater or less than the Allowance, the Contract Price will be increased or decreased accordingly.

Article, as used in these General Conditions, means a numbered Article of the General Conditions, unless otherwise indicated by the context.

Change Order means a written document duly approved and executed by City, which changes the scope of Work, the Contract Price, or the Contract Time.

City means the City of Morgan Hill, acting through its City Council, officers, employees, and authorized representatives.

City Engineer means the City Engineer for City and his or her authorized delegee(s) designated to oversee and manage the Project on City’s behalf.

Claim means a separate demand by Contractor for a change in the Contract Time or Contract Price, that has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected by City, in whole or in part; or a written demand by Contractor objecting to the amount of Final Payment.

Contract means the signed agreement between City and Contractor for performing the Work required for the Project, and all documents expressly incorporated therein.

Contract Documents means, collectively, all of the documents listed as such in Section 2 of the Contract, including the Notice Inviting Bids; the Instructions to Bidders; addenda, if any; the Bid Proposal, and attachments thereto; the Contract; the Notice of Award and Notice to Proceed; the payment and performance bonds; the General Conditions; the Special Conditions; the Project Plans and Specifications; any Change Orders; and any other documents

expressly made part of the Contract Documents. The Contract Documents do not include documents provided “For Reference Only,” or documents that are intended solely to provide information regarding existing conditions.

Contract Price means the total compensation to be paid to Contractor for performance of the Work, as set forth in the Contract and as may be amended by Change Order or adjusted for an Allowance. The Contract Price is not subject to adjustment due to inflation or due to the increased cost of labor, material, supplies, or equipment following submission of the Bid Proposal. The Contract Price is deemed to include all applicable federal, state, and local taxes.

Contract Time means the number of calendar days specified for complete performance of the Work, as set forth in the Contract and as may be amended by Change Order.

Contractor means the individual, partnership, corporation, or joint-venture that has signed the Contract with City to perform the Work.

Day means a calendar day unless otherwise specified.

Design Professional means the licensed individual(s) or firm(s) retained by City to provide architectural or engineering services for the Project. If no Design Professional has been retained for this Project, any reference to Design Professional is deemed to refer to the Engineer.

DIR means the California Department of Industrial Relations.

Drawings has the same meaning as Plans.

Engineer means the City Engineer for the City of Morgan Hill and his or her authorized delegee(s).

Excusable Delay is defined in Section 5.3(B), Excusable Delay.

Extra Work means new or unforeseen work added to the Project, as determined by the Engineer in his or her sole discretion, including Work that was not part of or incidental to the scope of the Work when the Contractor’s bid was submitted; Work that is substantially different from the Work as described in the Contract Documents at bid time; or Work that results from a substantially differing and unforeseeable condition.

Final Completion means Contractor has fully completed all of the Work required by the Contract Documents to the City’s satisfaction, including all punch list items, and any required commissioning or training, and has provided the City with all required submittals, including the instructions and manuals, product warranties, and as-built drawings.

Final Payment means payment to Contractor of the unpaid Contract Price, including release of undisputed retention, less amounts withheld or deducted pursuant to the Contract Documents.

Furnish means to purchase and deliver for the Project.

Government Code Claim means a claim submitted pursuant to California Government Code § 900 et seq.

Hazardous Materials means any substance or material identified now or in the future as hazardous under any Laws, or any other substance or material that may be considered hazardous or otherwise subject to Laws governing handling, disposal, or cleanup.

Including, whether or not capitalized, means “including, but not limited to,” unless the context requires otherwise.

Inspector means the individual(s) or firm(s) retained or employed by City to inspect the workmanship, materials, and manner of construction of the Project and its components to ensure compliance with the Contract Documents and all Laws.

Install means to fix in place for materials, and to fix in place and connect for equipment.

Law(s) means all applicable local, state, and federal laws, regulations, rules, codes, ordinances, permits, orders, and the like enacted or imposed by or under the auspices of any governmental entity with jurisdiction over any of the Work or any performance of the Work, including health and safety requirements.

Non-Excusable Delay is defined in Section 5.3(D), Non-Excusable Delay.

Plans means the City-provided plans, drawings, details, or graphical depictions of the Project requirements, but does not include Shop Drawings.

Project means the public works project referenced in the Contract.

Project Manager means the individual designated by City to oversee and manage the Project on City’s behalf and may include his or her authorized delegate(s) when the Project Manager is unavailable. If no Project Manager has been designated for this Project, any reference to Project Manager is deemed to refer to the Engineer.

Recoverable Costs is defined in Section 5.3(F), Recoverable Costs.

Request for Information or RFI means a Contractor's written request for information about the Contract Documents, the Work or the Project, submitted to City in the manner and format specified by City.

Section, when capitalized in these General Conditions, means a numbered section or subsection of the General Conditions, unless the context clearly indicates otherwise.

Shop Drawings means drawings, plan details or other graphical depictions prepared by or on behalf of Contractor, and subject to City acceptance, which are intended to provide details for fabrication, installation, and the like, of items required by or shown in the Plans or Specifications.

Specialty Work means Work that must be performed by a specialized Subcontractor with the specified license or other special certification, and that the Contractor is not qualified to self-perform.

Specifications means the technical, text specifications describing the Project requirements, which are prepared for and incorporated into the Contract by or on behalf of City, and does not include the Contract, General Conditions or Special Conditions.

Subcontractor means an individual, partnership, corporation, or joint-venture retained by Contractor directly or indirectly through a subcontract to perform a specific portion of the Work. The term Subcontractor applies to subcontractors, suppliers, fabricators, and equipment lessors of all tiers, unless otherwise indicated by the context. A third party such as a utility performing related work on the Project is not a Subcontractor, even if Contractor must coordinate its Work with the third party.

Technical Specifications has the same meaning as Specifications.

Work means all of the construction and services necessary for or incidental to completing the Project in conformance with the requirements of the Contract Documents.

Work Day or Working Day, whether or not capitalized, means a weekday when the City is open for business, and does not include holidays observed by City.

Worksite means the place or places where the Work is performed, which includes, but may extend beyond the Project site, including separate locations for staging, storage, or fabrication.

Article 2 - Roles and Responsibilities

2.1 City.

- (A) **City Council.** The City Council has final authority in all matters affecting the Project, except to the extent it has delegated authority to the Engineer.
- (B) **Engineer.** The Engineer, acting within the authority conferred by the City Council, is responsible for administration of the Project on behalf of City, including authority to provide directions to the Design Professional and to Contractor to ensure proper and timely completion of the Project. The Engineer's decisions are final and conclusive within the scope of his or her authority, including interpretation of the Contract Documents.
- (C) **Project Manager.** The Project Manager assigned to the Project will be the primary point of contact for the Contractor and will serve as City's representative, for daily administration of the Project on behalf of City. Unless otherwise specified, all of Contractor's communications to City (in any form) will go to or through the Project Manager. City reserves the right to reassign the Project Manager role at any time or to delegate duties to additional City representatives, without prior notice to or consent of Contractor.
- (D) **Design Professional.** The Design Professional is responsible for the overall design of the Project, and, to the extent authorized by City, may act on City's behalf to ensure performance of the Work in compliance with the Plans and Specifications, including any design changes authorized by Change Order. The Design Professional's duties may include review of Contractor's submittals, visits to any Worksite, inspecting the Work, evaluating test and inspection results, and participation in Project-related meetings, including any pre-construction conference, weekly meetings, and coordination meetings. The Design Professional's interpretation of the Plans or Specifications is final and conclusive.

2.2 Contractor.

- (A) **General.** Contractor must provide all labor, materials, supplies, equipment, services, and incidentals necessary to perform and timely complete the Work in strict accordance with the Contract Documents, and in an economical and efficient manner in the best interests of City, and with minimal inconvenience to the public.
- (B) **Responsibility for the Work and Risk of Loss.** Contractor is responsible for supervising and directing all aspects of the Work to facilitate the efficient and timely completion of the Work. Contractor is

solely responsible for, and required to exercise full control over the Work, including the construction means, methods, techniques, sequences, procedures, safety precautions and programs, and coordination of all portions of the Work with that of all other contractors and Subcontractors, except to the extent that the Contract Documents provide other specific instructions. Contractor's responsibilities extend to any plan, method or sequence suggested, but not required by City or specified in the Contract Documents. From the date of commencement of the Work until either the date on which City formally accepts the Project or the effective date of termination of the Contract, whichever is later, Contractor bears all risks of injury or damage to the Work and the materials and equipment delivered to any Worksite, by any cause including fire, earthquake, wind, weather, vandalism or theft.

(C) **Project Administration.** Contractor must provide sufficient and competent administration, staff, and skilled workforce necessary to perform and timely complete the Work in accordance with the Contract Documents. Before starting the Work, Contractor must designate in writing and provide complete contact information, including telephone numbers and email address, for the officer or employee in Contractor's organization who is to serve as Contractor's primary representative for the Project, and who has authority to act on Contractor's behalf. A Subcontractor may not serve as Contractor's primary representative.

(D) **On-Site Superintendent.** Contractor must, at all times during performance of the Work, provide a qualified and competent full-time superintendent, acceptable to City, and assistants, as necessary, who must be physically present at the Project site while any aspect of the Work is being performed. The superintendent must have full authority to act and communicate on behalf of Contractor, and Contractor will be bound by the superintendent's communications to City. City's approval of the superintendent is required before the Work commences. If City is not satisfied with the superintendent's performance, City may request a qualified replacement of the superintendent. Failure to comply may result in temporary suspension of the Work, at Contractor's sole expense and with no extension of Contract Time, until an approved superintendent is physically present to supervise the Work. Contractor must provide written notice to City, as soon as practicable, before replacing the superintendent.

(E) **Standards.** Contractor must, at all times, ensure that the Work is performed in an efficient, skillful manner following best practices and in full compliance with the Contract Documents and Laws and applicable manufacturer's recommendations. Contractor has a material and ongoing obligation to provide true and complete information, to the best of its knowledge, with respect to all records, documents, or communications

pertaining to the Project, including oral or written reports, statements, certifications, Change Order requests, or Claims.

(F) **Meetings.** Contractor, its project manager, superintendent, and any primary Subcontractors requested by City, must attend a pre-construction conference, if requested by City, as well as weekly Project progress meetings scheduled with City. If applicable, Contractor may also be required to participate in coordination meetings with other parties relating to other work being performed on or near the Project site or in relation to the Project, including work or activities performed by City, other contractors, or other utility owners.

(G) **Construction Records.** Contractor will maintain up-to-date, thorough, legible, and dated daily job reports, which document all significant activity on the Project for each day that Work is performed on the Project. The daily report for each day must include the number of workers at the Project site; primary Work activities; major deliveries; problems encountered, including injuries, if any; weather and site conditions; and delays, if any. Contractor will take date and time-stamped photographs to document general progress of the Project, including site conditions prior to construction activities, before and after photographs at offset trench laterals, existing improvements and utilities, damage and restoration. Contractor will maintain copies of all subcontracts, Project-related correspondence with subcontractors, and records of meetings with Subcontractors. Upon request by the City, Contractor will permit review of and/or provide copies of any of these construction records.

(H) **Responsible Party.** Contractor is solely responsible to City for the acts or omissions of any Subcontractors, or any other party or parties performing portions of the Work or providing equipment, materials or services for or on behalf of Contractor or the Subcontractors. Upon City's written request, Contractor must promptly and permanently remove from the Project, at no cost to City, any employee, Subcontractor, or employee of a Subcontractor who the Engineer has determined to be incompetent, intemperate or disorderly, or who has failed or refused to perform the Work as required under the Contract Documents.

(I) **Correction of Defects.** Contractor must promptly correct, at Contractor's sole expense, any Work that is determined by City to be deficient or defective in any way, including workmanship, materials, parts or equipment. Workmanship, materials, parts or equipment that do not conform to the requirements under the Plans, Specifications and every other Contract Document, as determined by City, will be considered defective and subject to rejection. Contractor must also promptly correct, at Contractor's sole expense, any Work performed beyond the lines and grades shown on the Plans or established by City, and any Extra Work

performed without City's prior written approval. If Contractor fails to correct or to take reasonable steps toward correcting defective Work within five days following notice from City, or within the time specified in City's notice to correct, City may elect to have the defective Work corrected by its own forces or by a third party, in which case the cost of correction will be deducted from the Contract Price. If City elects to correct defective Work due to Contractor's failure or refusal to do so, City or its agents will have the right to take possession of and use any equipment, supplies, or materials available at the Project site or any Worksite on City property, in order to effectuate the correction, at no extra cost to City. Contractor's warranty obligations under Section 11.2, Warranty, will not be waived nor limited by City's actions to correct defective Work under these circumstances. Alternatively, City may elect to retain defective Work, and deduct the difference in value, as determined by the Engineer, from payments otherwise due to Contractor. This paragraph applies to any defective Work performed by Contractor during the one-year warranty period under Section 11.2.

(J) **Contractor's Records.** Contractor must maintain all of its records relating to the Project in any form, including paper documents, photos, videos, electronic records, approved samples, and the construction records required pursuant to paragraph (G), above. Project records subject to this provision include, but are not limited to, complete Project cost records and records relating to preparation of Contractor's bid, including estimates, take-offs, and price quotes or bids.

- (1) Contractor's cost records must include all supporting documentation, including original receipts, invoices, and payroll records, evidencing its direct costs to perform the Work, including, but not limited to, costs for labor, materials and equipment. Each cost record should include, at a minimum, a description of the expenditure with references to the applicable requirements of the Contract Documents, the amount actually paid, the date of payment, and whether the expenditure is part of the original Contract Price, related to an executed Change Order, or otherwise categorized by Contractor as Extra Work. Contractor's failure to comply with this provision as to any claimed cost operates as a waiver of any rights to recover the claimed cost.
- (2) Contractor must continue to maintain its Project-related records in an organized manner for a period of five years after City's acceptance of the Project or following Contract termination, whichever occurs first. Subject to prior notice to Contractor, City is entitled to inspect or audit any of Contractor's Project records relating to the Project or to investigate Contractor's plant or equipment during Contractor's normal business hours. The record-

keeping requirements set forth in this subsection 2.2(J) will survive expiration or termination of the Contract.

(K) **Copies of Project Documents.** Contractor and its Subcontractors must keep copies, at the Project site, of all Work-related documents, including the Contract, permit(s), Plans, Specifications, Addenda, Contract amendments, Change Orders, RFIs and RFI responses, Shop Drawings, as-built drawings, schedules, daily records, testing and inspection reports or results, and any related written interpretations. These documents must be available to City for reference at all times during construction of the Project.

2.3 Subcontractors.

(A) **General.** All Work which is not performed by Contractor with its own forces must be performed by Subcontractors, subject to the **35%** limitation set forth in the Instructions to Bidders. City reserves the right to approve or reject any and all Subcontractors proposed to perform the Work, for reasons including the subcontractor's poor reputation, lack of relevant experience, financial instability, and lack of technical ability or adequately trained workforce. Each Subcontractor must obtain a City business license before performing any Work.

(B) **Contractual Obligations.** Contractor must require each Subcontractor to comply with the provisions of the Contract Documents as they apply to the Subcontractor's portion(s) of the Work, including the generally applicable terms of the Contract Documents, and to likewise bind their subcontractors. Contractor will provide that the rights that each Subcontractor may have against any manufacturer or supplier for breach of warranty or guarantee relating to items provided by the Subcontractor for the Project, will be assigned to City. Nothing in these Contract Documents creates a contractual relationship between a Subcontractor and City, but City is deemed to be a third-party beneficiary of the contract between Contractor and each Subcontractor. Copies of subcontracts must be available to the Engineer upon request. Before a Subcontractor commences Work on the Project, Contractor must provide the Engineer a written statement with the name of the Subcontractor, a description of each portion of the Work performed by the Subcontractor, and the percentage of the overall Work to be performed by the Subcontractor.

(C) **Termination.** If the Contract is terminated, each Subcontractor's agreement must be assigned by Contractor to City, subject to the prior rights of any surety, but only if and to the extent that City accepts, in writing, the assignment by written notification, and assumes all rights and obligations of Contractor pursuant to each such subcontract agreement.

(D) **Substitution of Subcontractor.** If Contractor requests substitution of a listed Subcontractor under Public Contract Code Section 4107, Contractor is solely responsible for all costs City incurs in responding to the request, including legal fees and costs to conduct a hearing, and any increased subcontract cost to perform the Work that was to be performed by the listed Subcontractor. If City determines that a Subcontractor is unacceptable to City based on the Subcontractor's failure to satisfactorily perform its Work, or for any of the grounds for substitution listed in Public Contract Code Section 4107(a), City may request removal of the Subcontractor from the Project. Upon receipt of a written request from City to remove a Subcontractor pursuant to this paragraph, Contractor will immediately remove the Subcontractor from the Project and, at no further cost to City, will either (1) self-perform the remaining Work to the extent that Contractor is duly licensed and qualified to do so, or (2) substitute a Subcontractor that is acceptable to City, in compliance with Public Contract Code Section 4107, as applicable.

2.4 Coordination of Work.

(A) **Concurrent Work.** City reserves the right to perform have performed, or permit performance of other work on or adjacent to the Project site while the Work is being performed for the Project. Contractor is responsible for coordinating its Work with other work being performed on or adjacent to the Project site, including by any utility companies or agencies, and must avoid hindering, delaying, or interfering with the work of other contractors, individuals, or entities, and must ensure safe and reasonable site access and use as required or authorized by City. To the full extent permitted by law, Contractor must hold harmless and indemnify City against any and all claims arising from or related to Contractor's avoidable, negligent, or willful hindrance of, delay to, or interference with the work of any utility company or agency or another contractor or subcontractor.

(B) **Coordination.** If Contractor's Work will connect or interface with work performed by others, Contractor is responsible for independently measuring and visually inspecting such work to ensure a correct connection and interface. Contractor is responsible for any failure by Contractor or its Subcontractors to confirm measurements before proceeding with connecting Work. Before proceeding with any portion of the Work affected by the construction or operations of others, Contractor must give the Project Manager prompt written notification of any defects Contractor discovers which will prevent the proper execution of the Work. Failure to give notice of any known or reasonably discoverable defects will be deemed acknowledgement by Contractor that the work of others is not defective and will not prevent the proper execution of the Work. Contractor must also promptly notify City if work performed by others, including work

or activities performed by City's own forces, is operating to hinder, delay, or interfere with Contractor's timely performance of the Work. City reserves the right to backcharge Contractor for any additional costs incurred due to Contractor's failure to comply with the requirements in this Section 2.4.

2.5 Submittals. Unless otherwise specified, Contractor must submit to Engineer for review and acceptance, all schedules, Shop Drawings, samples, product data and similar submittals required by the Contract Documents, or upon request by Engineer. Unless otherwise specified, all submittals, including Requests for Information (RFIs) are subject to the provisions of this Section, as well as specific submittal requirements that may be included elsewhere in the Contract Documents, including the Special Conditions or Specifications. The Engineer may require submission of a submittal schedule at or before a pre-construction conference, as may be specified in the Notice to Proceed.

(A) **General.** Contractor is responsible for ensuring that its submittals are accurate and conform to the Contract Documents.

(B) **Time and Manner of Submission.** Contractor must ensure that its submittals are prepared and delivered in a manner consistent with the current City-accepted schedule for the Work and within the applicable time specified elsewhere in the Contract Documents, or if no time is specified, in such time and sequence so as not to delay the performance of the Work or completion of the Project.

(C) **Required Contents.** Each submittal must include the Project name and contract number, Contractor's name and address, the name and address of any Subcontractor or supplier involved with the submittal, the date, and references to applicable Specification section(s) and/or drawing and detail number(s).

(D) **Required Corrections.** If corrections are required, Contractor must promptly make and submit any required corrections as specified in full conformance with the requirements of this Section, or other requirements that apply to that submittal.

(E) **Effect of Review and Acceptance.** Review and acceptance of a submittal by City will not relieve Contractor from complying with the requirements of the Contract Documents. Contractor is responsible for any errors in any submittal, and review or acceptance of a submittal by City is not an assumption of risk or liability by City.

(F) **Enforcement.** Any Work performed or any material furnished, installed, fabricated, or used without City's prior acceptance of a required

submittal is performed or provided at Contractor's risk, and Contractor may be required to bear the costs incident thereto, including the cost of removing and replacing such Work or material, repairs to other affected portions of the Work, and the cost of additional time or services required of City, including costs for the Design Professional, Project Manager, or Inspector.

(G) **Excessive RFIs.** An RFI will be considered excessive or unnecessary if the City determines that the explanation or response to the RFI is clearly and unambiguously discernable from the Contract Documents. City's costs to review and respond to excessive or unnecessary RFIs may be deducted from payments otherwise due to Contractor.

2.6 Shop Drawings. When Shop Drawings are required by the Specifications or requested by the Engineer, they must be prepared according to best practices at Contractor's expense. The Shop Drawings must be of a size and scale to clearly show all necessary details. Unless otherwise specified by City, Shop Drawings must be provided to the Engineer for review and acceptance at least 30 days before the Work will be performed. If City requires changes, the corrected Shop Drawings must be resubmitted to the Engineer for review within the time specified by the Engineer. For all Project components requiring Shop Drawings, Contractor will not furnish materials or perform any Work until the Shop Drawings for those components are accepted by City. Contractor is responsible for any errors or omissions in the Shop Drawings, shop fits and field corrections; any deviations from the Contract Documents; and for the results obtained by the use of Shop Drawings. Acceptance of Shop Drawings by City does not relieve Contractor of Contractor's responsibility.

2.7 Access to Work. Contractor must afford prompt and safe access to any Worksite by City and its employees, agents, or consultants authorized by City; and upon request by City, Contractor must promptly arrange for City representatives to visit or inspect manufacturing sites or fabrication facilities for items to be incorporated into the Work.

2.8 Personnel. Contractor and its Subcontractors must employ only competent and skillful personnel to perform the Work. Contractor and its Subcontractor's supervisors, security or safety personnel, and employees who have unescorted access to the Project site must possess proficiency in English sufficient to read, understand, receive, and implement oral or written communications or instructions relating to their respective job functions, including safety and security requirements. Upon written notification from the Engineer, Contractor and its Subcontractors must immediately discharge any personnel who are incompetent, disorderly, disruptive, threatening, abusive, or profane, or otherwise refuse or fail to comply with the requirements of the Contract Documents or Laws, including Laws pertaining to health and safety. Any such

discharged personnel may not be re-employed or permitted on the Project in any capacity without City's prior written consent.

Article 3 - Contract Documents

3.1 Interpretation of Contract Documents.

(A) ***Plans and Specifications.*** The Plans and Specifications included in the Contract Documents are complementary. If Work is shown on one but not on the other, Contractor must perform the Work as though fully described on both, consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. The Plans and Specifications are deemed to include and require everything necessary and reasonably incidental to completion of the Work, whether or not particularly mentioned or shown. Contractor must perform all Work and services and supply all things reasonably related to and inferable from the Contract Documents. In the event of a conflict between the Plans and Specifications, the Specifications will control, unless the Plan(s) at issue are dated later than the Specification(s) at issue. Detailed drawings take precedence over general drawings, and large-scale drawings take precedence over smaller scale drawings. Any arrangement or division of the Plans and Specifications into sections is for convenience and is not intended to limit the Work required by separate trades. A conclusion presented in the Plans or Specifications is only a recommendation. Actual locations and depths must be determined by Contractor's field investigation. Contractor may request access to underlying or background information in City's possession that is necessary for Contractor to form its own conclusions.

(B) ***Duty to Notify and Seek Direction.*** If Contractor becomes aware of a changed condition in the Project, or of any ambiguity, conflict, inconsistency, discrepancy, omission, or error in the Contract Documents, including the Plans or Specifications, Contractor must promptly submit a Request for Information to the Engineer and wait for a response from City before proceeding further with the related Work. The RFI must notify the City of the issue and request clarification, interpretation, or direction. The Engineer's clarification, interpretation, or direction will be final and binding on Contractor. If Contractor proceeds with the related Work before obtaining City's response, Contractor will be responsible for any resulting costs, including the cost of correcting any incorrect or defective Work that results. Timely submission of a clear and complete RFI is essential to avoiding delay. Delay resulting from Contractor's failure to submit a timely and complete RFI to the Engineer is Non-Excusable Delay. If Contractor believes that City's response to an RFI justifies a change to the Contract Price or Contract Time, Contractor must perform the Work as directed, but

may submit a timely Change Order request in accordance with the Contract Documents. (See Article 5 and 6.)

(C) **Figures and Dimensions.** Figures control over scaled dimensions.

(D) **Technical or Trade Terms.** Any terms that have well-known technical or trade meanings will be interpreted in accordance with those meanings, unless otherwise specifically defined in the Contract Documents.

(E) **Measurements.** Contractor must verify all relevant measurements in the Contract Documents and at the Project site before ordering any material or performing any Work, and will be responsible for the correctness of those measurements or for costs that could have been avoided by independently verifying measurements.

(F) **Compliance with Laws.** The Contract Documents are intended to comply with Laws and will be interpreted to comply with Laws.

3.2 Order of Precedence. Information included in one Contract Document but not in another will not be considered a conflict or inconsistency. Unless otherwise specified in the Special Conditions, in case of any conflict or inconsistency among the Contract Documents, the following order of precedence will apply, beginning from highest to lowest, with the most recent version taking precedent over an earlier version:

- (A) Change Orders;
- (B) Addenda;
- (C) Contract;
- (D) Notice to Proceed;
- (E) Appendix B- Federal Contract Requirements (only if used);
- (F) Special Conditions;
- (G) General Conditions;
- (H) Payment and Performance Bonds;
- (I) Specifications;
- (J) Plans;
- (K) Notice of Award
- (L) Notice Inviting Bids;
- (M) Appendix A – Federal Bidding Requirements (only if used);
- (N) Instructions to Bidders;
- (O) Contractor's Bid Proposal and attachments;
- (P) The City's standard specifications, as applicable; and
- (Q) Any generic documents prepared by and on behalf of a third party, that were not prepared specifically for this Project, such as Caltrans Standard Specifications or Caltrans Special Provisions.

3.3 Caltrans Standard Specifications. Any reference to or incorporation of the Standard Specifications of the State of California, Department of Transportation (“Caltrans”), including “Standard Specifications,” “Caltrans Specifications,” “State Specifications,” or “CSS,” means the most current edition of Caltrans’ Standard Specifications, unless otherwise specified (“Caltrans Standard Specifications”), including the most current amendments as of the date that Contractor’s bid was submitted for this Project. The following provisions apply to use of or reference to the Caltrans Standard Specifications or Special Provisions:

- (A) **Limitations.** None of the “General Provisions” of the Caltrans Standard Specifications, i.e., Sections 1 through 9, applies to these Contract Documents with the exception of any specific provisions, if any, which are expressly stated to apply to these Contract Documents.
- (B) **Conflicts or Inconsistencies.** If there is a conflict or inconsistency between any provision in the Caltrans Standard Specifications or Special Provisions and a provision of these Contract Documents, as determined by City, the provision in the Contract Documents will govern.
- (C) **Meanings.** Terms used in the Caltrans Standard Specifications or Special Provisions are to be interpreted as follows:
 - (1) Any reference to the “Engineer” is deemed to mean the City Engineer.
 - (2) Any reference to the “Special Provisions” is deemed to mean the Special Conditions, unless the Caltrans Special Provisions are expressly included in the Contract Documents listed in Section 2 of the Contract.
 - (3) Any reference to the “Department” or “State” is deemed to mean City.

3.4 For Reference Only. Contractor is responsible for the careful review of any document, study, or report provided by the City or appended to the Contract Documents solely for informational purposes and identified as “For Reference Only.” Nothing in any document, study, or report so appended and identified is intended to supplement, alter, or void any provision of the Contract Documents. Contractor is advised that City or its representatives may be guided by information or recommendations included in such reference documents, particularly when making determinations as to the acceptability of proposed materials, methods, or changes in the Work. Any record drawings or similar final or accepted drawings or maps that are not part of the Contract Documents are deemed to be For Reference Only. The provisions of the Contract Documents

are not modified by any perceived or actual conflict with provisions in any document that is provided For Reference Only.

3.5 Current Versions. Unless otherwise specified by City, any reference to standard specifications, technical specifications, or any City or state codes or regulations means the latest specification, code or regulation in effect at the time the Contract is signed.

3.6 Conformed Copies. If City prepares a conformed set of the Contract Documents following award of the Contract, it will provide Contractor with two hard copy (paper) sets and one copy of the electronic file in PDF format. It is Contractor's responsibility to ensure that all Subcontractors, including fabricators, are provided with the conformed set of the Contract Documents at Contractor's sole expense.

3.7 Ownership. No portion of the Contract Documents may be used for any purpose other than construction of the Project, without prior written consent from City. Contractor is deemed to have conveyed the copyright in any designs, drawings, specifications, Shop Drawings, or other documents (in paper or electronic form) developed by Contractor for the Project, and City will retain all rights to such works, including the right to possession.

Article 4 - Bonds, Indemnity, and Insurance

4.1 Payment and Performance Bonds. Within ten days following issuance of the Notice of Award, Contractor is required to provide a payment bond and a performance bond, each in the penal sum of not less than 100 percent of the Contract Price, and each executed by Contractor and its surety using the bond forms included with the Contract Documents.

(A) **Surety.** Each bond must be issued and executed by a surety admitted in California. If an issuing surety cancels the bond or becomes insolvent, within seven days following written notice from City, Contractor must substitute a surety acceptable to City. If Contractor fails to substitute an acceptable surety within the specified time, City may, at its sole discretion, withhold payment from Contractor until the surety is replaced to City's satisfaction, or terminate the Contract for default.

(B) **Supplemental Bonds for Increase in Contract Price.** If the Contract Price increases during construction by five percent or more over the original Contract Price, Contractor must provide supplemental or replacement bonds within ten days of written notice from City pursuant to this Section, covering 100% of the increased Contract Price and using the bond forms included with the Contract Documents.

4.2 Indemnity. To the fullest extent permitted by law, Contractor must indemnify, defend, and hold harmless City, its Council, officers, officials, employees, agents, volunteers, and consultants, (individually, an “Indemnitee,” and collectively the “Indemnitees”) from and against any and all liability, loss, damage, claims, causes of action, demands, charges, fines, costs, and expenses (including, without limitation, attorney fees, expert witness fees, paralegal fees, and fees and costs of litigation or arbitration) (collectively, “Liability”) of every nature arising out of or in connection with the acts or omissions of Contractor, its employees, Subcontractors, representatives, or agents, in bidding or performing the Work or in failing to comply with any obligation of Contractor under the Contract, except such Liability caused by the active negligence, sole negligence, or willful misconduct of an Indemnitee. This indemnity requirement applies to any Liability arising from alleged defects in the content or manner of submission of Contractor’s bid for the Contract. Contractor’s failure or refusal to timely accept a tender of defense pursuant to this Contract will be deemed a material breach of this Contract. City will timely notify Contractor upon receipt of any third-party claim relating to the Contract, as required by Public Contract Code Section 9201. Contractor waives any right to express or implied indemnity against any Indemnitee. Contractor’s indemnity obligations under this Contract will survive the expiration or any early termination of the Contract.

4.3 Insurance. No later than ten days following issuance of the Notice of Award, Contractor must procure and provide proof of the insurance coverage required by this Section in the form of certificates and endorsements acceptable to City. The required insurance must cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work, and must remain in full force and effect at all times during the period covered by the Contract through the date of City’s acceptance of the Project. The coverages may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by excess or “umbrella” policies, provided each such policy complies with the requirements set forth herein. All required insurance must be issued by a company licensed to do business in the State of California, and each such insurer must have an A.M. Best’s financial strength rating of “A” or better and a financial size rating of “VIII” or better. If Contractor fails to provide any of the required coverage in full compliance with the requirements of the Contract Documents, City may, at its sole discretion, purchase such coverage at Contractor’s expense and deduct the cost from payments due to Contractor, or terminate the Contract for default. Contractor further understands that City reserves the right to modify the insurance requirements set forth herein, with thirty (30) days’ notice provided to Contractor, at any time as deemed necessary to protect the interests of City. The procurement of the required insurance will not be construed to limit Contractor’s liability under this Contract or to fulfill Contractor’s indemnification obligations under this Contract.

(A) **Deductibles and Self-Insured Retentions.** Any deductibles or self-insured retentions must be declared to and approved by City. If the City's Risk Manager determines that the deductibles and/or self-insured retentions are unacceptably high, at City's option, Contractor must either reduce or eliminate the deductibles and/or self-insured retentions as they apply to City and all required Additional Insured; or must provide a financial guarantee, to City's satisfaction, guaranteeing payment of losses and related investigation, claim administration, and legal expenses.

(B) **Policies and Limits.** The following insurance policies and limits are required for this Contract unless otherwise specified in the Special Conditions:

- (1) **Commercial General Liability Insurance ("CGL").** Contractor shall maintain CGL and must include coverage for liability arising from Contractor's or its Subcontractor's acts or omissions in the performance of the Work against claims and liabilities for personal injury, death, or property damage providing protection in the minimum amount of: (i) two million dollars (\$2,000,000.00) combined single limit each occurrence and either a general aggregate limit of four million dollars (\$4,000,000.00) or a general aggregate limit of two million dollars (\$2,000,000.00) as applied on a "per project" or "per location" basis, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.
 - a. CGL policy may not exclude explosion, collapse, underground excavation hazard, or removal of lateral support.
 - b. CGL policy must include contractor's protected coverage, blanket contractual, and completed operations.
- (2) **Union Pacific Railroad Company Insurance Requirements.** Refer to Appendix A, Article 5. Contractor must meet these requirements and must obtain Railroad Protective Liability Insurance.
- (3) **Workers' Compensation Insurance and Employer's Liability:** Contractor shall maintain Workers Compensation coverage, as required by law. The policy must comply with the requirements of the California Workers' Compensation Insurance and Safety Act and provide protection in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) for

any one accident or occurrence, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater. If Contractor is self-insured, Contractor must provide its Certificate of Permission to Self-Insure, duly authorized by the Department of Industrial Relations.

- (4) **Automobile Liability:** Contractor shall maintain Automobile Liability covering all owned, non-owned and hired automobiles (if Contractor does not own automobiles, then Contractor shall maintain Hired/Non-owned Automobile Liability) against claims and liabilities for personal injury, death, or property damage providing protection in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) combined single limit, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.
- (5) **Pollution (Environmental) Liability:** Because the performance of Contractor's work or service under this Contract involves hazardous materials, contaminated soil disposal, and/or a risk of accidental release of fuel oil, chemicals or other toxic gases or hazardous materials, Contractor shall procure and maintain Pollution Liability covering Contractor's liability for bodily injury, property damage and environmental damage resulting from pollution and related cleanup costs arising out of the work or services to be performed under this Contract. Coverage shall be provided for both work performed on site, as well as during the transport of hazardous materials. Such coverage shall be in the minimum amount of: (i) Two Million Dollars (\$2,000,000.00) for any one accident or occurrence, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.
- (6) **Professional Liability:**
 - a. If the performance of Contractor's work or service under this Contract involves professional and/or technical services (examples include, but are not limited to, architects, engineers, land surveyors, legal services, and appraisers), Contractor shall procure and maintain either a claims made or occurrence Errors and Omission liability insurance in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) each claim, or (ii) the maximum amount of such insurance

available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater. Further, if Contractor maintains a claims-made policy, Contractor shall provide written evidence of such insurance to City for at least five (5) years after the completion of work performed under this Contract.

- b. If the performance of Contractor's work or service under this Contract relates to Information Technology or related services (examples include, but are not limited to computer programmers, hardware engineers, or other systems consultants), Contractor shall procure and maintain a claims made Errors and Omission liability insurance, including Cyber Liability and Data Breach, in the minimum amount of: (i) One Million Dollars (\$1,000,000.00) each claim, or (ii) the maximum amount of such insurance available to Contractor under Contractor's combined insurance policies (including any excess or "umbrella" policies), whichever is greater.

(C) **Required Endorsements.** Contractor must provide proof of the following endorsements, listed for each policy for which endorsements are required, as outlined below:

- (1) For all Policies except Professional Liability:
 - a. "Waiver of Subrogation" endorsements providing that the carrier agrees to waive any right of subrogation it may have against the City of Morgan Hill and the City's elected or appointed officials, boards, agencies, officers, agents, employees, and volunteers.
- (2) General Liability, Automobile, and Pollution Liability:
 - a. "Additionally Insured" endorsements naming the City of Morgan Hill, its elected or appointed officials, boards, agencies, officers, agents, employees, and volunteers as additional insureds;
 - b. "Primary and Non-Contributing" endorsements stating that the policy is primary non-contributing;
- (3) General Liability:
 - a. "Separation of Insureds" endorsements stating that the inclusion of more than one insured will not operate to impair

the rights of one insured against another, and the coverages afforded will apply as though separate policies have been issued to each insured.

(D) **Subcontractors.** Contractor must ensure that each Subcontractor is required to maintain the same insurance coverage required under this Section 4.3, with respect to its performance of Work on the Project, including those requirements related to the additional insureds and waiver of subrogation. Contractor must confirm that each Subcontractor has complied with requirements as outlined herein. The insurance requirements for Subcontractors do not replace or limit the Contractor's insurance obligations.

(E) **Certificates.** Contractor must furnish City with copies of all certificates as outlined herein, whether new or modified, promptly upon receipt. In the event of a claim or legal action, CONSULTANT shall promptly furnish CITY of Morgan Hill with copies of all policies outlined herein. No policy subject to Contractor's Contract with City shall be reduced, canceled, allowed to expire, or materially changed except after thirty (30) days' notice by the insurer to City, unless due to non-payment of premiums, in which case ten (10) days written notice must be made to City. Certificates, including renewal certificates, may be mailed electronically to riskmgmt@morganhill.ca.gov or delivered to the Certificate Holder address as follows:

City of Morgan Hill
Attn: Risk Management
17575 Peak Avenue
Morgan Hill, CA 95037

(F) **Contractor's Responsibilities.** This Section 4.3 establishes the minimum requirements for Contractor's insurance coverage in relation to this Project, but is not intended to limit Contractor's ability to procure additional or greater coverage. Contractor is responsible for its own risk assessment and needs and is encouraged to consult its insurance provider to determine what coverage it may wish to carry beyond the minimum requirements of this Section. Contractor is solely responsible for the cost of its insurance coverage, including premium payments, deductibles, or self-insured retentions, and no Additional Insured will be responsible or liable for any of the cost of Contractor's insurance coverage.

Article 5 - Contract Time

5.1 Time is of the Essence. Time is of the essence in Contractor's performance and completion of the Work, and Contractor must diligently prosecute the Work and complete it within the Contract Time.

(A) **General.** Contractor must commence the Work on the date indicated in the Notice to Proceed, and must fully complete the Work in strict compliance with all requirements of the Contract Documents and within the Contract Time. Contractor may not begin performing the Work before the date specified in the Notice to Proceed.

(B) **Authorization.** Contractor is not entitled to compensation or credit for any Work performed before the date specified in the Notice to Proceed, with the exception of any schedules, submittals, or other requirements, if any, that must be provided or performed before issuance of the Notice to Proceed

(C) **Rate of Progress.** Contractor and its Subcontractors must, at all times, provide workers, materials, and equipment sufficient to maintain the rate of progress necessary to ensure full completion of the Work within the Contract Time. If City determines that Contractor is failing to prosecute the Work at a sufficient rate of progress, City may, in its sole discretion, direct Contractor to provide additional workers, materials, or equipment, or to work additional hours or days without additional cost to City, in order to achieve a rate of progress satisfactory to City. If Contractor fails to comply with City's directive in this regard, City may, at Contractor's expense, separately contract for additional workers, materials, or equipment or use City's own forces to achieve the necessary rate of progress. Alternatively, City may terminate the Contract based on Contractor's default.

5.2 Schedule Requirements. Contractor must prepare all schedules using standard, commercial scheduling software acceptable to Engineer, and must provide the schedules in electronic and paper form as requested by the Engineer. In addition to the general scheduling requirements set forth below, Contractor must also comply with any scheduling requirements included in the Special Conditions or in the Technical Specifications.

(A) **Baseline (As-Planned) Schedule.** Within ten calendar days following City's issuance of the Notice to Proceed (or as otherwise specified in the Notice to Proceed), Contractor must submit to City for review and acceptance a baseline as-planned schedule using critical path methodology showing in detail how Contractor plans to perform and fully complete the Work within the Contract Time including labor, equipment, materials and fabricated items. The baseline schedule must show the order of the major items of Work and the dates of start and completion of

each item, including when the materials and equipment will be procured. The schedule must also include the work of all trades reflecting anticipated labor or crew hours and equipment loading for the construction activities, and must be sufficiently comprehensive and detailed to enable progress to be monitored on a day-by-day basis. For each activity, the baseline schedule must be dated, provided in the format specified in the Contract Documents or as required by City, and must include, at a minimum, a description of the activity, the start and completion dates of the activity, and the duration of the activity.

(1) ***Specialized Materials Ordering.*** Within five calendar days following issuance of the Notice to Proceed, Contractor must order any specialized material or equipment for the Work that is not readily available from material suppliers. Contractor must also retain documentation of the purchase orders date(s).

(B) ***City's Review of Schedules.*** City will review and may note exceptions to the baseline schedule, and to the progress schedules submitted as required below, to assure completion of the Work within the Contract Time. Contractor is solely responsible for resolving any exceptions noted in a schedule and, within seven days, must correct the schedule to address the exceptions. City's review or acceptance of Contractor's schedules will not operate to waive or limit Contractor's duty to complete the Project within the Contract Time, nor to waive or limit City's right to assess liquidated damages for Contractor's unexcused failure to do so.

(C) ***Progress Schedules.*** After City accepts the final baseline schedule with no exceptions, Contractor must submit an updated progress schedule and three week look-ahead schedule, in the format specified by City, for review and acceptance with each application for a progress payment or when otherwise specified by City, until completion of the Work. The updated progress schedule must show: how the actual progress of the Work as constructed to date compares to the baseline schedule; reflect any proposed changes in the construction schedule or method of operations, including to achieve Project milestones within the Contract Time; and identify any actual or potential impacts to the critical path. Contractor must also submit periodic reports to City of any changes in the projected material or equipment delivery dates for the Project.

(1) ***Float.*** The progress schedule must show early and late completion dates for each task. The number of days between those dates will be designated as the "float." Any float belongs to the Project and may be allocated by the Engineer to best serve timely completion of the Project.

(2) ***Failure to Submit Schedule.*** Reliable, up-to-date schedules are essential to efficient and cost-effective administration of the Project and timely completion. If Contractor fails to submit a schedule within the time periods specified in this Section, or submits a schedule to which City has noted exceptions that are not corrected, City may withhold up to ten percent from payment(s) otherwise due to Contractor until the exceptions are resolved, the schedule is corrected and resubmitted, and City has accepted the schedule. In addition, Contractor's failure to comply with the schedule requirements in this Section 5.2 will be deemed a material default and a waiver of any claims for Excusable Delay or loss of productivity arising during any period when Contractor is out of compliance, subject only to the limits of Public Contract Code Section 7102.

(D) ***Recovery Schedule.*** If City determines that the Work is more than one week behind schedule, within seven days following written notice of such determination, Contractor must submit a recovery schedule, showing how Contractor intends to perform and complete the Work within the Contract Time, based on actual progress to date.

(E) ***Effect of Acceptance.*** Contractor and its Subcontractors must perform the Work in accordance with the most current City-accepted schedule unless otherwise directed by City. City's acceptance of a schedule does not operate to extend the time for completion of the Work or any component of the Work, and will not affect City's right to assess liquidated damages for Contractor's unexcused delay in completing the Work within the Contract Time.

(F) ***Posting.*** Contractor must at all times prominently post a copy of the most current City-accepted progress or recovery schedule in its on-site office.

(G) ***Reservation of Rights.*** City reserves the right to direct the sequence in which the Work must be performed or to make changes in the sequence of the Work in order to facilitate the performance of work by City or others, or to facilitate City's use of its property. The Contract Time or Contract Price may be adjusted to the extent such changes in sequence actually increase or decrease Contractor's time or cost to perform the Work.

(H) ***Authorized Working Days and Times.*** Contractor is limited to working Monday through Friday, excluding City of Morgan Hill-observed holidays, during City's normal business hours, except as expressly provided in the Special Conditions, or as authorized in writing by City. City reserves the right to charge Contractor for additional costs incurred by City

due to Work performed on days or during hours not expressly authorized in the Contract Documents, including reimbursement of costs incurred for inspection, testing, and construction management services.

5.3 Delay and Extensions of Contract Time.

(A) **Notice of Delay.** If Contractor becomes aware of any actual or potential delay affecting the critical path, Contractor must promptly notify the Engineer in writing, regardless of the nature or cause of the delay, so that City has a reasonable opportunity to mitigate or avoid the delay.

(B) **Excusable Delay.** The Contract Time may be extended if Contractor encounters “Excusable Delay,” which is an unavoidable delay in completing the Work within the Contract Time due to causes completely beyond Contractor’s control, and which Contractor could not have avoided or mitigated through reasonable care, planning, foresight, and diligence, provided that Contractor is otherwise fully performing its obligations under the Contract Documents. Grounds for Excusable Delay may include fire, natural disasters, including earthquake or unusually severe weather, acts of terror or vandalism, epidemic, unforeseeable adverse government actions, unforeseeable actions of third parties, encountering unforeseeable hazardous materials, unforeseeable site conditions, or suspension for convenience under Article 13. The Contract Time will not be extended based on circumstances which will not unavoidably delay completing the Work within the Contract Time based on critical path analysis.

(C) **Weather Delays.** A “Weather Delay Day” is a Working Day during which Contractor and its forces, including Subcontractors, are unable to perform more than 40% of the critical path Work scheduled for that day due to adverse weather conditions which impair the ability to safely or effectively perform the scheduled critical path Work that day. Adverse weather conditions may include rain, saturated soil, and Project site clean-up required due to adverse weather. Determination of what constitutes critical path Work scheduled for that day will be based on the most current, City-approved schedule. Contractor will be entitled to a non-compensable extension of the Contract Time for each Weather Delay Day in excess of the normal Weather Delay Days within a given month as determined by reliable records, including monthly rainfall averages, for the preceding ten years (or as otherwise specified in the Special Conditions or Specifications).

(1) Contractor must fully comply with the applicable procedures in Articles 5 and 6 of the General Conditions regarding requests to modify the Contract Time.

(2) Contractor will not be entitled to an extension of time for a Weather Delay Day to the extent Contractor is responsible for concurrent delay on that day.

(3) Contractor must take reasonable steps to mitigate the consequences of Weather Delay Days, including prudent workforce management and protecting the Work, Project Site, materials, and equipment.

(D) **Non-Excusable Delay.** Delay which Contractor could have avoided or mitigated through reasonable care, planning, foresight and diligence is "Non-Excusable Delay." Contractor is not entitled to an extension of Contract Time or any compensation for Non-Excusable Delay, or for Excusable Delay that is concurrent with Non-Excusable Delay. Non-Excusable Delay includes delay caused by:

(1) weather conditions which are normal for the location of the Project, as determined by reliable records, including monthly rainfall averages, for the preceding ten years;

(2) Contractor's failure to order equipment and materials sufficiently in advance of the time needed for completion of the Work within the Contract Time;

(3) Contractor's failure to provide adequate notification to utility companies or agencies for connections or services necessary for completion of the Work within the Contract Time;

(4) foreseeable conditions which Contractor could have ascertained from reasonably diligent inspection of the Project site or review of the Contract Documents or other information provided to the Contractor;

(5) Contractor's failure, refusal, or financial inability to perform the Work within the Contract Time, including insufficient funds to pay its Subcontractors or suppliers.

(6) performance or non-performance by Contractor's Subcontractors or suppliers;

(7) the time required to respond to excessive RFIs (see Section 2.5(G));

(8) delayed submission of required submittals, or the time required for correction and resubmission of defective submittals;

(9) time required for repair of, re-testing, or re-inspection of defective Work;

(10) enforcement of Laws by City, or outside agencies with jurisdiction over the Work; or

(11) City's exercise or enforcement of any of its rights or Contractor's duties pursuant to the Contract Documents, including correction of defective Work, extra inspections or testing due to non-compliance with Contract requirements, safety compliance, environmental compliance, or rejection and return of defective or deficient submittals.

(E) **Compensable Delay.** Pursuant to Public Contract Code Section 7102, in addition to entitlement to an extension of Contract Time, Contractor is entitled to compensation for costs incurred due to delay caused solely by City, when that delay is unreasonable under the circumstances involved and not within the contemplation of the parties ("Compensable Delay"). Contractor is not entitled to an extension of Contract Time or recovery of costs for Compensable Delay that is concurrent with Non-Excusable Delay. Delay due to causes that are beyond the control of either City or Contractor, including Weather Delay Days, discovery of Historic or Archeological Items pursuant to Section 7.18, or the actions or inactions of third parties or other agencies, is not Compensable Delay, and will only entitle Contractor to an extension of time commensurate with the time lost due to such delay.

(F) **Recoverable Costs.** Contractor is not entitled to compensation for Excusable Delay unless it is Compensable Delay, as defined above. Contractor is entitled to recover only the actual, direct, reasonable, and substantiated costs ("Recoverable Costs") for each working day that the Compensable Delay prevents Contractor from proceeding with more than 50% of the critical path Work scheduled for that day, based on the most recent progress schedule accepted by City. Recoverable Costs will not include home office overhead or lost profit.

(G) **Request for Extension of Contract Time or Recoverable Costs.** A request for an extension of Contract Time or any associated Recoverable Costs must be submitted in writing to City within ten calendar days of the date the delay is first encountered, even if the duration of the delay is not yet known at that time, or any entitlement to the Contract Time extension or to the Recoverable Costs will be deemed waived. In addition to complying with the requirements of this Article 5, the request must be submitted in compliance with the Change Order request procedures in Article 6, below. Strict compliance with these requirements is necessary

to ensure that any delay or consequences of delay may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project and timely performance of the Work. Any request for an extension of Contract Time or Recoverable Costs that does not strictly comply with all of the requirements of Article 5 and Article 6 will be deemed waived.

(1) *Required Contents.* The request must include a detailed description of the cause(s) of the delay, and must also describe the measures that Contractor has taken to mitigate the delay and/or its effects, including efforts to mitigate the cost impact of the delay, such as by workforce management, or by a change in sequencing. If the delay is still ongoing at the time the request is submitted, the request should also include Contractor's plan for continued mitigation of the delay or its effects.

(2) *Delay Days and Costs.* The request must specify the number of days of Excusable Delay claimed, or provide a realistic estimate if the duration of the delay is not yet known. If the Contractor believes it is entitled to Recoverable Costs for Compensable Delay, the request must specify the amount of and basis for the Recoverable Costs that are claimed or provide a realistic estimate if the amount is not yet known. Any estimate of delay duration or cost must be updated in writing and submitted with all required supporting documentation as soon as the actual time and cost is known. The maximum extension of Contract Time will be the number of days, if any, by which an Excusable Delay or a Compensable Delay exceeds any concurrent Non-Excusable Delay. Contractor is entitled to an extension of Contract Time, or compensation for Recoverable Costs, only if, and only to the extent that, such delay will unavoidably delay Final Completion.

(3) *Supporting Documentation.* The request must also include any and all supporting documentation necessary to evidence the delay and its actual impacts, including scheduling and cost impacts, with a time impact analysis using critical path methodology, and demonstrating the unavoidable delay to Final Completion. The time impact analysis must be submitted in a form or format acceptable to City.

(4) *Burden of Proof.* Contractor has the burden of proving that the delay was an Excusable or Compensable Delay, as defined above; Contractor has fully complied with its scheduling obligations in Section 5.2, Schedule Requirements; Contractor has made reasonable efforts to mitigate the delay and its schedule and cost impacts; the delay will unavoidably result in delaying Final Completion, and any Recoverable Costs claimed by Contractor

were actually incurred and were reasonable under the circumstances.

(5) *Legal Compliance.* Nothing in this Section 5.3 is intended to require the waiver, alteration, or limitation of the applicability of Public Contract Code Section 7102.

(6) *No Waiver.* Any grant of an extension of Contract Time or compensation for Recoverable Costs due to Compensable Delay will not operate as a waiver of City's right to assess liquidated damages for Non-Excusable Delay.

(7) *Dispute Resolution.* In the event of a dispute over entitlement to an extension of Contract Time or compensation for Recoverable Costs, Contractor may not stop Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work. Contractor's sole recourse for an unresolved dispute based on City's rejection of a Change Order request for an extension of Contract Time or compensation for Recoverable Costs is to comply with the dispute resolution provisions set forth in Article 12, below.

5.4 Liquidated Damages. It is expressly understood that if Final Completion is not achieved within the Contract Time, City will suffer damages from the delay that are difficult to determine and accurately specify. Pursuant to Public Contract Code section 7203, if Contractor fails to achieve Final Completion within the Contract Time, City will charge Contractor in the amount specified in the Contract for each day that Final Completion is delayed beyond the Contract Time, as liquidated damages and not as a penalty. Any waiver of accrued liquidated damages, in whole or in part, is subject to approval of the City Council or its authorized delegee.

(A) **Liquidated Damages.** Liquidated damages will not be assessed for any Excusable or Compensable Delay, as set forth above.

(B) **Milestones.** Liquidated damages may also be separately assessed for failure to meet milestones specified elsewhere in the Contract Documents.

(C) **Setoff.** City is entitled to deduct the amount of liquidated damages assessed against any payments otherwise due to Contractor, including progress payments, Final Payment, or unreleased retention. If there are insufficient Contract funds remaining to cover the full amount of liquidated damages assessed, City is entitled to recover the balance from Contractor or its performance bond surety.

(D) **Occupancy or Use.** Occupancy or use of the Project in whole or in part prior to Final Completion does not constitute City's acceptance of the Project and will not operate as a waiver of City's right to assess liquidated damages for Contractor's Non-Excusable Delay in achieving Final Completion.

(E) **Other Remedies.** City's right to liquidated damages under this Section applies only to damages arising from Contractor's Non-Excusable Delay or failure to complete the Work within the Contract Time. City retains its right to pursue all other remedies under the Contract for other types of damage, including damage to property or persons, costs or diminution in value from defective materials or workmanship, costs to repair or complete the Work, or other liability caused by Contractor.

Article 6 - Contract Modification

6.1 Contract Modification. Subject to the limited exception set forth in subsection (D) below, any change in the Work or the Contract Documents, including the Contract Price or Contract Time, will not be a valid and binding change to the Contract unless it is formalized in a Change Order, including a "no-cost" Change Order or a unilateral Change Order. Changes in Work. City reserves the right to make the Work pursuant to this Article 6 will not operate to release, limit, or abridge Contractor's warranty obligations pursuant to Article 11 or any obligations of Contractor's bond sureties.

(A) **City-Directed Changes.** City may direct changes in the scope or sequence of Work or the requirements of the Contract Documents, without invalidating the Contract. Such changes may include Extra Work as set forth in subsection (C) below, or deletion or modification of portions of the Work. Contractor must promptly comply with City-directed changes in the Work in accordance with the intent of the original Contract Documents, even if Contractor and City have not yet reached agreement as to adjustments to the Contract Price or Contract Time for the change in the Work or for the Extra Work. Contractor is not entitled to extra compensation for cost savings resulting from "value engineering" pursuant to Public Contract Code Section 7101, except to the extent authorized in advance by City in writing, and subject to any applicable procedural requirements for submitting a proposal for value engineering cost savings.

(B) **Disputes.** In the event of a dispute over entitlement to or the amount of a change in Contract Time or a change in Contract Price related to extra City-directed change in the Work, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to

diligently prosecute the performance and timely completion of the Work, including the Work in dispute. Likewise, in the event that City and Contractor dispute whether a portion or portions of the Work are already required by the Contract Documents or constitute Extra Work, or otherwise dispute the interpretation of any portion(s) of the Contract Documents, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute, as directed by City. If Contractor refuses to perform the Work in dispute, City may, acting in its sole discretion, elect to delete the Work from the Contract and reduce the Contract Price accordingly, and self-perform the Work or direct that the Work be performed by others. Alternatively, City may elect to terminate the Contract for convenience or for cause. Contractor's sole recourse for an unresolved dispute related to changes in the Work or performance of any Extra Work is to comply with the dispute resolution provisions set forth in Article 12, below.

- (C) **Extra Work.** City may direct Contractor to perform Extra Work related to the Project. Contractor must promptly perform any Extra Work as directed or authorized by City in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement on adjustments to the Contract Price or Contract Time for such Extra Work. If Contractor believes it is necessary to perform Extra Work due to changed conditions, Contractor must promptly notify the Engineer in writing, specifically identifying the Extra Work and the reason(s) the Contractor believes it is Extra Work. This notification requirement does not constitute a Change Order request pursuant to Section 6.2, below. Contractor must maintain detailed daily records that itemize the cost of each element of Extra Work, and sufficiently distinguish the direct cost of the Extra Work from the cost of other Work performed. For each day that Contractor performs Extra Work, or Work that Contractor contends is Extra Work, Contractor must submit no later than the following Working Day, a daily report of the Extra Work performed that day and the related costs, together with copies of certified payroll, invoices, and other documentation substantiating the costs ("Extra Work Report"). The Engineer will make any adjustments to Contractor's Extra Work Report(s) based on the Engineer's records of the Work. When an Extra Work Report(s) is agreed on and signed by both City and Contractor, the Extra Work Report(s) will become the basis for payment under a duly authorized and signed Change Order. Failure to submit the required documentation by close of business on the next Working Day is deemed a full and complete waiver for any change in the Contract Price or Contract Time for any Extra Work performed that day.

(D) **Minor Changes and RFIs.** Minor field changes, including RFI replies from City, that do not affect the Contract Price or Contract Time and that are approved by the Engineer acting within his or her scope of authority, do not require a Change Order. By executing an RFI reply from City, Contractor agrees that it will perform the Work as clarified therein, with no change to the Contract Price or Contract Time.

(E) **Remedy for Non-Compliance.** Contractor's failure to promptly comply with a City-directed change is deemed a material breach of the Contract, and in addition to all other remedies available to it, City may, at its sole discretion, hire another contractor or use its own forces to complete the disputed Work at Contractor's sole expense, and may deduct the cost from the Contract Price.

6.2 Contractor Change Order Requests. Contractor must submit a request or proposal for a change in the Work, compensation for Extra Work, or a change in the Contract Price or Contract Time as a written Change Order request or proposal.

(A) **Time for Submission.** Any request for a change in the Contract Price or the Contract Time must be submitted in writing to the Engineer within ten calendar days of the date that Contractor first encounters the circumstances, information or conditions giving rise to the Change Order request, even if the total amount of the requested change in the Contract Price or impact on the Contract Time is not yet known at that time. If City requests that Contractor propose the terms of a Change Order, unless otherwise specified in City's request, Contractor must provide the Engineer with a written proposal for the change in the Contract Price or Contract Time within five working days of receiving City's request, in a form satisfactory to the Engineer.

(B) **Required Contents.** Any Change Order request or proposal submitted by Contractor must include a complete breakdown of actual or estimated costs and credits, and must itemize labor, materials, equipment, taxes, insurance, subcontract amounts, and if applicable, Extra Work Reports. Any estimated cost must be updated in writing as soon as the actual amount is known.

(C) **Required Documentation.** All claimed costs must be fully documented, and any related request for an extension of time or delay-related costs must be included at that time and in compliance with the requirements of Article 5 of the General Conditions. Upon request, Contractor must permit City to inspect its original and unaltered bidding records, subcontract agreements, subcontract change orders, purchase orders, invoices, or receipts associated with the claimed costs.

(D) **Required Form.** Contractor must use City's form(s) for submitting all Change Order requests or proposals, unless otherwise specified by City.

(E) **Certification.** All Change Order requests must be signed by Contractor and must include the following certification:

"The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Change Order request are true and correct. Contractor warrants that this Change Order request is comprehensive and complete as to the Work or Changes referenced herein, and agrees that any costs, expenses, or time extension requests not included herein are deemed waived."

6.3 Adjustments to Contract Price. The amount of any increase or decrease in the Contract Price will be determined based on one of the following methods listed below, in the order listed with unit pricing taking precedence over the other methods. Markup applies only to City-authorized time and material Work, and does not apply to any other payments to Contractor. For Work items or components that are deleted in their entirety, Contractor will only be entitled to compensation only for those direct, actual, and documented costs (including restocking fees), reasonably incurred before Contractor was notified of the City's intent to delete the Work, with no markup for overhead, profit, or other indirect costs.

(A) **Unit Pricing.** Amounts previously provided by Contractor in the form of unit prices, either in a bid schedule or in a post-award schedule of values pursuant to Section 8.1 Schedule of Values, will apply to determine the price for the affected Work, to the extent applicable unit prices have previously been provided for that type of Work. No additional markup for overhead, profit, or other indirect costs. will be added to the calculation.

(B) **Lump Sum.** A mutually agreed upon, all-inclusive lump sum price for the affected Work with no additional markup for overhead, profit, or other indirect costs;

(C) **Time and Materials.** On a time and materials basis, if and only to the extent compensation on a time and materials basis is expressly authorized by City in advance of Contractor's performance of the Work and subject to any not-to-exceed limit. Time and materials compensation for increased costs or Extra Work (but not decreased costs or deleted Work), will include allowed markup for overhead, profit, and other indirect costs, and which may include a not-to-exceed limit, calculated as the total

of the following sums:, the cumulative total of which may not exceed the maximum markup rate of 15%:

- (1) All direct labor costs provided by the Contractor, excluding superintendence, project management, or administrative costs plus 15 percent markup;
- (2) All direct material costs provided by the Contractor, including sales tax, plus 15 percent markup;
- (3) All direct plant and equipment rental costs provided by the Contractor, plus 15 percent markup;
- (4) All direct additional subcontract costs plus ten percent markup for Work performed by Subcontractors; and
- (5) Increased bond or insurance premium costs computed at 1.5% percent of total of the previous four sums.

6.4 Unilateral Change Order. If the parties dispute the terms of a proposed Change Order, including disputes over the amount of compensation or extension of time that Contractor has requested, , the value of deleted or changed Work, what constitutes Extra Work, or quantities used, City may elect to issue a unilateral Change Order, directing performance of the Work, and authorizing a change in the Contract Price or Contract Time for the amount of compensation or added time that the City believes is merited. Contractor's sole recourse to dispute the terms of a unilateral Change Order is to submit a timely Claim pursuant to Article 12, below.

6.5 Non-Compliance Deemed Waiver. Contractor waives its entitlement to any increase in the Contract Price or Contract Time if Contractor fails to fully comply with the provisions of this Article. Contractor will not be paid for unauthorized Extra Work.

Article 7 - General Construction Provisions

7.1 Permits, Fees, Business License, and Taxes.

(A) ***Permits, Fees, and City Business License.*** Contractor must obtain and pay for all permits, fees, or licenses required to perform the Work, including a City business license. Contractor must cooperate with and provide notifications to all government agencies with jurisdiction over the Project, as may be required. Contractor must provide City with copies of all records of permits and permit applications, payment of required fees, and any licenses required for the Work.

(B) **Taxes.** Contractor must pay for all taxes on labor, material and equipment, except Federal Excise Tax to the extent that City is exempt from Federal Excise Tax.

7.2 Temporary Facilities. Contractor must provide, at Contractor's sole expense, any and all temporary facilities for the Project, including an onsite staging area for materials and equipment, a field office, sanitary facilities, utilities, storage, scaffolds, barricades, walkways, and any other temporary structure required to safely perform the Work along with any incidental utility services. The location of all temporary facilities must be approved by the City prior to installation. Temporary facilities must be safe and adequate for the intended use, and installed and maintained in accordance with Laws and the Contract Documents. Contractor must fence and screen the Project site and, if applicable, any separate Worksites, including the staging area, and its operation must minimize inconvenience to neighboring properties. Additional provisions pertaining to temporary facilities may be included in the Specifications or Special Conditions.

(A) **Utilities.** Contractor must install and maintain the power, water, sewer and all other utilities required for the Project site, including the piping, wiring, internet and Wi-Fi connections, and any related equipment necessary to maintain the temporary facilities.

(B) **Removal and Repair.** Contractor must promptly remove all such temporary facilities when they are no longer needed or upon completion of the Work, whichever comes first. Contractor must promptly repair any damage to City's property or to other property caused by the installation, use, or removal of the temporary facilities, and must promptly restore the property to its original or intended condition.

7.3 Noninterference and Site Management. Contractor must avoid interfering with City's use of its property at or adjacent to the Project site, including use of roadways, entrances, parking areas, walkways, and structures. Contractor must also minimize disruption of access to private property in the Project vicinity. Contractor must coordinate with affected property owners, tenants, and businesses, and maintain some vehicle and pedestrian access to their residences or properties at all times. Temporary access ramps, fencing or other measures must be provided as needed. Before blocking access to a private driveway or parking lot, Contractor must provide effective notice to the affected parties at least 48 hours in advance of the pending closure and allow them to remove vehicles. Private driveways, residences and parking lots must have access to a roadway during non-Work hours.

(A) **Offsite Acquisition.** Unless otherwise provided by City, Contractor must acquire, use and dispose of, at its sole expense, any additional Worksites, licenses, easements, and temporary facilities necessary to access and perform the Work.

(B) **Offsite Staging Area and Field Office.** If additional space beyond the Project site is needed, such as for the staging area or the field office, Contractor may need to make arrangements with the nearby property owner(s) to secure the space. Before using or occupying any property owned by a third party, Contractor must provide City with a copy of the necessary license agreement, easement, or other written authorization from the property owner, together with a written release from the property owner holding City harmless from any related liability, in a form acceptable to the City Attorney.

(C) **Traffic Management.** Contractor must provide traffic management and traffic controls as specified in the Contract Documents, as required by Laws, and as otherwise required to ensure the public and worker safety, and to avoid interference with public or private operations or the normal flow of vehicular, bicycle, or pedestrian traffic.

7.4 Signs. No signs may be displayed on or about City's property, except signage which is required by Laws or by the Contract Documents, without City's prior written approval as to size, design, and location.

7.5 Project Site and Nearby Property Protections.

(A) **General.** Contractor is responsible at all times, on a 24-hour basis and at its sole cost for protecting the Work, the Project site, and the materials and equipment to be incorporated into the Work until the City has accepted the Project, excluding any exceptions to acceptance, if any. Except as specifically authorized by City, Contractor must confine its operations to the area of the Project site indicated in the Plans and Specifications. Contractor is liable for any damage caused by Contractor or its Subcontractors to the Work, City's property, the property of adjacent or nearby property owners and the work or personal property of other contractors working for City, including damage related to Contractor's failure to adequately secure the Work or any Worksite.

(1) Subject to City's approval, Contractor will provide and install safeguards to protect the Work; any Worksite, including the Project site; City's real or personal property and the real or personal property of adjacent or nearby property owners, including plant and tree protections.

(2) City wastewater systems may not be interrupted. If the Work disrupts existing sewer facilities, Contractor must immediately notify City and establish a plan, subject to City's approval, to convey the sewage in closed conduits back into the sanitary sewer system. Sewage must not be permitted to flow in trenches or be covered by backfill.

(3) Contractor must remove with due care, and store at City's request, any objects or material from the Project site that City will salvage or reuse at another location.

(4) If directed by Engineer, Contractor must promptly repair or replace any property damage, as specified by the Engineer. However, acting in its sole discretion, City may elect to have the property damage remedied otherwise, and may deduct the cost to repair or replace the damaged property from payment otherwise due to Contractor.

(5) Contractor will not permit any structure or infrastructure to be loaded in a manner that will damage or endanger the integrity of the structure or infrastructure.

(B) **Securing Project Site.** After completion of Work each day, Contractor must secure the Project site and, to the extent feasible, make the area reasonably accessible to the public unless City approves otherwise. All excess materials and equipment not protected by approved traffic control devices must be relocated to the staging area or demobilized. Trench spoils must be hauled off the Project site daily and open excavations must be protected with steel plates. Contractor and Subcontractor personnel may not occupy or use the Project site for any purpose during non-Work hours, except as may be provided in the Contract Documents or pursuant to prior written authorization from City.

(C) **Unforeseen Conditions.** If Contractor encounters facilities, utilities, or other unknown conditions not shown on or reasonably inferable from the Plans or apparent from inspection of the Project site, Contractor must immediately notify the City and promptly submit a Request for Information to obtain further directions from the Engineer. Contractor must avoid taking any action which could cause damage to the facilities or utilities pending further direction from Engineer. If Engineer's subsequent direction to Contractor affects Contractor's cost or time to perform the Work, Contractor may submit a Change Order request as set forth in Article 6, above.

(D) **Support; Adjacent Properties.** Contractor must provide, install, and maintain all shoring, bracing, and underpinning necessary to provide

support to City's property and adjacent properties and improvements thereon. Contractor must provide notifications to adjacent property owners as may be required by Laws. See also Section 7.15 Trenching of Five Feet or More.

(E) **Notification of Property Damage.** Contractor must immediately notify the City of damage to any real or personal property resulting from Work on the Project. Contractor must immediately provide a written report to City of any such property damage in excess of \$500 (based on estimated cost to repair or replace) within 24 hours of the occurrence. The written report must include: (1) the location and nature of the damage, and the owner of the property, if known; (2) the name and address of each employee of Contractor or any Subcontractor involved in the damage; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with another government agency, Contractor will provide a copy of the report to City.

7.6 Materials and Equipment.

(A) **General.** Unless otherwise specified, all materials and equipment required for the Work must be new, free from defects, and of the best grade for the intended purpose, and furnished in sufficient quantities to ensure the proper and expeditious performance of the Work. Contractor must employ measures to preserve the specified quality and fitness of the materials and equipment. Unless otherwise specified, all materials and equipment required for the Work are deemed to include all components required for complete installation and intended operation, and must be installed in accordance with the manufacturer's recommendations or instructions. Contractor is responsible for all shipping, handling, and storage costs associated with the materials and equipment required for the Work. Contractor is responsible for providing security and protecting the Work and all of the required materials, supplies, tools and equipment at Contractor's sole cost until City has formally accepted the Project as set forth in Section 11.1, Final Completion. Contractor will not assign, sell, mortgage, or hypothecate any materials or equipment for the Project, or remove any materials or equipment that have been installed or delivered.

(B) **City-Provided.** If the Work includes installation of materials or equipment to be provided by City, Contractor is solely responsible for the proper examination, handling, storage, and installation in accordance with the Contract Documents. Contractor must notify City of any defects discovered in City-provided materials or equipment sufficiently in advance of scheduled use or installation to afford adequate time to procure replacement materials or equipment as needed. Contractor is solely

responsible for any loss of or damage to such items which occurs while the items are in Contractor's custody and control, the cost of which may be offset from the Contract Price and deducted from any payment(s) due to Contractor.

(C) **Intellectual Property Rights.** Contractor must, at its sole expense, obtain any authorization or license required for use of patented or copyright-protected materials, equipment, devices or processes that are incorporated into the Work. Contractor's indemnity obligations in Article 4 apply to any claimed violation of intellectual property rights in violation of this provision.

7.7 Substitutions.

(A) **"Or Equal."** Any Specification designating a material, product, or thing (collectively "item") or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate the quality and type of item or service desired, and Contractor may request use of any equal item or service. Unless otherwise stated in the Specifications, any reference to a specific brand or trade name for an item that is used solely for the purpose of describing the type of item desired, will be deemed to be followed by the words "or equal." A substitution will only be approved if it is a true "equal" item in every aspect of design, function, and quality, as determined by City, including dimensions, weight, maintenance requirements, durability, fit with other elements, and schedule impacts.

(B) **Request for Substitution.** A post-award request for substitution of an item or service must be submitted in writing to the Engineer for approval in advance, within the applicable time period provided in the Contract Documents. If no time period is specified, the substitution request may be submitted any time within 35 days after the date of award of the Contract, or sufficiently in advance of the time needed to avoid delay of the Work, whichever is earlier.

(C) **Substantiation.** Any available data substantiating the proposed substitute as an equal item or service must be submitted with the written request for substitution. Contractor's failure to timely provide all necessary substantiation, including any required test results as soon as they are available, is grounds for rejection of the proposed substitution, without further review.

(D) **Burden of Proving Equality.** Contractor has the burden of proving the equality of the proposed substitution. City has sole discretion to determine whether a proposed substitution at Contractor's sole cost is equal, and City's determination is final.

(E) **Approval or Rejection.** If the proposed substitution is approved, Contractor is solely responsible for any additional costs or time associated with the substituted item or service. If the proposed substitution is rejected, Contractor must, without delay, install the item or use the service as specified by the City.

(F) **Contractor's Obligations.** City's approval of a proposed substitution will not relieve Contractor from any of its obligations under the Contract Documents. In the event Contractor makes an unauthorized substitution, Contractor will be solely responsible for all resulting cost impacts, including the cost of removal and replacement and the impact to other design elements.

7.8 Testing and Inspection.

(A) **General.** All materials, equipment, and workmanship used in the Work are subject to inspection and testing by City at all times and locations during construction and/or fabrication and at any Worksite, including at shops and yards as well as at the Project site. All manufacturers' application or installation instructions must be provided to the Inspector at least ten days prior to the first such application or installation. Contractor must, at all times, make the Work available for testing or inspection. Neither City's inspection or testing of Work, nor its failure to do so, operate to waive or limit Contractor's duty to complete the Work in accordance with the Contract Documents.

(B) **Scheduling and Notification.** Contractor must cooperate with City in coordinating the inspections and testing. Contractor must submit samples of materials, at Contractor's expense, and schedule all tests required by the Contract Documents in time to avoid any delay to the progress of the Work. Contractor must notify the Engineer no later than noon of the Working Day before any inspection or testing and must provide timely notice to the other necessary parties as specified in the Contract Documents. If Contractor schedules an inspection or test beyond regular Work hours, or on a Saturday, Sunday, or recognized City holiday, Contractor must notify the Engineer at least two Working Days in advance for approval. If approved, Contractor must reimburse City for the cost of the overtime inspection or testing. Such costs, including the City's hourly costs for required personnel, may be deducted from payments otherwise due to Contractor.

(C) **Responsibility for Costs.** City will bear the initial cost of inspection and testing to be performed by independent testing consultants retained by City, subject to the following exceptions:

- (1) Contractor will be responsible for the costs of any subsequent tests which are required to substantiate compliance with the Contract Documents, and any associated remediation costs.
- (2) Contractor will be responsible for inspection costs, at City's hourly rates, for inspection time lost because the Work is not ready, or Contractor fails to appear for a scheduled inspection.
- (3) If any portion of the Work that is subject to inspection or testing is covered or concealed by Contractor prior to the inspection or testing, Contractor will bear the cost of making that portion of the Work available for the inspection or testing required by the Contract Documents, and any associated repair or remediation costs.
- (4) Contractor is responsible for properly shoring all compaction test sites deeper than five feet below grade, as required under Section 7.15 below.
- (5) Any Work or material that is defective or fails to comply with the requirements of the Contract Documents must be promptly repaired, removed, replaced, or corrected by Contractor, at Contractor's sole expense, even if that Work or material was previously inspected or included in a progress payment

(D) **Contractor's Obligations.** Contractor is solely responsible for any delay occasioned by remediation of defective or of noncompliant Work or material. Inspection of the Work does not in any way relieve Contractor of its obligations to perform the Work as specified. Any Work done without the required inspection(s) will also be subject to rejection by City.

(E) **Distant Locations.** If required off-site testing or inspection must be conducted at a location more than 100 miles from the Project site, Contractor is solely responsible for the additional travel costs required for testing and/or inspection at such locations.

(F) **Final Inspection.** The provisions of this Section 7.8 also apply to final inspection under Article 11, Completion and Warranty Provisions.

7.9 Project Site Conditions and Maintenance. Contractor must at all times, on a 24-hour basis and at its sole cost, maintain the Project site and staging and storage areas in clean, neat, and sanitary condition and in compliance with all Laws pertaining to safety, air quality, and dust control. Adequate toilets must be provided, and properly maintained and serviced for all workers on the Project site, located in a suitably secluded area, subject to City's prior approval. Contractor must also, on a daily basis and

at its sole cost, remove and properly dispose of the debris and waste materials from the Project site.

(A) **Air Emissions Control.** Contractor must not discharge smoke or other air contaminants into the atmosphere in violation of any Laws.

(B) **Dust and Debris.** Contractor must minimize and confine dust and debris resulting from the Work. Contractor must abate dust nuisance by cleaning, sweeping, and immediately sprinkling with water excavated areas of dirt or other materials prone to cause dust, and within one hour after the Engineer notifies Contractor that an airborne nuisance exists. The Engineer may direct that Contractor provide an approved water-spraying truck for this purpose. If water is used for dust control, Contractor will only use the minimum necessary. Contractor must take all necessary steps to keep wastewater out of streets, gutters, or storm drains. See Section 7.19, Environmental Control. If City determines that the dust control is not adequate, City may have the work done by others and deduct the cost from the Contract Price. Contractor will immediately remove any excess excavated material from the Project site and any dirt deposited on public streets.

(C) **Clean up.** Before discontinuing Work in an area, Contractor must clean the area and remove all rubbish debris and waste along with the construction equipment, tools, machinery, waste and surplus materials. Contractor must, at all times, minimize and confine dust and debris resulting from construction activities.

(1) Except as otherwise specified, all excess Project materials, and the materials removed from existing improvements on the Project site with no salvage value or intended reuse by City, will be Contractor's property.

(2) Hauling trucks and other vehicles leaving the Project site must be cleaned of exterior mud or dirt before traveling on City streets. Materials and loose debris must be delivered and loaded to prevent dropping materials or debris. Contractor must immediately remove spillage from hauling on any publicly traveled way. Streets affected by Work on the Project must be kept clean by street sweeping.

(D) **Disposal.** Contractor must dispose of all Project debris and waste materials in a safe and legal manner. Contractor may not burn or bury waste materials on the Project site. Contractor will not allow any dirt, refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed of onto streets, into manholes or into the storm drain system.

(E) **Completion.** At the completion of the Work, Contractor must remove from the Project site all of its equipment, tools, surplus materials, waste materials and debris., presenting a clean and neat appearance. Before demobilizing from the Project site, Contractor must ensure that all surfaces are cleaned, sealed, waxed, or finished as applicable, and that all marks, stains, paint splatters, and the like have been properly removed from the completed Work and the surrounding areas. Contractor must ensure that all parts of the construction are properly joined with the previously existing and adjacent improvements and conditions. Contractor must provide all cutting, fitting and patching needed to accomplish that requirement. Contractor must also repair or replace all existing improvements that are damaged or removed during the Work, both on and off the Project site, including curbs, sidewalks, driveways, fences, signs, utilities, street surfaces and structures. Repairs and replacements must be at least equal to the previously existing improvements, and the condition, finish and dimensions must match the previously existing improvements. Contractor must restore to original condition all property or items that are not designated for alteration under the Contract Documents and leave each Worksite clean and ready for occupancy or use by City.

(F) **Non-Compliance.** If Contractor fails to commence compliance with its maintenance and cleanup obligations within two business days following written notification from any City or its representative clean up order, City may, acting in its sole discretion, elect to suspend the Work until the condition(s) is corrected with no increase in the Contract Time or Contract Price, or undertake appropriate cleanup measures without further notice and the cost will be deducted from any amounts due or to become due to Contractor.

7.10 Instructions and Manuals. Contractor must provide to City three copies each of all instructions and manuals required by the Contract Documents, unless otherwise specified. These must be complete as to drawings, details, parts lists, performance data, and other information that may be required for City to easily maintain and service the materials and equipment installed for this Project.

(A) **Submittal Requirements.** All manufacturers' application or installation instructions must be provided to the City at least ten days prior to the first such application. The instructions and manuals, along with any required guarantees, must be delivered to City for review.

(B) **Training.** Contractor or its Subcontractors must train City's personnel in the operation and maintenance of any complex equipment or systems as a condition precedent to Final Completion, if required in the Contract Documents.

7.11 As-built Drawings. Contractor and its Subcontractors must prepare and maintain at the Project site a detailed, complete, and accurate as-built set of the Plans which will be used solely for the purpose of recording changes made in any portion of the original Plans in order to create accurate record drawings at the end of the Project.

(A) ***Duty to Update.*** The as-built drawings must be updated as changes occur, on a daily basis if necessary. City may withhold the estimated cost for City to have the as-built drawings prepared from payments otherwise due to the Contractor, until the as-built drawings are brought up to date to the satisfaction of City. Actual locations to scale must be identified on the as-built drawings for all runs of mechanical and electrical work, including all site utilities, installed underground, in walls, floors, or otherwise concealed. Deviations from the original Plans must be shown in detail. The exact location of all main runs, whether piping, conduit, ductwork, or drain lines, must be shown by dimension and elevation. The location of all buried pipelines, appurtenances, or other improvements must be represented by coordinates and by the horizontal distance from visible above-ground improvements.

(B) ***Final Completion.*** Contractor must verify that all changes in the Work are depicted in the as-built drawings and must deliver the complete set of as-built drawings to City for review and acceptance as a condition precedent to Final Completion and Final Payment.

7.12 Existing Utilities.

(A) ***General.*** The Work may be performed in developed, urban areas with existing utilities, both above and below ground, including utilities identified in the Contract Documents or in other informational documents or records. Contractor must take due care to locate identified or reasonably identifiable utilities before proceeding with trenching, excavation, or any other activity that could damage or disrupt existing utilities. This may include excavation with small equipment, potholing, or hand excavation, and, if practical, using white paint or other suitable markings to delineate the area to be excavated. Except as otherwise provided herein, Contractor will be responsible for costs resulting from damage to identified or reasonably identifiable utilities due to Contractor's negligence or failure to comply with the Contract Documents, including the requirements in this Article 7.

(B) ***Unidentified Utilities.*** Pursuant to Government Code Section 4215, if, during the performance of the Work, Contractor discovers utility facilities not identified by City in the Contract Documents, Contractor must immediately provide written notice to City and the utility. City assumes responsibility for the timely removal, relocation, or protection of existing

main or trunkline utility facilities located on the Project site, if those utilities are not identified in the Contract Documents. Contractor will be compensated in accordance with the provisions of the Contract Documents for the costs of locating, repairing damage not due to Contractor's failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Plans or Specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. Contractor will not be assessed liquidated damages for delay in completion of the Work, to the extent such delay was caused by City's failure to provide for removal or relocation of the utility facilities.

7.13 Notice of Excavation. Contractor must comply with all applicable requirements in Government Code Sections 4216 through 4216.5, which are incorporated herein. Government Code Section 4216.2, requires that except in an emergency, Contractor must contact the appropriate regional notification center, or Underground Services Alert, at least two working days, but not more than fourteen calendar days before starting any excavation if the excavation will be conducted in an area that is known, or reasonably should be known, to contain subsurface installations. Contractor may not begin excavation until it has obtained and submitted to Engineer an inquiry identification number from Underground Services Alert.

7.14 Trenching and Excavations of Four Feet or More. As required by Public Contract Code Section 7104, if the Work includes digging trenches or other excavations that extend deeper than four feet below the surface, the provisions in this Section apply to the Work and the Project.

(A) ***Duty to Notify.*** Contractor must promptly, and before the following conditions are disturbed, provide written notice to City if Contractor finds any of the following conditions:

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

(2) Subsurface or latent physical conditions at the Project site differing from those indicated by information about the Project site made available to bidders prior to the deadline for submitting bids; or

(3) Unknown physical conditions at the Project site of any unusual nature, materially different from those ordinarily encountered and

generally recognized as inherent in work of the character required by the Contract Documents.

(B) **City Investigation.** City will promptly investigate the conditions and if City finds that the conditions materially differ from those indicated, apparent, or reasonably inferred from information about the Project site made available to bidders, or do involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, City will issue a Change Order.

(C) **Disputes.** In the event that a dispute arises between City and Contractor regarding any of the conditions specified in subsection (B) above, or the terms of a Change Order issued by the City, Contractor will not be excused from completing the Work within the Contract Time, but must proceed with all Work to be performed under the Contract. Contractor will retain any and all rights provided either by the Contract or by Laws which pertain to the resolution of disputes between Contractor and City.

7.15 Trenching of Five Feet or More. As required by Labor Code Section 6705, if the Contract Price exceeds \$25,000.00 and the Work includes the excavation of any trench or trenches of five feet or more in depth, a detailed plan must be submitted to City for acceptance in advance of the excavation. The detailed plan must show the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation. If the plan varies from the shoring system standards, it must be prepared by a California registered civil or structural engineer. Use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders is prohibited.

7.16 New Utility Connections. Except as otherwise specified, City will pay connection charges and meter costs for new permanent utilities required by the Contract Documents, if any. Contractor must notify City sufficiently in advance of the time needed to request service from each utility provider so that connections and services are initiated in accordance with the Project schedule.

7.17 Lines and Grades. Contractor is required to use any benchmark provided by the Engineer. Unless otherwise specified in the Contract Documents, Contractor must provide all lines and grades required to execute the Work. Contractor must also provide, preserve, and replace if necessary, all construction stakes required for the Project. All stakes or marks must be set by a California licensed surveyor or a California registered civil engineer. Contractor must notify the Engineer of any discrepancies found between Contractor's staking and grading and

information provided by the Contract Documents. Upon completion, all Work must conform to the lines, elevations, and grades shown in the Plans, including any changes directed by a Change Order.

7.18 Historic or Archeological Items.

(A) **Contractor's Obligations.** Contractor must ensure that all persons performing Work at the Project site are required to immediately notify the Project Manager, upon discovery of any potential historic or archeological items, including historic or prehistoric ruins, a burial ground, archaeological or vertebrate paleontological site, including fossilized footprints or other archeological, paleontological or historical feature on the Project site (collectively, "Historic or Archeological Items").

(B) **Discovery; Cessation of Work.** Upon discovery of any potential Historic or Archeological Items, Work must be stopped within an 85-foot radius of the find and may not resume until authorized in writing by City. If required by City, Contractor must assist in protecting or recovering the Historic or Archeological Items, with any such assistance to be compensated as Extra Work on a time and materials basis under Article 6, Contract Modification. At City's discretion, a suspension of Work required due to discovery of Historic or Archeological Items may be treated as Excusable Delay pursuant to Article 5 or as a suspension for convenience under Article 13.

7.19 Environmental Control. Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. Contractor must prevent the release of any hazardous material or hazardous waste into the soil or groundwater, and prevent the unlawful discharge of pollutants into City's storm drain system and watercourses as required below. Contractor and its Subcontractors must at all times in the performance of the Work comply with all Laws concerning pollution of waterways.

(A) **Stormwater Permit.** Contractor must comply with all applicable conditions of the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activity ("Stormwater Permit").

(B) **Contractor's Obligations.** If required for the Work, a copy of the Stormwater Permit is on file in City's principal administrative offices, and Contractor must comply with the same without adjustment of the Contract Price or the Contract Time. Contractor must timely and completely submit required reports and monitoring information required by the conditions of the Stormwater Permit. Contractor must also comply with all other Laws

governing discharge of stormwater, including applicable municipal stormwater management programs.

- 7.20 Noise Control.** Contractor must comply with all applicable noise control Laws. Noise control requirements apply to all equipment used for the Work or related to the Work, including trucks, transit mixers or transient equipment that may or may not be owned by Contractor.
- 7.21 Mined Materials.** Pursuant to the Surface Mining and Reclamation Act of 1975, Public Resources Code Section 2710 *et seq.*, any purchase of mined materials, such as construction aggregate, sand, gravel, crushed stone, road base, fill materials, and any other mineral materials must originate from a surface mining operation included on the AB 3098 List, which is available online at:
<ftp://ftp.consrv.ca.gov/pub/omr/AB3098%20List/AB3908List.pdf>.

Article 8 - Payment

- 8.1 Schedule of Values.** Prior to submitting its first application for payment, Contractor must prepare and submit to the Project Manager a schedule of values apportioned to the various divisions and phases of the Work, including mobilization and demobilization. If a Bid Schedule was submitted with Contractor's bid, the amounts in the schedule of values must be consistent with the Bid Schedule. Each line item contained in the schedule of values must be assigned a value such that the total of all items equals the Contract Price. The items must be sufficiently detailed to enable accurate evaluation of the percentage of completion claimed in each application for payment, and the assigned value consistent with any itemized or unit pricing submitted with Contractor's bid.
- (A) **Measurements for Unit Price Work.** Materials and items of Work to be paid for on the basis of unit pricing will be measured according to the methods specified in the Contract Documents.
- (B) **Deleted or Reduced Work.** Contractor will not be compensated for Work that City has deleted or reduced in scope, except for any labor, material or equipment costs for such Work that Contractor reasonably incurred before Contractor learned that the Work could be deleted or reduced. Contractor will only be compensated for those actual, direct and documented costs incurred, and will not be entitled to any mark up for overhead or lost profits.
- 8.2 Progress Payments.** Following the last day of each month, or as otherwise required by the Special Conditions or Specifications, Contractor will submit to Project Manager a monthly application for payment for Work

performed during the preceding month based on the estimated value of the Work performed during that preceding month.

(A) ***Application for Payment.*** Each application for payment must be itemized to include labor, materials, and equipment incorporated into the Work, and materials and equipment delivered to the Project site, as well as authorized and approved Change Orders. Each payment application must be supported by the unit prices submitted with Contractor's Bid Schedule and/or schedule of values and any other substantiating data required by the Contract Documents. **Each application for payment shall be accompanied by completed "Contract Balance Form," a copy of which is provided at the end of Article 8.**

(B) ***Payment of Undisputed Amounts.*** City will pay the undisputed amount due within thirty days after Contractor has submitted a complete and accurate payment application, subject to Public Contract Code Section 20104.50. City will deduct a percentage from each progress payment as retention, as set forth in Section 8.5, below, and may withhold additional amounts as set forth in Section 8.3, below.

8.3 Adjustment of Payment Application. City may adjust or reject the amount requested in a payment application, including application for Final Payment, in whole or in part, if the amount requested is disputed or unsubstantiated. Contractor will be notified in writing of the basis for the modification to the amount requested. City may also deduct or withhold from payment otherwise due based upon any of the circumstances and amounts listed below. Sums withheld from payment otherwise due will be released when the basis for that withholding has been remedied and no longer exists.

(A) For Contractor's unexcused failure to perform the Work as required by the Contract Documents, including correction or completion of punch list items. City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(B) For loss or damage caused by Contractor or its Subcontractors arising out of or relating to performance of the Work, or any failure to protect the Project site, City may deduct an amount based on the estimated cost to repair or replace.

(C) For Contractor's failure to pay its Subcontractors and suppliers when payment is due. City may withhold an amount equal to the total of past due payments and may opt to pay that amount separately via joint check pursuant to Section 8.6(B), Joint Checks.

(D) For Contractor's failure to timely correct rejected, nonconforming, or defective Work. City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(E) For any unreleased stop notice, City may withhold 125% of the amount claimed.

(F) For Contractor's failure to submit any required schedule or schedule update in the manner and within the time specified in the Contract Documents, City may withhold an amount equal to five percent of the total amount requested until Contractor complies with its schedule submittal obligations.

(G) For Contractor's failure to maintain or submit as-built documents in the manner and within the time specified in the Contract Documents; City may withhold or deduct an amount based on the City's cost to prepare the as-builts.

(H) Work performed without Shop Drawings, that have been accepted by the City when accepted Shop Drawings are required before proceeding with the Work. City may deduct an amount based on the estimated costs to correct unsatisfactory Work or diminution in value.

(I) For fines, payments, or penalties assessed under the Labor Code, City may deduct from payments due to Contractor as required by Laws and as directed by the Division of Labor Standards Enforcement.

(J) For any other costs or charges that may be withheld or deducted from payments to Contractor, as provided in the Contract Documents, including liquidated damages, City may withhold or deduct such amounts from payment otherwise due to Contractor.

8.4 Early Occupancy. Neither City's payment of progress payments nor its partial or full use or occupancy of the Project constitutes acceptance of any part of the Work.

8.5 Retention. City will retain five percent of the full amount due on each progress payment (i.e., the amount due before any withholding or deductions pursuant to Section 8.3, Adjustment to Payment Application), or the percentage stated in the Notice Inviting Bids, whichever is greater, as retention to ensure full and satisfactory performance of the Work. Contractor is not entitled to any reduction in the rate of withholding at any time, nor to release of any retention before 35 days following City's acceptance of the Project.

(A) ***Substitution of Securities.*** As provided by Public Contract Code Section 22300, Contractor may request in writing that it be allowed, at its sole expense, to substitute securities for the retention withheld by City. Any escrow agreement entered into pursuant to this provision must fully comply with Public Contract Code Section 22300, and will be subject to approval as to form by City's legal counsel. If City exercises its right to draw upon such securities in the event of default pursuant to section (7) of the statutory Escrow Agreement for Security Deposits in Lieu of Retention, pursuant to subdivision (f) of Public Contract Code Section 22300 ("Escrow Agreement"), and if Contractor disputes that it is in default, its sole remedy is to comply with the dispute resolution procedures in Article 12 and the provisions therein. It is agreed that for purposes of this paragraph, an event of default includes City's rights pursuant to these Contract Documents to withhold or deduct sums from retention, including withholding or deduction for liquidated damages, incomplete or defective Work, stop payment notices, or backcharges. It is further agreed that if any individual authorized to give or receive written notice on behalf of a party pursuant to section (10) of the Escrow Agreement are unavailable to give or receive notice on behalf of that party due to separation from employment, retirement, death, or other circumstances, the successor or delegee of the named individual is deemed to be the individual authorized to give or receive notice pursuant to section (10) of the Escrow Agreement.

(B) ***Release of Undisputed Retention.*** All undisputed retention, less any amounts that may be assessed as liquidated damages, retained for stop notices, or otherwise withheld pursuant to Section 8.3 Adjustment of Payment Application will be released as Final Payment to Contractor no sooner than 35 days following recordation of the notice of completion, and no later than 60 days following acceptance of the Project by City's governing body or authorized designee pursuant to Section 11.1(C) Acceptance, or, if the Project has not been accepted, no later than 60 days after the Project is otherwise considered complete pursuant to Public Contract Code Section 7107(c).

8.6 Payment to Subcontractors and Suppliers. Each month, Contractor must promptly pay each Subcontractor and supplier the value of the portion of labor, materials, and equipment incorporated into the Work or delivered to the Project site by the Subcontractor or supplier during the preceding month. Such payments must be made in accordance with the requirements of Laws pertaining to such payments, and those of the Contract Documents and applicable subcontract or supplier contract.

(A) ***Withholding for Stop Notice.*** Pursuant to Civil Code Section 9358, City will withhold 125% of the amount claimed by an unreleased stop notice, a portion of which may be retained by City for the costs

incurred in handling the stop notice claim, including attorneys' fees and costs, as authorized by law.

(B) **Joint Checks.** City reserves the right, acting in its sole discretion, to issue joint checks made payable to Contractor and a Subcontractor or supplier, if City determines this is necessary to ensure fair and timely payment to Subcontractor or supplier who has provide services or goods for the Project. . As a condition to release of payment by a joint check, the joint check payees may be required to execute a joint check agreement in a form provided or approved by the City Attorney's Office. The joint check payees will be jointly and severally responsible for the allocation and disbursement of funds paid by joint check. Payment by joint check will not be construed to create a contractual relationship between City and a Subcontractor or supplier of any tier beyond the scope of the joint check agreement.

8.7 Final Payment. Contractor's application for Final Payment must comply with the requirements for submitting an application for a progress payment as stated in Section 8.2, above. Corrections to previous progress payments, including adjustments to estimated quantities for unit priced items, may be included in the Final Payment. If Contractor fails to submit a timely application for Final Payment, City reserves the right to unilaterally process and issue Final Payment without an application from Contractor in order to close out the Project. For the purposes of determining the deadline for Claim submission pursuant to Article 12, the date of Final Payment is deemed to be the date that City acts to release undisputed retention as final payment to Contractor, or otherwise provides written notice to Contractor of Final Payment. . or that no undisputed funds remain available for Final Payment due to offsetting withholdings or deductions pursuant to Section 8.3, Adjustment of Payment Application. If the amount due from Contractor to City exceeds the amount of Final Payment, City retains the right to recover the balance from Contractor or its sureties.

8.8 Release of Claims. City may, at any time, require that payment of the undisputed portion of any progress payment or Final Payment be contingent upon Contractor furnishing City with a written waiver and release of all claims against City arising from or related to the portion of Work covered by those undisputed amounts, subject to the limitations of Public Contract Code Section 7100. Any disputed amounts may be specifically excluded from the release.

8.9 Warranty of Title. Contractor warrants that title to all work, materials, or equipment incorporated into the Work and included in a request for payment will pass over to City free of any claims, liens, or encumbrances upon payment to Contractor.

CONTRACT BALANCE FORM

East Fifth Street Sewer Main Project

Note: A detailed invoice MUST be attached to this Contract Balance Form.

CONTRACTOR NAME: _____	DATE: _____
MAILING ADDRESS: _____	TELEPHONE NO.: _____
_____	FAX NO.: _____
_____	PROJECT NO.: _____
	INVOICE NO.: _____

- | | | |
|--|-------------|----------------|
| 1. ORIGINAL CONTRACT AMOUNT: | \$ _____ | |
| 2. APPROVED CHANGE ORDERS TOTAL: | \$ _____ | |
| 3. REVISED CONTRACT AMOUNT: | | (1+2) \$ _____ |
| 4. PREVIOUS BALANCE PAID: | \$ _____ | |
| 5. REMAINING BALANCE: | | (3-4) \$ _____ |
| 6. CURRENT PROGRESS PAYMENT DUE:
(before retention) | \$ _____ | |
| 7. 5% RETENTION FROM WORK DONE: | (-)\$ _____ | |
| 8. CURRENT BALANCE DUE: | | (6-7) \$ _____ |
| 9. REMAINING BALANCE OF REVISED
CONTRACT AMOUNT:
(including retention) | | (5-8) \$ _____ |

Article 9 - Labor Provisions

9.1 Discrimination Prohibited. Discrimination against any prospective or present employee engaged in the Work on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status is strictly prohibited. Contractor and its Subcontractors are required to comply with all applicable Laws prohibiting discrimination, including the California Fair Employment and Housing Act (Government Code Sections 12900 *et seq.*), Government Code Section 11135, and Labor Code Sections 1735, 1777.5, 1777.6, and 3077.5.

9.2 Labor Code Requirements.

(A) ***Eight Hour Day.*** Pursuant to Labor Code Section 1810, eight hours of labor constitute a legal day's work under this Contract.

(B) ***Penalty.*** Pursuant to Labor Code Section 1813, Contractor will forfeit to City as a penalty, the sum of \$25.00 for each day during which a worker employed by Contractor or any Subcontractor is required or permitted to work more than eight hours in any one calendar day or more than 40 hours per calendar week, except if such workers are paid overtime under Labor Code Section 1815.

(C) ***Apprentices.*** Contractor is responsible for compliance with the requirements governing employment and payment of apprentices, as set forth in Labor Code Section 1777.5, which is fully incorporated by reference.

(D) ***Notices.*** Pursuant to Labor Code Section 1771.4, Contractor is required to post all job site notices prescribed by Laws.

9.3 Prevailing Wages. Each worker performing Work under this Contract that is covered under Labor Code Sections 1720 or 1720.9, including cleanup at the Project site, must be paid at a rate not less than the prevailing wage as defined in Sections 1771 and 1774 of the Labor Code. The prevailing wage rates are available online at <http://www.dir.ca.gov/dlsr>. Contractor must post a copy of the applicable prevailing rates at the Project site.

(A) ***Penalties.*** Pursuant to Labor Code Section 1775, Contractor and any Subcontractor will forfeit to City as a penalty up to \$200.00 for each calendar day, or portion a day, for each worker paid less than the applicable prevailing wage rate. Contractor must also pay each worker the difference between the applicable prevailing wage rate and the amount actually paid to that worker.

(B) **Federal Requirements.** If this Project is subject to federal prevailing wage requirements in addition to California prevailing wage requirements, Contractor and its Subcontractors are required to pay the higher of the currently applicable state or federal prevailing wage rates.

9.4 Payroll Records. Contractor must comply with the provisions of Labor Code Sections 1776 and 1812 and all implementing regulations, which are fully incorporated by this reference, including requirements for electronic submission of payroll records to the DIR.

(A) **Contractor and Subcontractor Obligations.** Contractor and each Subcontractor must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in connection with the Work. Each payroll record must contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) Contractor or Subcontractor has complied with the requirements of Labor Code Sections 1771, 1811, and 1815 for any Work performed by its employees on the Project.

(B) **Certified Record.** A certified copy of an employee's payroll record must be made available for inspection or furnished to the employee or his or her authorized representative on request, to City, or to the Division of Labor Standards Enforcement, to the Division of Apprenticeship Standards of the DIR, and as further required by the Labor Code.

(C) **Enforcement.** Upon notice of noncompliance with Labor Code Section 1776, Contractor or Subcontractor has ten days in which to comply with the requirements of this section. If Contractor or Subcontractor fails to do so within the ten-day period, Contractor or Subcontractor will forfeit a penalty of \$100.00 per day, or portion a day, for each worker for whom compliance is required, until strict compliance is achieved. Upon request by the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement, these penalties will be withheld from payments then due to Contractor.

9.5 Labor Compliance. Pursuant to Labor Code Section 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the DIR.

9.6 Wage Theft Prevention. Compliance with Wage and Hour Laws: Contractor, and any subcontractor it employs to complete work under this Agreement, shall comply with all applicable federal, state and local wage and hour laws. Applicable laws may include, but are not limited to, the Federal Fair Labor Standards Act and the California Labor Code.

Final Judgments, Decisions, and Orders: For purposes of this Section, a “final judgment, decision, or order” refers to one for which all appeals have been exhausted or the time to appeal has expired. Relevant investigatory government agencies include: the federal Department of Labor, the California Division of Labor Standards Enforcement, or any other governmental entity or division tasked with the investigation and enforcement of wage and hour laws.

Prior Judgments against Contractor and/or its Subcontractors: BY SIGNING THIS AGREEMENT, CONTRACTOR AFFIRMS THAT IT HAS DISCLOSED ANY FINAL JUDGMENTS, DECISIONS OR ORDERS FROM A COURT OR INVESTIGATORY GOVERNMENT AGENCY FINDING – IN THE FIVE (5) YEARS PRIOR TO EXECUTING THIS AGREEMENT – THAT CONTRACTOR OR ITS SUBCONTRACTOR(S) HAS VIOLATED ANY APPLICABLE WAGE AND HOUR LAWS. CONTRACTOR FURTHER AFFIRMS THAT IT OR ITS SUBCONTRACTOR(S) HAS SATISFIED AND COMPLIED WITH – OR HAS REACHED AGREEMENT WITH THE CITY REGARDING THE MANNER IN WHICH IT WILL SATISFY – ANY SUCH JUDGMENTS, DECISIONS OR ORDERS.

Judgments or Decisions During Term of Contract: If at any time during the term of this Agreement, a court or investigatory government agency issues a final judgment, decision or order finding that Contractor or an subcontractor it employs to perform work under this Agreement has violated any applicable wage and hour law, or Contractor learns of such a judgment, decision, or order that was not previously disclosed, Contractor shall inform the City Attorney, no more than fifteen (15) days after the judgment, decision or order becomes final or of learning of the final judgment, decision or order. Contractor and its subcontractors shall promptly satisfy and comply with any such judgment, decision, or order, and shall provide the City Attorney with documentary evidence of compliance with the final judgment, decision or order within five (5) days of satisfying the final judgment, decision or order. The City reserves the right to require Contractor to enter into an agreement with the City regarding the manner in which any such final judgment, decision, or order will be satisfied.

City’s Right to Withhold Payment: Where Contractor or any subcontractor it employs to perform work under this Agreement has been found in

violation of any applicable wage and hour law by a final judgment, decision or order of a court or government agency, the City reserves the right to withhold payment to Contractor until such judgment, decision or order has been satisfied in full.

Material Breach: Failure to comply with any part of this Section constitutes a material breach of this Agreement. Such breach may serve as a basis for immediate termination of this Agreement and/or any other remedies available under this Agreement and/or law.

Notice to City Related to Wage Theft Prevention: Notice provided to the City Attorney as required under this Section shall be addressed to: City Attorney, City of Morgan Hill, 17575 Peak Avenue, Morgan Hill, CA 95037. The Notice provisions of this Section are separate from any other notice provisions in this Agreement and, accordingly, only notice provided to the above address satisfies the notice requirements in this Section.

Article 10 - Safety Provisions

10.1 Safety Precautions and Programs. Contractor and its Subcontractors are fully responsible for safety precautions and programs, and for the safety of persons and property in the performance of the Work. Contractor and its Subcontractors must at all times comply with all applicable health and safety Laws and seek to avoid injury, loss, or damage to persons or property by taking reasonable steps to protect its employees and other persons at any Worksite, materials and equipment stored on or off site, and property at or adjacent to any Worksite.

(A) **Reporting Requirements.** Contractor must immediately notify the City of any death, serious injury or illness resulting from Work on the Project. Contractor must immediately provide a written report to City of each recordable accident or injury occurring at any Worksite within 24 hours of the occurrence. The written report must include: (1) the name and address of the injured or deceased person; (2) the name and address of each employee of Contractor or of any Subcontractor involved in the incident; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with a government agency, Contractor will provide a copy of the report to City.

(B) **Legal Compliance.** Contractor's safety program must comply with the applicable legal and regulatory requirements. Contractor must provide City with copies of all notices required by Laws.

(C) **Contractor's Obligations.** Any damage or loss caused by Contractor arising from the Work which is not insured under property insurance must be promptly remedied by Contractor.

(D) **Remedies.** If City determines, in its sole discretion, that any part of the Work or Project site is unsafe, City may, without assuming responsibility for Contractor's safety program, require Contractor or its Subcontractor to cease performance of the Work or to take corrective measures to City's satisfaction. If Contractor fails to promptly take the required corrective measures, City may perform them and deduct the cost from the Contract Price. Contractor agrees it is not entitled to submit a Claim for damages, for an increase in Contract Price, or for a change in Contract Time based on Contractor's compliance with City's request for corrective measures pursuant to this provision.

10.2 Hazardous Materials. Unless otherwise specified in the Contract Documents, this Contract does not include the removal, handling, or disturbance of any asbestos or other Hazardous Materials. If Contractor encounters materials on the Project site that Contractor reasonably believes to be asbestos or other Hazardous Materials, and the asbestos or other Hazardous Materials have not been rendered harmless, Contractor may continue Work in unaffected areas reasonably believed to be safe, but must immediately cease work on the area affected and report the condition to City. No asbestos, asbestos-containing products or other Hazardous Materials may be used in performance of the Work.

10.3 Material Safety. Contractor is solely responsible for complying with Section 5194 of Title 8 of the California Code of Regulations, including by providing information to Contractor's employees about any hazardous chemicals to which they may be exposed in the course of the Work. A hazard communication program and other forms of warning and training about such exposure must be used. Contractor must also maintain Safety Data Sheets ("SDS") at the Project site, as required by Law, for materials or substances used or consumed in the performance of the Work. The SDS will be accessible and available to Contractor's employees, Subcontractors, and City.

(A) **Contractor Obligations.** Contractor is solely responsible for the proper delivery, handling, use, storage, removal, and disposal of all materials brought to the Project site and/or used in the performance of the Work. Contractor must notify the Engineer if a specified product or material cannot be used safely.

(B) **Labeling.** Contractor must ensure proper labeling on any material brought onto the Project site so that any persons working with or in the vicinity of the material may be informed as to the identity of the material,

any potential hazards, and requirements for proper handling, protections, and disposal.

- 10.4 Hazardous Condition.** Contractor is solely responsible for determining whether a hazardous condition exists or is created during the course of the Work, involving a risk of bodily harm to any person or risk of damage to any property. If a hazardous condition exists or is created, Contractor must take all precautions necessary to address the condition and ensure that the Work progresses safely under the circumstances. Hazardous conditions may result from, but are not limited to, use of specified materials or equipment, the Work location, the Project site condition, the method of construction, or the way any Work must be performed.
- 10.5 Emergencies.** In an emergency affecting the safety or protection of persons, Work, or property at or adjacent to any Worksite, Contractor must take reasonable and prompt actions to prevent damage, injury, or loss, without prior authorization from the City if, under the circumstances, there is inadequate time to seek prior authorization from the City.

Article 11 - Completion and Warranty Provisions

11.1 Final Completion.

(A) ***Final Inspection and Punch List.*** When the Work required by this Contract is fully performed, Contractor must provide written notification to City requesting final inspection. The Engineer will schedule the date and time for final inspection, which must include Contractor's primary representative for the Project and its superintendent. Based on that inspection, City will prepare a punch list of any items that are incomplete, missing, defective, incorrectly installed, or otherwise not compliant with the Contract Documents. The punch list to Contractor will specify the time by which all of the punch list items must be completed or corrected. The punch list may include City's estimated cost to complete each punch list item if Contractor fails to do so within the specified time. The omission of any non-compliant item from a punch list will not relieve Contractor from fulfilling all requirements of the Contract Documents. Contractor's failure to complete any punch list item within the time specified in the punch list will not waive or abridge its warranty obligations for any such items that must be completed by the City or by a third party retained by the City due to Contractor's failure to timely complete any such outstanding item.

(B) ***Requirements for Final Completion.*** Final Completion will be achieved upon completion or correction of all punch list items, as verified by City's further inspection, and upon satisfaction of all other Contract requirements, including any commissioning required under the Contract

Documents, and submission of all final submittals, including instructions and manuals as required under Section 7.10, and complete, final as-built drawings as required under Section 7.11, all to City's satisfaction.

(C) **Acceptance.** The Project will be considered accepted upon City Council action during a public meeting to accept the Project, unless the Engineer is authorized to accept the Project, in which case the Project will be considered accepted upon the date of the Engineer's issuance of a written notice of acceptance. In order to avoid delay of Project close out, the City may elect, acting in its sole discretion, to accept the Project as complete subject to exceptions for punch list items that are not completed within the time specified in the punch list.

(D) **Final Payment and Release of Retention.** Final Payment and release of retention, less any sums withheld pursuant to the provisions of the Contract Documents, will not be made sooner than 35 days after recordation of the notice of completion. If Contractor fails to complete all of the punch list items within the specified time, City may withhold up to 150% of City's estimated cost to complete each of the remaining items from Final Payment and may use the withheld retention to pay for the costs to self-perform the outstanding items or to retain a third party to complete any such outstanding punch list item.

11.2 Warranty.

(A) **General.** Contractor warrants that all materials and equipment will be new unless otherwise specified, of good quality, in conformance with the Contract Documents, and free from defective workmanship and materials. Contractor further warrants that the Work will be free from material defects not intrinsic in the design or materials required in the Contract Documents. Contractor warrants that materials or items incorporated into the Work comply with the requirements and standards in the Contract Documents, including compliance with Laws, and that any Hazardous Materials encountered or used were handled as required by Laws. At City's request, Contractor must furnish satisfactory evidence of the quality and type of materials and equipment furnished. Contractor's warranty does not extend to damage caused by normal wear and tear, or improper use or maintenance.

(B) **Warranty Period.** Contractor's warranty must guarantee its Work for a period of one year from the date of Project acceptance (the "Warranty Period"), except when a longer guarantee is provided by a supplier or manufacturer or is required by the Specifications or Special Conditions. Contractor must obtain from its Subcontractors, suppliers and manufacturers any special or extended warranties required by the Contract Documents.

(C) **Warranty Documents.** As a condition precedent to Final Completion, Contractor must supply City with all warranty and guarantee documents relevant to equipment and materials incorporated into the Work and guaranteed by their suppliers or manufacturers.

(D) **Subcontractors.** The warranty obligations in the Contract Documents apply to Work performed by Contractor and its Subcontractors, and Contractor expressly agrees to be co-guarantor of such Work.

(E) **Contractor's Obligations.** Upon written notice from City to Contractor of any defect in the Work discovered during the Warranty Period, Contractor or its responsible Subcontractor must promptly correct the defective Work at its own cost. Contractor's obligation to correct defects discovered during the Warranty Period will continue past the expiration of the Warranty Period as to any defects in Work for which Contractor was notified prior to expiration of the Warranty Period. Work performed during the Warranty Period ("Warranty Work") will be subject to the warranty provisions in this Section 11.2 for a one-year period that begins upon completion of such Warranty Work to City's satisfaction.

(F) **City's Remedies.** If Contractor or its responsible Subcontractor fails to correct defective Work within ten days following notice by City, or sooner, if required by the circumstances, Contractor expressly agrees that City may correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor must reimburse City for its costs in accordance with subsection (H) below.

(G) **Emergency Repairs.** In cases of emergency where any delay in correcting defective Work could cause harm, loss or damage, City may immediately correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor or its surety must reimburse City for its costs in accordance with subsection (H), below.

(H) **Reimbursement.** Contractor must reimburse City for its costs to repair under subsections (F) or (G), above, within 30 days following City's submission of a demand for payment pursuant to this provision. If City is required to initiate legal action to compel Contractor's compliance with this provision, and City is the prevailing party in such action, Contractor and its surety are solely responsible for all of City's attorney's fees and legal costs expended to enforce Contractor's warranty obligations herein in addition to any and all costs City incurs to correct the defective Work.

11.3 Use Prior to Final Completion. City reserves the right to occupy or make use of the Project, or any portions of the Project, prior to Final

Completion if City has determined that the Project or portion of it is in a condition suitable for the proposed occupation or use, and that it is in its best interest to occupy or make use of the Project, or any portions of it, prior to Final Completion. City will notify Contractor in writing of its intent to occupy or make use of the Project or any portions of the Project, pursuant to this provision.

(A) **Non-Waiver.** Occupation or use of the Project, in whole or in part, prior to Final Completion will not operate as acceptance of the Work or any portion of it, nor will it operate as a waiver of any of City's rights or Contractor's duties pursuant to these Contract Documents, and will not affect nor bear on the determination of the time of substantial completion with respect to any statute of repose pertaining to the time for filing an action for construction defect.

(B) **City's Responsibility.** City will be responsible for the cost of maintenance and repairs due to normal wear and tear with respect to those portions of the Project that are being occupied or used before Final Completion. The Contract Price or the Contract Time may be adjusted pursuant to the applicable provisions of these Contract Documents if, and only to the extent that, any occupation or use under this Section actually adds to Contractor's cost or time to complete the Work within the Contract Time.

11.4 Substantial Completion. For purposes of determining "substantial completion" with respect to any statute of repose pertaining to the time for filing an action for construction defect, "substantial completion" is deemed to mean the last date that Contractor or any Subcontractor performs Work on the Project prior to City acceptance of the Project, except for warranty work performed under this Article.

Article 12 - Dispute Resolution

12.1 Claims. This Article applies to and provides the exclusive procedures for any Claim arising from or related to the Contract or performance of the Work.

(A) **Definition.** "Claim" means a separate demand by Contractor, submitted in writing by registered or certified mail with return receipt requested, for a change in the Contract Time, including a time extension or relief from liquidated damages, or a change in the Contract Price when the demand has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected or disputed by City, in whole or in part. A Claim may also include that portion of a unilateral Change Order that is disputed by the Contractor.

(B) **Limitations.** A Claim may only include the portion of a previously rejected demand that remains in dispute between Contractor and City. With the exception of any dispute regarding the amount of money actually paid to Contractor as Final Payment, Contractor is not entitled to submit a Claim demanding a change in the Contract Time or the Contract Price, which has not previously been submitted to City in full compliance with Article 5 and Article 6, and subsequently rejected in whole or in part by City.

(C) **Scope of Article.** This Article is intended to provide the exclusive procedures for submission and resolution of Claims of any amount, and applies in addition to the provisions of Public Contract Code Section 9204 and Sections 20104 *et seq.*, which are incorporated herein by this reference.

(D) **No Work Delay.** Notwithstanding the submission of a Claim or any other dispute between the parties related to the Project or the Contract Documents, Contractor must perform the Work and may not delay or cease Work pending resolution of a Claim or other dispute, but must continue to diligently prosecute the performance and timely completion of the Work, including the Work pertaining to a Claim or other dispute.

(E) **Informal Resolution.** Contractor will make a good faith effort to informally resolve a dispute before initiating a Claim, preferably by face-to-face meeting between authorized representatives of Contractor and City.

12.2 Claims Submission. The following requirements apply to any Claim subject to this Article:

(A) **Substantiation.** The Claim must be submitted to City in writing, clearly identified as a "Claim" submitted pursuant to this Article 12, and must include all of the documents necessary to substantiate the Claim including the Change Order request that was rejected in whole or in part, and a copy of City's written rejection that is in dispute. The Claim must clearly identify and describe the dispute, including relevant references to applicable portions of the Contract Documents, and a chronology of relevant events. Any Claim for additional payment must include a complete, itemized breakdown of all known or estimated labor, materials, taxes, insurance, and subcontract, or other costs. Substantiating documentation such as payroll records, receipts, invoices, or the like, must be submitted in support of each component of claimed cost. Any Claim for an extension of time or delay costs must be substantiated with a schedule analysis and narrative depicting and explaining claimed time impacts. Contractor understands that submission of a Claim which has no basis in fact or which Contractor knows to be false may violate the False Claims Act (Government Code Section 12650 *et seq.*).

(B) ***Claim Format and Content.*** A Claim must be submitted in the following format:

(1) Provide a cover letter, specifically identifying the submission as a “Claim” submitted under this Article 12 and specifying the requested remedy (e.g., amount of proposed change to Contract Price and/or change to Contract Time).

(2) Provide a summary of each Claim, including underlying facts and the basis for entitlement, and identify each specific demand at issue, , including the specific Change Order request (by number and submittal date), and the date of City's rejection of that demand, in whole or in part.

(3) Provide a detailed explanation of each issue in dispute. For multiple issues included within a single Claim or for multiple Claims submitted concurrently, separately number and identify each individual issue or Claim and include the following for each separate issue or Claim:

(a) A succinct statement of the matter in dispute, including Contractor's position and the basis for that position;

(b) Identify and attach all documents that substantiate the Claim, including relevant provisions of the Contract Documents, RFIs, calculations, and schedule analysis (see subsection (A), Substantiation above); and

(c) A chronology of relevant events; and

(d) Analysis and basis for claimed changes to Contract Price, Contract Time, or any other remedy requested.

(4) Provide a summary of issues and corresponding claimed damages. If, by the time of the Claim submission deadline (below), the precise amount of the requested change in the Contract Price or Contract Time is not yet known, Contractor must provide a good faith estimate, including the basis for that estimate, and must identify the date by which it is anticipated that the Claim will be updated to provide final amounts.

(5) Include the following certification, executed by Contractor's authorized representative:

“The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Claim submittal are true and correct. Contractor warrants that this Claim submittal is comprehensive and complete as to the matters in dispute, and agrees that any costs, expenses, or delay not included herein are deemed waived.

(C) ***Submission Deadlines.***

(1) A Claim disputing rejection of a request for a change in the Contract Time or Contract Price must be submitted within 15 days following the date that City notified Contractor in writing that a request for a change in the Contract Time or Contract Price, duly submitted in compliance with Article 5 and Article 6, has been rejected in whole or in part. A Claim disputing the terms of a unilateral Change Order must be submitted within 15 days following the date of issuance of the unilateral Change Order. These Claim deadlines apply even if Contractor cannot yet quantify the total amount of any requested change in the Contract Time or Contract Price. If the Contractor cannot quantify those amounts, it must submit an estimate of the amounts claimed pending final determination of the requested remedy by Contractor.

(2) With the exception of any dispute regarding the amount of Final Payment, any Claim must be filed on or before the date of Final Payment, or will be deemed waived.

(3) A Claim disputing the amount of Final Payment must be submitted within 15 days of the effective date of Final Payment, under Section 8.7, Final Payment, above.

(4) Strict compliance with these Claim submission deadlines is necessary to ensure that any dispute may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project. Any Claim that is not submitted within the specified deadlines will be deemed waived by Contractor.

12.3 City’s Response. City will respond within 45 days of receipt of the Claim with a written statement identifying which portion(s) of the Claim are disputed, unless the 45-day period is extended by mutual agreement of City and Contractor or as otherwise allowed under Public Contract Code Section 9204. However, if City determines that the Claim is not adequately substantiated pursuant to Section 12.2(A), Substantiation, City may first request, in writing, within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim that City may have against the Claim.

(A) **Additional Information.** If additional information is thereafter required, it may be requested and provided upon mutual agreement of City and Contractor. If Contractor's Claim is based on estimated amounts, Contractor has a continuing duty to update its Claim as soon as possible with information on actual amounts in order to facilitate prompt and fair resolution of the Claim.

(B) **Non-Waiver.** Any failure by City to respond within the times specified above will not be construed as acceptance of the Claim in whole or in part, or as a waiver of any provision of these Contract Documents.

12.4 Meet and Confer. If Contractor disputes City's written response, or City fails to respond within the specified time, within 15 days of receipt of City's response, or within 15 days of City's failure to respond within the applicable 45-day time period, respectively, Contractor may notify City of the dispute in writing sent by registered or certified mail, return receipt requested and demand an informal conference to meet and confer for settlement of the issues in dispute. If Contractor fails to dispute City's response, in writing, within the specified time, Contractor's Claim will be deemed waived.

(A) **Schedule Meet and Confer.** Upon receipt of the demand to meet and confer, City will schedule the meet and confer conference to be held within 30 days, or later if needed to ensure the mutual availability of each of the individuals that each party requires to represent its interests at the meet and confer conference.

(B) **Location for Meet and Confer.** The meet and confer conference will be scheduled at a location at or near City's principal office.

(C) **Written Statement After Meet and Confer.** Within ten working days after the meet and confer has concluded, City will issue a written statement identifying which portion(s) of the Claim remain in dispute, if any.

(D) **Submission to Mediation.** If the Claim or any portion remains in dispute following the meet and confer conference, within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, the Contractor may identify in writing disputed portion(s) of the Claim, which will be submitted for mediation, as set forth below.

12.5 Mediation and Government Code Claims.

(A) **Mediation.** Within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, following the meet and confer, , City and Contractor will mutually agree to a mediator, as provided under Public Contract Code Section 9204. Mediation will be scheduled to ensure the mutual availability of the selected mediator and all of the individuals that each party requires to represent its interests. If there are multiple Claims in dispute, the parties may agree to schedule the mediation to address all outstanding Claims at the same time. The parties will share the costs of the mediator and mediation fees equally, but each party is otherwise solely and separately responsible for its own costs to prepare for and participate in the mediation, including costs for its legal counsel or any other consultants.

(B) Government Code Claims.

(1) Timely presentation of a Government Code Claim is a condition precedent to filing any legal action based on or arising from the Contract. Compliance with the Claim submission requirements in this Article 12 is a condition precedent to filing a Government Code Claim.

(2) The time for filing a Government Code Claim will be tolled from the time Contractor submits its written Claim pursuant to Section 12.2, above, until the time that Claim is denied in whole or in part at the conclusion of the meet and confer process, including any period of time used by the meet and confer process. However, if the Claim is submitted to mediation, the time for filing a Government Code Claim will be tolled until conclusion of the mediation, including any continuations, if the Claim is not fully resolved by mutual agreement of the parties during the mediation or any continuation of the mediation.

12.6 Tort Claims. This Article does not apply to tort claims and nothing in this Article is intended nor will be construed to change the time periods for filing tort-based Government Code Claims.

12.7 Arbitration. It is expressly agreed, under Code of Civil Procedure Section 1296, that in any arbitration to resolve a dispute relating to this Contract, the arbitrator's award must be supported by law and substantial evidence.

12.8 Burden of Proof and Limitations. Contractor bears the burden of proving entitlement to and the amount of any claimed damages. Contractor is not entitled to damages calculated on a total cost basis, but

must prove actual damages. Contractor is not entitled to speculative, special, or consequential damages, including home office overhead or any form of overhead not directly incurred at the Project site or any other Worksite; lost profits; loss of productivity; lost opportunity to work on other projects; diminished bonding capacity; increased cost of financing for the Project; extended capital costs; non-availability of labor, material or equipment due to delays; or any other indirect loss arising from the Contract. The Eichleay Formula or similar formula will not be used for any recovery under the Contract. The City will not be directly liable to any Subcontractor or supplier.

12.9 Legal Proceedings. In any legal proceeding that involves enforcement of any requirements of the Contract Documents, the finder of fact will receive detailed instructions on the meaning and operation of the Contract Documents, including conditions, limitations of liability, remedies, claim procedures, and other provisions bearing on the defenses and theories of liability. Detailed findings of fact will be requested to verify enforcement of the Contract Documents. All of the City's remedies under the Contract Documents will be construed as cumulative, and not exclusive, and the City reserves all rights to all remedies available under law or equity as to any dispute arising from or relating to the Contract Documents or performance of the Work.

12.10 Other Disputes. The procedures in this Article 12 will apply to any and all disputes or legal actions, in addition to Claims, arising from or related to this Contract, including disputes regarding suspension or early termination of the Contract, unless and only to the extent that compliance with a procedural requirement is expressly and specifically waived by City. Nothing in this Article is intended to delay suspension or termination under Article 13.

Article 13 - Suspension and Termination

13.1 Suspension for Cause. In addition to all other remedies available to City, if Contractor fails to perform or correct Work in accordance with the Contract Documents, including non-compliance with applicable environmental or health and safety Laws, City may immediately order the Work, or any portion of it, suspended until the circumstances giving rise to the suspension have been eliminated to City's satisfaction.

(A) **Notice of Suspension.** Upon receipt of City's written notice to suspend the Work, in whole or in part, except as otherwise specified in the notice of suspension, Contractor and its Subcontractors must promptly stop Work as specified in the notice of suspension; comply with directions for cleaning and securing the Worksite; and protect the completed and in-

progress Work and materials. Contractor is solely responsible for any damages or loss resulting from its failure to adequately secure and protect the Project.

(B) **Resumption of Work.** Upon receipt of the City's written notice to resume the suspended Work, in whole or in part, except as otherwise specified in the notice to resume, Contractor and its Subcontractors must promptly re-mobilize and resume the Work as specified; and within ten days from the date of the notice to resume, Contractor must submit a recovery schedule, prepared in accordance with the Contract Documents, showing how Contractor will complete the Work within the Contract Time.

(C) **Failure to Comply.** Contractor will not be entitled to an increase in Contract Time or Contract Price for a suspension occasioned by Contractor's failure to comply with the Contract Documents.

(D) **No Duty to Suspend.** City's right to suspend the Work will not give rise to a duty to suspend the Work, and City's failure to suspend the Work will not constitute a defense to Contractor's failure to comply with the requirements of the Contract Documents.

13.2 Suspension for Convenience. City reserves the right to suspend, delay, or interrupt the performance of the Work in whole or in part, for a period of time determined to be appropriate for City's convenience. Upon notice by City pursuant to this provision, Contractor must immediately suspend, delay, or interrupt the Work and secure the Project site as directed by City, except for taking measures to protect completed or in progress Work as directed in the suspension notice, and subject to the provisions of Section 13.1(A) and (B), above. If Contractor submits a timely request for a Change Order in compliance with Articles 5 and 6, the Contract Price and the Contract Time will be equitably adjusted by Change Order pursuant to Articles 5 and 6 to reflect the cost and delay impact occasioned by such suspension for convenience except to the extent that any such impacts were caused by Contractor's failure to comply with the Contract Documents or the terms of the suspension notice or notice to resume. However, Contract Time will only be extended if the suspension causes or will cause unavoidable delay in Final Completion. If Contractor disputes the terms of a Change Order issued for such equitable adjustment due to suspension for convenience, its sole recourse is to comply with the Claim procedures in Article 12.

13.3 Termination for Default. City may declare that Contractor is in default of the Contract for a material breach of or inability to fully, promptly, or satisfactorily perform its obligations under the Contract

(A) **Default.** Events giving rise to a declaration of default include Contractor's refusal or failure to supply sufficient skilled workers, proper materials, or equipment to perform the Work within the Contract Time; Contractor's refusal or failure to make prompt payment to its employees, Subcontractors, or suppliers or to correct defective Work or damage; Contractor's failure to comply with the Laws, or orders of any public agency with jurisdiction over the Project; evidence of Contractor's bankruptcy, insolvency, or lack of financial capacity to complete the Work as required within the Contract Time; suspension, revocation, or expiration and nonrenewal of Contractor's license or DIR registration; dissolution, liquidation, reorganization, or other major change in Contractor's organization, ownership, structure or existence as a business entity; unauthorized assignment of Contractor's rights or duties under the Contract; or any material breach of the Contract requirements.

(B) **Notice of Default and Opportunity to Cure.** Upon City's declaration that Contractor is in default, due to a material breach of the Contract Documents, if City determines that the default is curable, City will afford Contractor the opportunity to cure the default within ten days of City's notice of default, or within a period of time reasonably necessary for such cure, including a shorter period of time if applicable.

(C) **Termination.** If Contractor fails to cure the default or fails to expediently take steps reasonably calculated to cure the default within the time period specified in the notice of default, City may issue written notice to Contractor and its performance bond surety of City's termination of the Contract for default.

(D) **Waiver.** Time being of the essence in the performance of the Work, if Contractor's surety fails to arrange for completion of the Work in accordance with the Performance Bond, within seven calendar days from the date of the notice of termination, pursuant to Paragraph (C), City may immediately make arrangements for the completion of the Work through use of its own forces, by hiring a replacement contractor, or by any other means that City determines advisable under the circumstances. Contractor and its surety will be jointly and severally liable for any additional cost incurred by City to complete the Work following termination, where "additional cost" means all cost in excess of the cost City would have incurred if Contractor had timely completed Work without the default and termination. In addition, City will have the right to immediate possession and use of any materials, supplies, and equipment procured for the Project and located at the Project site or any Worksite on City property for the purposes of completing the remaining Work.

(E) **Compensation.** Within 30 days of receipt of updated as-builts, all warranties, manuals, instructions, or other required documents for Work

installed to date, and delivery to City of all equipment and materials for the Project for which Contractor has already been compensated, Contractor will be compensated for the Work satisfactorily performed in compliance with the Contract Documents up to the effective date of the termination pursuant to the terms of Article 8, Payment, subject to City's rights to withhold or deduct sums from payment otherwise due pursuant to Section 8.3, and excluding any costs Contractor incurs as a result of the termination, including any cancellation or restocking charges or fees due to third parties. If Contractor disputes the amount of compensation determined by City, its sole recourse is to comply with the Claim Procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of the total compensation to be paid by City.

(F) ***Wrongful Termination.*** If Contractor disputes the termination, its sole recourse is to comply with the Claim procedures in Article 12. If a court of competent jurisdiction or an arbitrator later determines that the termination for default was wrongful, the termination will be deemed to be a termination for convenience, and Contractor's damages will be strictly limited to the compensation provided for termination for convenience, under Section 13.4, below. Contractor waives any claim for any other damages for wrongful termination including special or consequential damages, lost opportunity costs or lost profits, and any award of damages is subject to Section 12.8, Burden of Proof and Limitations.

13.4 Termination for Convenience. City reserves the right, acting in its sole discretion, to terminate all or part of the Contract for convenience upon written notice to Contractor.

(A) ***Compensation to Contractor.*** In the event of City's termination for convenience, Contractor waives any claim for damages, including for loss of anticipated profits from the Project. The following will constitute full and fair compensation to Contractor, and Contractor will not be entitled to any additional claim or compensation.

(1) ***Completed Work.*** The value of its Work satisfactorily performed as of the date notice of termination is received, based on Contractor's schedule of values and unpaid costs for items delivered to the Project site that were fabricated for incorporation in the Work;

(2) ***Demobilization.*** Demobilization costs specified in the schedule of values, or if demobilizations cost were not provided in a schedule of values pursuant to Section 8.1, then based on actual, reasonable, and fully documented demobilization costs; and

(3) **Termination Markup.** Five percent of the total value of the Work performed as of the date of notice of termination including reasonable, actual, and documented costs to comply with the direction in the notice of termination for convenience, and demobilization costs, which is deemed to cover all overhead and profit to date.

(B) **Disputes.** If Contractor disputes the amount of compensation determined by City pursuant to paragraph (A), above, its sole recourse is to comply with the Claim procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of total compensation to be paid by City.

13.5 Actions Upon Termination for Default or Convenience. The following provisions apply to any termination under this Article, whether for default or convenience, and whether in whole or in part.

(A) **General.** Upon termination City may immediately enter upon and take possession of the Project and the Work and all tools, equipment, appliances, materials, and supplies procured or fabricated for the Project. Contractor will transfer title to and deliver all completed Work and all Work in progress to City.

(B) **Submittals.** Unless otherwise specified in the notice of termination, Contractor must immediately submit to City all designs, drawings, as-built drawings, Project records, contracts with vendors and Subcontractors, manufacturer warranties, manuals, and other such submittals or Work-related documents required under the terms of the Contract Documents, including incomplete documents or drafts.

(C) **Close Out Requirements.** Except as otherwise specified in the notice of termination, Contractor must comply with all of the following:

(1) Immediately stop the Work, except for any Work that must be completed pursuant to the notice of termination and comply with City's instructions for cessation of labor and securing the Project and any other Worksite(s).

(2) Comply with City's instructions to protect the completed Work and materials, using best efforts to minimize further costs.

(3) Contractor must not place further orders or enter into new subcontracts for materials, equipment, services or facilities, except as may be necessary to complete any portion of the Work that is not terminated.

(4) As directed in the notice, Contractor must assign to City or cancel existing subcontracts that relate to performance of the terminated Work, subject to any prior rights, if any, of the surety for Contractor's performance bond, and settle all outstanding liabilities and claims, subject to City's approval.

(5) As directed in the notice, Contractor must use its best efforts to sell any materials, supplies, or equipment intended solely for the terminated Work in a manner and at market rate prices acceptable to City.

(D) ***Payment Upon Termination.*** Upon completion of all termination obligations, as specified herein and in the notice of termination, Contractor will submit its request for Final Payment, including any amounts due following termination pursuant to this Article 13. Payment will be made in accordance to the provisions of Article 8, based on the portion of the Work satisfactorily completed, including the close out requirements, and consistent with the previously submitted schedule of values and unit pricing, including demobilization costs. Adjustments to Final Payment may include deductions for the cost of materials, supplies, or equipment retained by Contractor; payments received for sale of any such materials, supplies, or equipment, less re-stocking fees charged; and as otherwise specified in Section 8.3, Adjustment of Payment Application.

(E) ***Continuing Obligations.*** Regardless of any Contract termination, Contractor's obligations for portions of the Work already performed will continue and the provisions of the Contract Documents will remain in effect as to any claim, indemnity obligation, warranties, guarantees, submittals of as-built drawings, instructions, or manuals, record maintenance, or other such rights and obligations arising prior to the termination date.

Article 14 - Miscellaneous Provisions

14.1 Assignment of Unfair Business Practice Claims. Under Public Contract Code Section 7103.5, Contractor and its Subcontractors agree to assign to City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the Contract or any subcontract. This assignment will be effective at the time City tenders Final Payment to Contractor, without further acknowledgement by the parties.

- 14.2 Provisions Deemed Inserted.** Every provision of law required to be inserted in the Contract Documents is deemed to be inserted, and the Contract Documents will be construed and enforced as though such provision has been included. If it is discovered that through mistake or otherwise that any required provision was not inserted, or not correctly inserted, the Contract Documents will be deemed amended accordingly.
- 14.3 Waiver.** City's waiver of a breach, failure of any condition, or any right or remedy contained in or granted by the provisions of the Contract Documents will not be effective unless it is in writing and signed by City. City's waiver of any breach, failure, right, or remedy will not be deemed a waiver of any other breach, failure, right, or remedy, whether or not similar, nor will any waiver constitute a continuing waiver unless specified in writing by City.
- 14.4 Titles, Headings, and Groupings.** The titles and headings used and the groupings of provisions in the Contract Documents are for convenience only and may not be used in the construction or interpretation of the Contract Documents or relied upon for any other purpose.
- 14.5 Statutory and Regulatory References.** With respect to any amendments to any statutes or regulations referenced in these Contract Documents, the reference is deemed to be the version in effect on the date that that bids were due.
- 14.6 Survival.** The provisions that survive termination or expiration of this Contract include Contract Section 11, Notice, and subsections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6, of Section 12, General Provisions; and the following provisions in these General Conditions: Section 2.2(J), Contractor's Records, Section 2.3(C), Termination, Section 3.7, Ownership, Section 4.2, Indemnity, Article 12, Dispute Resolution, and Section 11.2, Warranty.

END OF GENERAL CONDITIONS

SPECIAL CONDITIONS

1.0 Shop Drawings. Whenever Shop Drawings are required by the Contract Documents or by the Engineer, Contractor must submit five (5) prints of each shop drawing to the Engineer.

(A) If three (3) prints of the drawing are returned to Contractor marked "NO EXCEPTIONS TAKEN," further revision of the drawings will not be required. If one (1) print of the drawing is returned to Contractor marked "REVISE AND RESUBMIT," Contractor must revise the drawing and resubmit five (5) copies of the revised drawing to the Engineer. City reserves the right to withhold payment due Contractor to cover additional costs of the Engineer's review beyond the second submission.

(B) Fabrication of an item may not commence before the Engineer has reviewed the pertinent shop drawings and returned copies to Contractor marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

(C) Revisions indicated on shop drawings are deemed necessary to meet the existing requirements of the Contract Documents and may not be taken as the basis of claims for extra Work. Contractor is not entitled to claim for damages or extension of time due to any delay resulting from making the required revisions to shop drawings. The Engineer's review of the shop drawings does not relieve Contractor of responsibility for any errors or omissions contained in the shop drawings nor will such review operate to waive or modify any provision contained in the Contract Documents.

2.0 Waste Water. City will provide water required for performance of the Work. Contractor is responsible for the appropriate disposal of waste water in coordination with City personnel. Contractor must provide a backflow preventer on all point of connections to City's Water System. All backflow preventers must be checked and approved by City's Public Works Water Division. Contractor must provide a deposit (refundable) and make necessary arrangements to pick up a hydrant meter at City's Public Works Office. At the completion of the Project, if the hydrant meter is not returned promptly or if it is damaged, Contractor shall forfeit its deposit.

3.0 Equipment. Contractor must provide and use equipment and plants suitable to produce the quality of Work and materials required by the Contract Documents. Contractor may be required to remove equipment which the Engineer deems unsuitable for the Work. Contractor must ensure that equipment

is operated by trained, experienced operators, and at a speed or rate of production not to exceed that recommended by the manufacturer. Any vehicles used to haul materials over existing streets and highways must be equipped with pneumatic tires.

4.0 Lines and Grades. The Contractor will set the stakes or marks necessary to establish the lines and grades required for the completion of the Work in accordance with the Contract Documents.

(A) **Measurements.** Distances and measurements are given and will be made in a horizontal plane. Grades are given from the top of stakes or nail unless otherwise noted. Three (3) consecutive points shown on the same rate of slope must be used in common in order to detect any variation from a straight grade. Any variation from a straight grade, straight slope or line, must be reported to the Engineer. If such discrepancy is not reported to the Engineer, Contractor is responsible for any error in the finished work.

(B) **Stakes.** Contractor must preserve all stakes and points set for lines, grades or measurements of the Work in their proper places until authorized by the Engineer to remove them. All expenses incurred by replacing stakes shall be born by the Contractor.

5.0 Disposal of Materials Outside of Street Right-of-Way. Unless otherwise specified in the Specifications or Special Conditions, Contractor is solely responsible for disposing of materials outside the street right-of-way and for all associated costs. Before disposing materials outside the street right-of-way, Contractor must 1) obtain a written release from the property owner releasing City from any and all responsibility in connection with the disposal of material on that property; and 2) obtain permission from the Engineer to dispose of the material at the permitted location.

6.0 Emergency Contact. Prior to the commencement of Work on the Project, Contractor must provide contact information to the Engineer for the person designated by Contractor to respond to any emergency that arises on the Worksite during the course of the Project. That person will be responsible for responding to the Worksite within thirty (30) minutes following notification of an emergency by City's Police or Fire Department, regardless of the time of day.

7.0 Right-of-Way. City will provide the right-of-way for performance of the Work. Contractor is solely responsible for any additional area required outside of the designated the right-of-way, unless otherwise provided in the Contract Documents.

(A) **Environmental Control.** Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides,

herbicides or other harmful materials. Contractor and its subcontractors shall at all times in the performance of the Work comply with all applicable federal, state, and local laws and regulations concerning pollution of waterways.

8.0 **Authorized Work Days and Hours.**

(A) **Authorized Work Days.** Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project on the following days of the week, excluding holidays observed by City:

(Monday through Friday)

(B) **Authorized Work Hours.** Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project during the following hours:

(8AM-5:00PM) Contractor is required to be off the road by 5pm each day.

9.0 **Pre-Construction Conference.** City will designate a date and time for a pre-construction conference with Contractor following Contract execution. Project administration procedures and coordination between City and Contractor will be discussed, and Contractor must present City with the following information or documents at the meeting for City's review and acceptance before the Work commences:

- 9.1 Name, 24-hour contact information, and qualifications of the proposed on-site superintendent;
- 9.2 List of all key Project personnel and their complete contact information, including email addresses and telephone numbers during regular hours and after hours;
- 9.3 Staging plans that identify the sequence of the Work, including any phases and alternative sequences or phases, with the goal of minimizing the impacts on residents, businesses and other operations in the Project vicinity;
- 9.4 If required, traffic control plans associated with the staging plans that are signed and stamped by a licensed traffic engineer;
- 9.5 Draft baseline schedule for the Work as required under Section 5.2, to be finalized within ten days after City issues the Notice to Proceed;

- 9.6 Breakdown of lump sum bid items, to be used for determining the value of Work completed for future progress payments to Contractor;
 - 9.7 Schedule with list of Project submittals that require City review, and list of the proposed material suppliers;
 - 9.8 Plan for coordination with affected utility owner(s) and compliance with any related permit requirements;
 - 9.9 Videotape and photographs recording the conditions throughout the pre-construction Project site, showing the existing improvements and current condition of the curbs, gutters, sidewalks, signs, landscaping, streetlights, structures near the Project such as building faces, canopies, shades and fences, and any other features within the Project area limits;
 - 9.10 If requested by City, Contractor's cash flow projections; and
 - 9.11 Any other documents specified in the Special Conditions or Notice of Award.
- 10.0 **Weather Delay Days.** This provision is intended to supplement the requirements of General Conditions Section 5.2 on Schedule Requirements and Section 5.3 on Delays and Extensions of Contract Time.

- (A) **Weather Delay Day.** A Weather Delay Day is a Working Day during which Contractor and its forces, including Subcontractors, are unable to perform more than forty percent (40%) of the critical path Work scheduled for that day due to adverse weather conditions which impair the ability to safely or effectively perform the scheduled critical path Work that day. Adverse weather conditions may include rain, saturated soil, and Worksite clean-up required due to adverse weather. Determination of what constitutes critical path Work scheduled for that day will be based on the most current, City-approved schedule.
- (B) **Normal Weather Delay Days.** Based on historic records for the Project location, Contractor's schedule should assume the following number of normal Weather Delay Days for each month:

Month	# Normal Weather Delay Days
January	11
February	11
March	10
April	6

May	4
June	2
July	1
August	1
September	1
October	4
November	7
December	10

Weather Delay Days which do not occur during a given month based on the number of days allocated for that month (above) do not carry over to another month.

11.0 **Close Out Requirements.** Contractor's close out requirements include the following, if applicable:

- 11.1 Contractor must replace, with thermoplastic, any existing striping within and adjacent to the Project site that is damaged during the Work. Partially damaged striping must be replaced in its entirety.
- 11.2 Contractor must replace any survey monuments that are damaged or removed during the Work, with a Record of Survey filed by a licensed land surveyor as required by California law.
- 11.3 Before removing any traffic control or street signs on the Project site, Contractor must take photographs showing their original locations. Upon completion of each phase of construction, Contractor must temporarily reset the signs at those locations. Contractor must then replace the signs permanently upon completion of the Work and the cost of their removal and replacement must be included in the Bid Proposal.

END OF SPECIAL CONDITIONS

TECHNICAL SPECIFICATIONS

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Technical Specifications shall be used in conjunction with the City of Morgan Hill's Standard Details for construction. This document can be found on the City's website.

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Appendix A

Union Pacific Railroad Crossing Agreement

Appendix B

Geotechnical Investigation-Cornerstone Earth Group, Dated 2-26-2021

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BID ITEM DESCRIPTIONS

BASE BID

Bid Item 1 – Mobilization

1. This bid item shall be lump sum. The maximum allowable bid price under this item shall be in conformance with Specification Section 01 71 13, Mobilization. Any amount beyond the maximum allowable amount shall not be paid until the final progress payment.
2. Mobilization shall conform to the provisions of Section 9-1.16D, “Mobilization” of the State Standard Specifications.
3. This bid item shall include payment for obtaining all bonds, all Contractor acquired permits, licenses, agreements, certifications, notices of intent in compliance with Section 01 14 16, Sewer Outage Notifications and Section 01 14 17, Public and Agency Notifications, and acquisition of temporary easements; moving onto the site of all equipment, materials and staff including obtaining and setting up of Contractor’s staging area/yard; furnishing and erecting all needed construction facilities, construction surveying/staking, fencing, project signage, project security, demobilization, preconstruction photographs, video recording of surface features, progress schedules and reports, contract meetings, and record drawings.

Bid Item 2 – Preparation and Implementation of Stormwater Pollution Prevention Plan (SWPPP)

1. The minimum allowable bid price under this item shall be \$10,000. Payment for this item shall be lump sum, prorated over the course of the project based upon the percentage complete of all items.
2. This item includes the preparation and implementation of a SWPPP and includes full compensation for compliance with Specification Section 01 57 00, Temporary Controls, and Caltrans Permit Storm Water requirements, including furnishing all labor, materials, tools, and equipment, incidentals, and performing all work for design and installation of SWPPP systems and compliance with Best Management Practices.

Bid Item 3 – Sheet piling, Shoring, and Bracing (exclusive of tunneled crossing launching and receiving shafts)

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the project based on percentage complete of all items, excluding Bid Items 1 through 4, for the purpose of the calculation.
2. The Contractor shall comply with the requirements described in Specification

Section 31 23 00 as well as applicable City, County, State, and Federal regulations regarding sheeting, shoring, and bracing. This bid item includes all excavation support measures required, including but not limited to design, installation, maintenance, and removal of shoring and bracing required to stabilize and prevent movement of existing ground and to protect and provide for the safety of the Contractor's workers due to sudden collapse or movement of the existing ground, during excavation and trenching operations, including furnishing all equipment, materials and personnel associated therewith, and in accordance with the project Technical Specifications and California Labor Code 6700-6708. Contractor shall comply with the geotechnical engineer's recommendation for sheeting, shoring and bracing, see Appendix B.

Bid Item 4 - Traffic Control

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the project based upon the percentage complete of all items, excluding Bid Items 1 through 4, for the purpose of the calculation.
2. This bid item includes preparing detailed traffic control plans by a Traffic Engineer registered in the State of California to be reviewed and approved by the City of Morgan Hill; placing, adjusting and removing temporary traffic control measures, such as, but not limited to, flags, cones, barricades, crash barriers, signs, flaggers (personnel dedicated to controlling and managing traffic), portable changeable message boards, lighted arrow boards, traffic control signs as part of the approved detailed traffic control plan, detours, lighting, portable A-frame signs, pedestrian and traffic ramps, trench plates, temporary striping, permanent striping, K-rails, pavement markers, and all incidentals necessary for worker, pedestrian and traffic protection, including furnishing all equipment, materials and personnel associated therewith, and in accordance with the project Technical Specifications. Traffic control shall be provided for all project work areas and shall be provided for the duration of the project.

Bid Item 5 – Trenchless Crossing (Auger Boring)

1. This bid item shall be paid per linear foot. Payment for this item will be prorated over the course of work associated with the trenchless crossing.
2. The work to be completed is auger boring to cross the Union Pacific Railroad (UPRR) between the open cut portions of the sewer main.
3. This bid item includes conformance with the UPRR Agreement provided in Appendix A; obtaining and executing necessary Contractor agreements and permits from UPRR to perform the work; obtaining and providing Railroad Liability Insurance and other insurance required by UPRR; obtaining and providing UPRR flaggers for the duration of work; UPRR monitoring, submittals; additional locating and protecting existing utilities; additional surveying; additional saw cutting, grinding, surface demolition; additional removal and proper disposal of concrete,

asphalt, and asphalt containing reinforcing fabric; additional spoil handling and proper disposal; shoring design, shoring, excavation, and backfill for the entry and receiving shafts; casing pipe; auger boring of casing pipe; 16" fusible carrier pipe; casing spacers; grouting annular space; end seals; dewatering, paving; striping; and including furnishing all equipment, traffic control, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 6 – Sanitary Sewer Bypass

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the project based upon the percentage complete of all items, excluding Bid Items 1 through 4, for the purpose of the calculation.
2. The work to be completed is the wastewater bypass pumping and rerouting required to perform the installation, removal, abandonment, reconnection, or rehabilitation of the sanitary sewer mains, service laterals, and manholes per the contract documents. **Contractor is responsible for all maintenance of the bypass pumps, including any necessary filtering device to keep the bypass pumps working in optimum condition.**
3. This bid item includes submittals and bypass pumping system(s), 100% backup system, excavation, temporary backfill and permanent backfill for the temporary bypass pumping system, piping systems, stone base and select fill, pavement and/or median replacement, striping replacement, all other work regarding temporary bypass pumping, piping, and flow diversion, and protection thereof, including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 7 – Remove Existing Sanitary Sewer Manhole

1. This bid item shall be paid at the unit price bid per each manhole removed regardless of depth.
2. The work to be completed is the removal of existing concrete or brick manhole, in accordance with the contract documents.
3. This bid item includes submittals; additional locating and protecting existing utilities; surveying; additional saw cutting, grinding, surface demolition; additional removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; additional excavation; additional spoil handling and proper disposal; dewatering as needed; prepare and compact base; demolition, removal, and proper disposal of manhole materials including steel, concrete, bricks, and steel reinforcement materials, dust control; place and compact; place and compact backfill; place and compact surface restoration and paving, including sidewalks, concrete paving, curbs, gutters, driveways, and edge grinding; restoration of striping and pavement markings, resetting valve boxes, monuments, and other surface features disturbed by the work; cleaning; record drawings; including

furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 8 – New Sanitary Sewer Manhole

1. This bid item shall be paid at the unit price bid per each manhole constructed regardless of depth.
2. The work to be completed is the construction of a new concrete sanitary sewer manhole as shown on the Contract Drawings.
3. This bid item includes submittals; additional locating and protecting existing utilities; surveying; additional saw cutting, grinding, surface demolition; additional removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; additional excavation; additional spoil handling and proper disposal; dewatering as needed; prepare and compact base; locate, furnish and install manhole materials including drop connections where shown; dust control; place and compact; connecting and sealing pipe ends in structures; place and compact backfill; place and compact surface restoration and paving, including sidewalks, concrete paving, curbs, gutters, valley gutters and edge grinding; restoration of striping and pavement markings, resetting valve boxes, monuments, and other surface features disturbed by the work; cleaning; all testing; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 9 – Rehabilitate Sanitary Sewer Manhole

1. This bid item shall be paid at the unit price bid per each manhole rehabilitated regardless of depth or configuration.
2. The work to be completed is the rehabilitation of all new and existing concrete sanitary sewer manholes with a mortar coating or equal per the contract documents.
3. This bid item includes submittals; furnish and install manhole rehabilitation coating materials; dust control; testing; cleaning; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 10 – Connect to Existing Sanitary Sewer Manhole

1. This bid item shall be paid at the unit price bid per each connection installed at the existing manhole.
2. This bid item includes, but is not limited to, additional locating and protecting existing utilities; additional surveying; additional saw cutting, grinding, surface demolition; additional removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; additional excavation; additional spoil

handling and proper disposal; additional dewatering as needed; excavation; backfill; compaction; materials; coring to penetrate existing manhole to accept new sewer pipe; connection of new pipe to manhole in accordance with the contract drawings; and concrete work; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 11 – New 15 -inch SDR26 PVC Sanitary Sewer Main (Open Cut Method)

1. This bid items shall be paid at the unit price bid per foot of installed 15 inch SDR26 pipe by open cut method measured from inside wall of manhole to inside wall of manhole and not including pipe within the manhole.
2. Provision and installation of SDR26 polyvinyl chloride (PVC) gravity sewer pipe by open cut method shall include: submittals; pipe materials; locating, supporting, and protecting existing utilities; installing sewer lateral stubs, surveying; saw cutting, grinding, surface demolition; removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; excavation of unpaved surfaces, where applicable; trenching; spoil handling and proper disposal; dust control; dewatering the trench as needed; removal of conflicting existing sanitary sewer pipe; furnish and install sewer pipe; prepare and compact pipe sub base; over-excavation where shown including proper disposal of materials and placement of foundation materials including geotextile fabric and crushed rock if needed; place and compact pipe bedding; connecting and sealing pipe ends in structures, manholes, cleanouts; place and compact trench backfill including geotextile fabric; place and compact surface restoration and paving, including concrete paving, curbs, gutters, valley gutters and edge grinding; restoration of striping and pavement markings, resetting valve boxes, monuments, and other surface features disturbed by the work; cleaning; pipe testing; post-installation cleaning, and testing of the completed pipe; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 12 – Remove 8-inch Sanitary Sewer Main and Replace with 12-inch SDR26 Sanitary Sewer Main (Open Cut)

1. This bid items shall be paid at the unit price bid per foot of installed pipe by open cut method measured from inside wall of manhole to inside wall of manhole and not including pipe within the manhole.
2. Provision and installation of SDR26 polyvinyl chloride (PVC) gravity sewer pipe by open cut method shall include: submittals; pipe materials; locating, supporting, and protecting existing utilities; surveying; saw cutting, grinding, surface demolition; removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; excavation of unpaved surfaces, where applicable; trenching; spoil handling and proper disposal; dust control; dewatering the trench as needed; remove existing sewer pipe; furnish and install sewer pipe; prepare and compact pipe sub base; over-excavation where shown including proper disposal of

materials and placement of foundation materials including geotextile fabric and crushed rock; place and compact pipe bedding; connecting and sealing pipe ends in structures, manholes, cleanouts; place and compact trench backfill including geotextile fabric; place and compact surface restoration and paving, including concrete paving, curbs, gutters, valley gutters and edge grinding; restoration of striping and pavement markings, resetting valve boxes, monuments, and other surface features disturbed by the work; cleaning; pipe testing; post-installation cleaning and testing of the completed pipe; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 13 – Video Inspection of Existing Laterals

1. This bid item shall be paid at the unit price bid per each existing sanitary sewer service laterals to be video inspected.
2. The work to be completed is the pre-construction CCTV of existing sanitary sewer service laterals from the existing sanitary sewer main to the cleanout/property line, including furnishing all equipment, materials, and personnel associated therewith, and in accordance with the contract documents.

Bid Item 14 – Reconnect Sanitary Sewer Laterals

1. This bid item shall be paid at the unit price bid per each sanitary sewer service lateral to be reconnected to the main, regardless of length. The work includes furnishing all equipment, materials and personnel associated with the following and in accordance with the Contract Documents and as directed by the Engineer.
2. This bid item shall include locating and protecting existing utilities; locating and exposing existing sewer lateral and removing all roots in portions of laterals to be reconnected; saw cutting, grinding, excavating and properly disposing of surface concrete, including sidewalk, curb, and gutter, and asphalt concrete surfaces, including asphalt containing reinforcing fabric; and where applicable, excavation of unpaved surfaces, retaining walls or curbs, landscaping, and fencing; trenching and proper handling and disposal of excavation spoils, including dust control, trench dewatering as needed; removal of existing lateral piping (as necessary for the work as determined to be required from the CCTV inspection); furnishing and installing new sewer lateral pipe between main and the section of the lateral to remain, including realignment of lateral location with applicable elbows and fittings, by open cut methods; and connecting the service lateral at wye installed in the main sewer line as shown on the Contract Drawings. Work includes preparing and compacting service lateral sub-base; furnishing, placing and compacting pipe bedding; furnishing, placing, and compacting trench backfill per the Contract Documents; furnishing, placing, and compacting of surface stabilization as applicable for the original surface removed including but not limited to restoration of existing landscaping, retaining walls and curbs, and fencing disturbed by the work. Furnishing, placing, and compacting of temporary asphalt pavement as

applicable for the original surface removed including daily placement of temporary hot mix asphalt, followed by phased placement of trench-only asphalt concrete base, resetting valve boxes, monuments, and other surface features disturbed by the work; protection of landscaping and trees; and restoration of landscaping and trees; cleaning, post installation CCTV inspection, and testing of the installed pipe; record drawing preparation and submittal; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 15 – Post Construction CCTV

1. This bid item shall be paid lump sum of new sanitary sewer mains and service laterals to be video inspected.
2. The work to be completed is the post-construction CCTV of all new sanitary sewer mains and all connecting service laterals, including furnishing all equipment, materials, and personnel associated therewith, and in accordance with the contract documents and City Standard Details.

Bid Item 16 – New Sanitary Sewer Laterals

3. This bid item shall be paid at the unit price bid per each new sanitary sewer service lateral to be connected to the sewer main. The work includes furnishing all equipment, materials and personnel associated with the following and in accordance with the Contract Documents and as directed by the Engineer. As these new sanitary sewer laterals are for a future development, they are to be capped as shown on plans.

This bid item shall include locating and protecting existing utilities, excavation of unpaved surfaces, trenching and proper handling and disposal of excavation spoils, including dust control, trench dewatering as needed; furnishing and installing new sewer lateral pipe between main, by open cut methods; and connecting the service lateral at wye installed in the main sewer line as shown on the Contract Drawings. Work includes preparing and compacting service lateral sub-base; furnishing, placing and compacting pipe bedding; furnishing, placing, and compacting trench backfill per the Contract Documents; furnishing, placing, and compacting of surface stabilization as applicable for the original surface removed including but not limited to restoration of area; record drawing preparation and submittal; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 17 – 6” -inch SDR26 PVC Sanitary Sewer Main Stub (Open Cut Method)

4. This bid items shall be paid at the unit price bid per foot of installed 6 inch SDR26 pipe by open cut method measured from inside wall of manhole to inside wall of manhole and not including pipe within the manhole. Work shall include the capping of the 6” stub as it is for future development.

Provision and installation of SDR26 polyvinyl chloride (PVC) gravity sewer pipe

by open cut method shall include: submittals; pipe materials; locating, supporting, and protecting existing utilities, excavation of unpaved surfaces, where applicable; trenching; spoil handling and proper disposal; dust control; dewatering the trench as needed; removal of conflicting existing sanitary sewer pipe; furnish and install sewer pipe; prepare and compact pipe sub base; over-excavation where shown including proper disposal of materials and placement of foundation materials and crushed rock if needed; place and compact pipe bedding; connecting and sealing pipe ends in structures, manholes, cleanouts; place and compact trench backfill; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Items 18 – Curb, Gutter and Sidewalk Replacement

1. This bid item shall be paid at the unit price bid per linear foot of concrete curb, gutter, and square foot for driveway, sidewalk, and colored concrete sidewalks repaired where disturbance is required for the sewer main, sewer laterals, manhole installations, and tunnel crossing. The work includes furnishing all equipment, materials and personnel associated with the following, and in accordance with the Contract Documents.
2. This bid item includes saw cutting and removal of the concrete curb, gutter, driveway, sidewalk at score joints; spoil handling and proper disposal; excavation; subgrade compaction; forms and formwork; concrete replacement and finishing/color match for the curb/gutter/sidewalk/driveway; formwork removal; and replacement of the concrete materials. Also included is surface replacement/restoration of landscaping, excluding trees required to be removed and replaced, disturbed during the construction and protection and replacement of irrigation and landscaping features disturbed by the work.

Bid Item 19 – Pre-construction Pothole

1. This bid item shall be paid at the unit price bid per each pre-construction pothole performed for pre-construction pothole(s) labelled on the Plans. Potholes shall include Level 3 and other fiber optic conduits within UPRR right of way. Pothole must expose top and bottom of conduit(s) or conduit banks. These must remain open and protected during the bore/jack work for UPRR inspection purposes.
2. The work shall include coordination with utility companies and USA, utility marking, traffic control, obtaining and executing UPRR permits and agreements including UPRR flaggers if needed, obtaining and utilizing Railroad Liability Insurance, potholing in conformance with UPRR requirements, neat removal of surface materials, potholing by vacuum extraction or other City-approved method, backfilling, surface restoration, and providing all required data related to preconstruction potholes. The work includes furnishing all equipment, materials and personnel associated with the foregoing, and in accordance with the Contract Documents. Work shall be performed within four weeks of Notice to Proceed.

Bid Item 20 – Utility Potholing

1. This bid item shall be paid on a unit price bid per each utility pothole performed as required by the Contract Documents.
2. Utility potholes are estimated along the alignment of the new sewer pipe. This estimate may not include all electrical, gas, water, and communications services which may exist within the project limits. This work shall be done prior to installing the sewer pipe. See the Contract Documents regarding accuracy of utility information shown on the Plans.
3. The work shall include coordination with utility companies and USA, utility marking, traffic control, obtaining and executing UPRR permits and agreements including UPRR flaggers if needed, obtaining and utilizing Railroad Liability Insurance if needed, potholing in conformance with UPRR requirements if needed, neat removal of surface materials, removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; spoil handling and proper disposal; dust control; dewatering as needed; potholing by vacuum extraction or other City-approved method, backfilling, surface restoration, and providing all required data related to utility potholing. The work includes furnishing all equipment, materials and personnel associated with the foregoing, and in accordance with the Contract Documents. Work shall be performed prior to roadway sawcutting or trenching operations.

Bid Item 21 – Striping (thermoplastic) and Pavement Markings

1. This bid item shall be paid lump sum and shall match existing conditions prior to the construction of this project.
2. Thermoplastic Traffic stripes, pavement markers and reflectors include full compensation for furnishing all labor, material, equipment, tools, and incidentals and for doing all the work involved in furnishing and installing traffic stripes, and pavement markings, complete in place, including removal of all existing pavement delineations, layout (cat tracking), and temporary pavement delineation, as shown on the plans, as specified herein and as directed by the Engineer. No additional or separate payment shall be made therefor.

Bid Item 22 – 2” Asphalt Overlay with Wedge Grind and Conform Pave

1. This bid item shall be paid at the unit price bid per square foot of 2-inch asphalt overlay with wedge grind and conform pave (Reference Appendix C for approximate quantities and sketch of work). The work includes furnishing all equipment, materials, compaction, testing, temporary striping, off-haul and disposal and personnel associated with the following, and in accordance with the Contract Documents. **Work shall include 6’ wide – 2” wedge grind and conform grind along curb and gutter and stamped concrete. Manholes and boxes to be raised shall be included as part of this line item of work.**

2. This bid item includes asphalt material; wedge grinding, conform grinding, spoil handling, raising of manholes and boxes and proper disposal of grindings; excavation; compaction; testing, oiling, temporary striping, and traffic control required for this work.

Bid Item 23 – Full Depth Asphalt Concrete (Revokable)

1. This bid item shall be paid at the unit price bid per square foot of 6 inches of full depth asphalt concrete. The work includes furnishing all equipment, materials, compaction, testing, restriping, off-haul and disposal and personnel associated with the following, and in accordance with the Contract Documents.
2. This bid item includes asphalt material; spoil handling and proper disposal of grindings; excavation; compaction; testing, oiling, restriping, and traffic control required for this work.

Bid Item 24 – Monument Removal and Replacement

1. This bid item shall be paid at the unit price bid per each monument to be removed and replaced. The work includes furnishing all labor, material, and equipment, including all required surveying and record survey work before and after the removal and replacement of the monument in accordance with the Contract Documents.

Bid Item 25 – Supplemental Work

1. Supplemental scope of work and price shall be agreed to prior to authorization and shall be paid out of this bid item.
2. The work shall include any new or unforeseen work not specified for in the Plans and Specifications. The lump sum dollar amount listed in the bid schedule for Supplemental Work shall be included in each bidder's proposal. Supplemental work shall be performed only upon direct written authorization from the Engineer. Agreed price may be used as an alternate method of payment, if directed by the Engineer.

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SECTION 01 10 01

PROJECT RECORDS AND SUBMITTALS

- 1.01 Description: This section delineates the procedure the Contractor is to adhere to in the submission of documentation for material approval, and covers the records required of the Contractor prior to, during, and following completion of the work.
- 1.02 Submittals
- A. Progress Schedule. Within 7 days after receiving the Notice to Proceed and before any work is begun, the Contractor shall submit four copies of a Progress Schedule complying with Section 1.09 of these Technical Provisions. The first progress payment will not be issued until the progress schedule is submitted.
 - B. Supervisory Personnel. The Contractor shall submit a list of supervisory personnel who will be responsible for the performance of the Contract. The Contractor shall designate one (1) person who will have full decision' making authority to represent the Contractor on a daily basis at the project site. The list will include phone numbers where the personnel may be reached by the Engineer.
 - C. Shop Drawings. The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the Contract. City shall have up to 20 calendar days to review the shop drawings.

At least 15 working days prior to ordering of any materials, the Contractor shall forward to Engineer, for approval, all submittals required by the individual sections of the specifications. Unless a different number is called for by an individual section, six (6) copies of each shop drawing, material description, and specification literature and three specimens of each sample are required, all of which will be retained or distributed by the Engineer. The Contractor shall submit whatever additional number of shop drawings and literature, in addition to the above requirements, that the Contractor wants returned. The Engineer may require the Contractor to submit a legible reproducible print in addition to the above copies. Contractor shall number each type of material separately and identify the use of each material.

All submittals shall be transmitted to the Engineer by mail or in person with the letter of transmittal included in these documents. The Engineer will return all reviewed submittals to the Contractor within 14 calendar days.

Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness, and compliance with contract requirements, and shall indicate approval thereon as evidence of such coordination and review. Shop

drawings submitted to the Engineer without evidence of the Contractor's approval will be returned for resubmission.

Approval by the Engineer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this Contract, except with respect to variations described and approved in accordance with the Paragraph below.

If shop drawings show variations from contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at time of submission. All such variation must be approved by the Engineer.

- D. Engineer's Approval. The Engineer will indicate approval or disapproval of each submittal, and the reasons for disapproval.
- i. If no corrections are required, the copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately incorporating the material and equipment covered by the submittal into the project.
 - ii. If limited corrections are required, the copies will be returned marked "MAKE CORRECTIONS NOTED." Work may begin immediately on incorporating the material and equipment covered by the corrected submittal into the project.
 - iii. If insufficient or incorrect data has been submitted, the copies will be returned marked "AMEND & RESUBMIT." No work incorporating the material and equipment covered by this submittal into the project may begin until the submittal has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
 - iv. If the submittal is unacceptable, the copies will be returned marked "REJECTED - SEE REMARKS." No work incorporating the material and equipment covered by this submittal into the project may begin until a new submittal has been made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
 - v. The Contractor shall not change any drawing after it has been marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED", or change any approved equipment or material without written permission of Engineer.
 - vi. If more than three submittals for a single item are required because of incorrect or insufficient data, or the submittal is unacceptable, or because the Contractor wishes to change previously approved material, then all costs incurred by the Engineer for the additional review shall be deducted from monies due the Contractor.

- vii. If submittals include cut sheets or drawings with details of more than one item which could be used, the Contractor shall clearly denote the specific material, size, or product proposed for use on the project.
- viii. Resubmittals shall include a listing of the Reviewer's comments from the previous submittal with associated Contractor's response to each comment.

- E. Certificates. For those items called for in individual sections, the Contractor must furnish certificates from manufacturers, suppliers, or others certifying that materials or equipment being furnished under the Contract comply with the requirements of these specifications.

Certificates of compliance shall conform to the provisions in Section 6-2.03C "Certificates of Compliance" of the Caltrans Standard Specifications and these specifications.

Certificates of compliance from the Contractor, suppliers, and/or manufacturers, shall clearly indicate that the material to be delivered to the jobsite will meet all requirements of the specifications. A certificate of compliance shall include, but not be limited to the project title, delivery location, date (or approximate date) of delivery, name of the material with appropriate classification or model numbers, quantity, name of the manufacturer, statement of compliance with all requirements of the specifications, and certifier's name, title and signature. In addition, a factory or mill certification (laboratory test report), if required by the specifications, shall be submitted with certificate of compliance. The factory or mill shall not substitute the certificate of compliance, unless it contains all information required for a certificate of compliance as described above.

Insufficient, incomplete, or unclear certificates shall be rejected and shall be resubmitted. The Contractor shall be responsible for all delays caused by the resubmittals.

- F. Samples. For those items called for in individual sections, the Contractor must furnish samples. Samples shall be of sufficient size to clearly illustrate functional characteristics and full range of color, texture, and pattern.

The Contractor shall notify the Engineer at least one (1) week prior to commencement of the construction and shall furnish the Engineer at least one (1) day notice when inspections are required, unless otherwise noted.

- G. Records. The Contractor shall provide, prior to acceptance of all work, all records as herein specified and as specified in the individual sections of the contract documents. Six (6) sets of all records shall be furnished to the Engineer for review, approval and distribution to the interested parties.

All submitted records shall be contained in a manual or manuals consisting of 8- 1/2 x 11 inch hardback 3 ring binders. Included in each manual shall be catalog data on each item, together with parts lists, description of operation, maintenance information, shop drawings, wiring and riser diagrams, along with all test data.

Catalogs and data in the manual shall be neat, clean copies. Drawings shall be accordion folded to letter size and installed in an envelope within the manual. An index shall be provided, which shall list all contents in an orderly manner, with the respective equipment suppliers' name, address and telephone number. The manufacturer's recommended servicing instructions shall also be included. Diagrams shall be complete for each system installed. Provide divider sheets with identifying tabs between each category.

- H. As-Built Drawings. The Contractor shall maintain a separate, neat, and legible set of construction drawings showing as built conditions of all constructed facilities. Changes shall be shown to scale in red on the appropriate Drawings. The locations of installed underground and hidden utilities will be shown and dimensioned to appropriate reference points. No work shall be permanently concealed until the required information has been recorded.

Where the Drawings are not of sufficient size, scale, or detail, the Contractor shall furnish his/her own drawings for incorporation of details and dimension. In such cases, the Contractor shall provide a reproducible set of his/her drawings, suitability cross referenced to the Contract Drawings.

The as-built drawings shall be maintained up to date at all times. Prior to any progress payments, the Engineer shall review the status of the as-built construction drawings. The Engineer shall withhold approval of progress payments until the as-built drawings are up to date.

Upon completion of the Contract, the Contractor shall furnish two satisfactory sets of as-built construction drawings. Drawings shall be certified that conditions shown are as-built. Final payment shall be withheld until the as-built construction drawings are received and accepted by the Engineer.

****END OF SECTION***

SECTION 01 14 16

SEWER OUTAGE NOTIFICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

This Section describes the requirements for providing advanced notification of construction activities to the City departments, residents, and businesses regarding planned sewer outages.

1.02 GENERAL

The requirements of this section shall be used in coordination with all related technical specification sections, the Contract Documents, and City of Morgan Hill requirements.

1.03 RELATED SECTIONS

- A. SECTION 01 57 00, TEMPORARY CONTROLS
- B. SECTION 01 14 17, PUBLIC AND AGENCY NOTIFICATIONS
- C. SECTION 33 01 30.01, SEWAGE FLOW CONTROL
- D. SECTION 33 01 30.02, BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT
- E. SECTION 01 55 26, TRAFFIC CONTROL

1.04 PROJECT REQUIREMENTS

- A. Provide labor, materials, and supervision as required to prepare and deliver sewer outage and construction notifications and to respond to affected residents and businesses.
- B. Contractor shall maintain a local telephone number of contact person for inquiries or complaints.

1.05 SUBMITTALS

The Contractor shall submit a detailed Public and Agency Notification Plan to the Engineer consisting of schedules, sample notices, contact personnel, contact phone numbers, and a detailed timeframe of when notices will be delivered.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

- A. Maintain service usage with the exception of planned outages throughout duration of project. Maximum amount of no service: 8 hours for any property served by the sewer. Any service out longer than 8 hours shall be bypassed to a sanitary sewer.
- B. Public Notification Program
 - 1. Notify the Engineer at least fourteen (7) days prior to any outage. Update notifications to the Engineer as required to reflect the current work.

2. Deliver written notices on the Contractor's letterhead to each home or business fourteen (7) days prior and again 72 hours prior to commencement of work being conducted on section of sewer, including telephone number of Contractor contact for inquires or complaints.
 3. Notifications shall provide instructions to homes and businesses to minimize discharge to the sewer during scheduled work to avoid back-ups.
 4. Notices shall include a summary of the work to be completed, purpose and location of the outage, and the time and duration of service interruption to building.
 5. The Contractor shall communicate verbally with the homeowner/business owner the day prior to the beginning of work conducted on the section relative to the homeowners/business owners.
 6. The Contractor shall contact any home or business that cannot be reconnected within the time stated in written notice.
- C. Service interruptions shall be strictly limited to the hours of 8:00 AM to 5:00 PM, Monday through Friday.
- D. The Contractor shall coordinate traffic control notifications as required in SECTION 01 55 26 of the Technical Specifications where feasible with the sewer outage notifications.

****END OF SECTION****

SECTION 01 14 17

PUBLIC AND AGENCY NOTIFICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

This Section describes the requirements for providing advanced notification of construction activities to City departments, local agencies, residents, and businesses.

1.02 GENERAL

The requirements of this section shall be used in coordination with all related Technical Specification sections, the Contract Documents, and City of Morgan Hill requirements.

1.03 RELATED SECTIONS

- A. SECTION 01 57 00, TEMPORARY CONTROLS
- B. SECTION 01 14 16 SEWER OUTAGE NOTIFICATIONS
- C. SECTION 01 55 26, TRAFFIC CONTROL

1.04 PROJECT REQUIREMENTS

- A. Provide labor, materials, and supervision as required to prepare and deliver professionally prepared construction notices to affected residents and businesses.
- B. Contractor shall maintain a local telephone number of contact person for inquiries or complaints.

1.05 SUBMITTALS

The Contractor shall submit a detailed Public and Agency Notification Plan to the Engineer consisting of schedules, sample notices, contact personnel, contact phone numbers, and a detailed timeframe of when notices will be delivered.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

- A. In addition to specific project notifications as required in other sections of the project Technical Specifications and Contract Documents, the Contractor shall give seven (14) days and 48-hour Advanced Project Construction Notification to entities and individuals that will be affected by project construction. The following entities and individuals shall be notified in writing of the general construction activities:

1. All residents on City blocks where work will be occurring.
 2. All businesses on City blocks where work will be occurring.
 3. City of Morgan Hill Public Works Department (Project Manager and Inspector).
 4. City of Morgan Hill Police Department (408) 779-2101.
 5. City of Morgan Hill Fire Department (408) 778-3259.
 6. City of Morgan Hill Garbage and Recycling: Recology South Valley (408) 842-3358.
 7. Affected School Districts.
 8. If an emergency or urgent street closure is required, the Contractor shall immediately notify:
 1. City of Morgan Hill Public Works Department (Project Manager and Inspector).
 2. City of Morgan Hill Police Department (408) 779-2101.
 3. City of Morgan Hill Fire Department (408) 778-3259.
- B. Contractor shall submit a Construction Access Permit to Santa Clara Valley Transportation Authority at least three weeks prior to any work that will disrupt transit service or affect a bus stop.
- C. Public Notification Program:
1. Deliver written notices on the Contractor's letterhead to each home, business, agency, or department one week before commencement of construction activities.
 2. Notices shall include a project name, a summary of the work to be completed, the location of the work, the expected duration of the work, the hours of work, and a telephone number of Contractor contact for inquires or complaints.
 3. A second notice shall be delivered to each home, business, agency, or department 48 hours before commencement of construction activities providing the same information detailed in the above item.
- D. Address City correspondence to: 17575 Peak Avenue, Morgan Hill, CA 95037-4128.

****END OF SECTION****

SECTION 01 55 25

TEMPORARY PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to apply temporary pavement markings.
- B. Lane line or centerline pavement delineation shall be provided at all times for travel lanes open to public traffic. Whenever the work causes obliteration of pavement delineation, temporary pavement delineation or permanent traffic stripes shall be in place prior to opening the traveled way to public traffic.
- C. The Contractor shall perform all work necessary to establish satisfactory alignment for temporary pavement delineation.
- D. Temporary pavement markings that are damaged from any cause during the progress of the work shall be immediately repaired or replaced by the Contractor at his/her expense.

1.02 REFERENCES

Related Sections

- A. SECTION 01 55 26, TRAFFIC CONTROL
- B. SECTION 32 17 23, TRAFFIC STRIPES AND PAVEMENT MARKINGS

PART 2 - PRODUCTS

2.01 TEMPORARY TRAFFIC STRIPE AND PAVEMENT MARKING TAPE

- A. Removable traffic stripe tape shall be the temporary removable type traffic stripe tape.
- B. Except where existing pavements are to remain in place or on the top layer of new pavements, the Contractor may use painted traffic stripes and pavement markings for temporary traffic stripe and temporary pavement marking. Painted traffic stripes and pavement markings, if used, shall conform to 84-2.03C(3), Painted Traffic Stripes and Pavement Markings, of the State Standard Specifications, except for payment and for the number of coats of paint which shall be, at the option of the Contractor, either one or two coats.

2.02 TEMPORARY PAVEMENT MARKERS

- A. The use of temporary pavement markers shall conform to the traffic control plans and as determined by the City.
- B. Temporary pavement markers shall be, one of the temporary reflective pavement markers for long-term day/night use (6 months or less).

- C. Reflective pavement markers conforming to the requirements of these Technical Specifications may be used in place of temporary reflective pavement markers for long-term day/night use (6 months or less) except at locations to simulate patterns of broken traffic stripe.

PART 3 - EXECUTION

3.01 TEMPORARY PAVEMENT MARKING TAPE

- A. Tape shall be applied to a clean dry surface and rolled slowly with a rubber tired vehicle or roller to ensure complete contact with the pavement surface in accordance with the manufacturer's recommendations. Installation procedures for application of tape when the air temperature and pavement temperature is less than 50 degrees F shall be approved by the City prior to beginning the installation of tape. Tape shall not be applied over existing stripes or markings. Completed stripes shall be straight on tangent alignments and shall be on a true arc on curved alignments.

3.02 TEMPORARY PAVEMENT MARKERS

- A. Temporary pavement markers shall be applied in accordance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer. Epoxy adhesive shall not be used in areas where removal of the pavement markers will be required.
- B. Placement of the reflective pavement markers used for temporary pavement markers shall conform to these Technical Specifications except that the waiting period requirements before placing the pavement markers on new asphalt concrete surfacing as specified in Section 81-3.03, "Construction," of the State Standard Specifications shall not apply and epoxy adhesive shall not be used to place pavement markers in areas where removal of the pavement markers will be required.

3.03 TEMPORARY PAVEMENT DELINEATION

- A. Temporary pavement delineation shall be placed, maintained, and removed in accordance with the provisions in Section 12-3.01, General, of the State Standard Specifications and these Technical Specifications.
- B. Surfaces on which temporary pavement delineation is to be applied shall be cleaned of all dirt and loose material and shall be dry when the pavement delineation is applied.

****END OF SECTION****

SECTION 01 55 26

TRAFFIC CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes requirements for traffic control.
- B. Related Sections:
 - 1. SECTION 31 23 00, EARTHWORK
 - 2. SECTION 33 31 11, GENERAL PIPING

1.02 REFERENCES

- A. City of Morgan Hill:
General Provisions.
- B. Caltrans:
 - 1. Standard Plans and Standard Specifications (latest edition).
 - 2. City Encroachment Permit.

1.03 DEFINITIONS

- A. Traffic Control Devices: Signs, signals, markings and other devices placed on or adjacent to a road to regulate, warn or guide traffic.
- B. Traffic Control Measures: Elements of the Traffic Control Plan including traffic control devices, personnel, materials, and equipment used to control traffic through the Work Zone.
- C. Traffic Control Plan: A written and drawn plan for handling traffic on a specific roadway through the Work Zone.
- D. Work Zone: A traveled area within the construction used by vehicles, bicyclists and pedestrians.

1.04 TRAFFIC CONTROL REQUIREMENTS

- A. Provide and maintain temporary traffic control measures to provide for the safe passage of vehicular and pedestrian traffic through and within the Project site.
- B. Provide and post "Expect Delays" signs at the beginning and end of a street a minimum of seven (7) calendar days prior to beginning construction on that street.
- C. Under some circumstances, construction may temporarily prevent access into private driveways. The Traffic Control Plan shall specifically identify these occurrences and provide a plan for minimizing the temporary condition.

1.05 TRAFFIC CONTROL PLAN

- A. Prepare and submit detailed Traffic Control Plans to the Engineer for approval. The Traffic Control Plans shall show proposed traffic control measures, signage and other traffic control devices, barricade locations, lane width reductions and lane shutdowns that will be implemented by the Contractor to maintain a safe work site. Traffic Control

- Plans shall be prepared and signed by a Traffic Engineer registered in the State of California if the street is an arterial.
- B. Selection of protective devices and directional measures that will be used, including the timing for their use and specific locations, is the responsibility of the Contractor.
 - C. The Contractor shall not start work within a Work Zone until the Traffic Control Plans have been accepted by the Engineer.
 - D. All traffic control shall conform to California Manuals of Uniform Traffic Control Devices (CaMUTCD).

1.06 PUBLIC NOTICE

- A. Notify the Engineer in person or by telephone at least five (5) working days before implementing the approved Traffic Control Plan. Roads shall not be closed unless authorized by the Engineer in writing at least one (1) week prior to the requested date. If street closure is approved, Contractor shall notify the following 48 hours prior to the street closure:
 - 1. All residents on City blocks where work will be occurring.
 - 2. All businesses on City blocks where work will be occurring.
 - 3. City of Morgan Hill Public Works Department (Project Manager and Inspector).
 - 4. City of Morgan Hill Police Department (408) 779-2101.
 - 5. City of Morgan Hill Fire Department (408) 778-3259.
 - 6. City of Morgan Hill Garbage and Recycling: Recology South Valley (408) 842-3358.
 - 7. Affected School Districts.
- B. If emergency or urgent street closures are required, the Contractor shall immediately notify:
 - 1. City of Morgan Hill Public Works Department (Project Manager and Inspector).
 - 2. City of Morgan Hill Police Department (408) 779-2101.
 - 3. City of Morgan Hill Fire Department (408) 778-3259.
- C. Notify local residents by door hanger at least seventy-two (72) hours in advance of obstructions and inconvenience due to construction activities, including:
 - 1. Obstruction of private driveways.
 - 2. Elimination of on-street parking in front of private residences.
 - 3. Any other similar inconvenience that may impact local residents.
 - 4. Door hangers shall include City and Contractor contact information and shall be approved by the Engineer prior to use.

1.07 TEMPORARY SIGNS

- A. Erect informational signs advising pending work and lane closures four (4) weeks in advance of actual work, as required by the City. Information on the signs shall be readable to both directions of travel.
- B. Erect signs advising of rough road conditions when temporary pavement has been placed, or when plates are in use.
- C. When needed to advise traffic of approaching conditions, Contractor shall use electronic signs with sequential arrow or changeable message.
 - 1. Electronic sign shall be installed beyond the outside shoulder of the roadway or behind an existing barrier or guardrail.
 - 2. The sign shall display the entire message within 7.5 seconds.
- D. Temporary signs shall be one sided, and shall be wooden or metal with tripod supports. The Contractor shall add sandbags to support legs for ballast.
- E. Signs that will remain in place at night must have reflective florescent orange sheeting.
- F. Changeable message signs and/or arrow boards may be required at any or all locations.

1.08 TEMPORARY BARRICADES

- A. Temporary barricades in good condition, as approved by the Engineer, are required to protect vehicles from areas with drop-offs.
- B. Use pin-and-loop type concrete barriers conforming to Caltrans Standards.
- C. Wooden Barricades shall follow industry standard with reflective devices and an 8-inch diameter amber flashing light using one, 50-watt, 12-volt, battery operated incandescent lamp. The flash shall be visible for 1,200 feet. Failed bulbs shall be promptly replaced.

1.09 FLAGGERS

- A. The Contractor's flaggers must wear orange, yellow, or yellow-green reflective vests and orange, yellow, yellow-green or white hardhats at all times.
- B. Utilize highly visible STOP/SLOW sign paddles with reflective sheeting.
- C. Utilize portable, self-contained two-way radios when more than one flagger is required for traffic control.
- D. Employ properly trained persons that have completed an approved traffic control and flagging course. Traffic control submittal shall include flagman certifications.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install, operate and maintain temporary traffic control devices in accordance with the Traffic Control Plan.
- B. Traffic control devices shall be promptly moved as construction progresses, and removed when no longer required.

- C. Turn, cover, or remove existing permanent traffic control devices when these devices conflict with approved temporary devices.

3.02 LANE CLOSURES

- A. Do not close any lane until the area is signed in accordance with the approved Traffic Control Plan.
- B. Two-way traffic shall be maintained whenever possible. When one lane must be closed, one-way traffic must be controlled by a flagger in each direction of traffic at all times.
- C. At the end of each workday, restore conditions to allow two-way traffic. Install temporary paving or cover open excavations with heavy steel trench plates, as appropriate for the conditions, to provide a minimum 11-foot wide traveled roadway in both directions. Provide signs indicating rough road conditions when using temporary pavement.
- D. Do not stop or hold vehicles for more than ten (10) minutes.
- E. Allow emergency vehicles immediate passage at all times.

3.03 TEMPORARY BARRICADES

- A. Concrete Barriers shall be installed as follows:
 - 1. Flare the leading end at a flare rate of 14:1.
 - 2. When placing concrete barriers, maintain a minimum of 24-inches from face of barrier to edge of traffic lane.

3.04 FLAGGERS

- A. Provide flaggers to safely control movement of vehicles and pedestrians around areas disrupted by the Work
- B. Flaggers shall be located in positions that provide sufficient time for motorists to respond to the flagger's instructions, and these positions shall be designated on the traffic control plan.

****END OF SECTION****

SECTION 01 57 00

TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

This Section describes the requirements for temporary controls, such as dust, rubbish, drainage, erosion and sediment, and pollution control in order to execute work expeditiously.

1.02 DUST CONTROL

- A. Dust control shall conform to the provisions in Section 18, Dust Palliatives, of the State Standard Specifications and these Technical Specifications. No separate payment will be made for any work performed or material used to control dust resulting from public traffic within the right-of-way.
- B. The Contractor shall furnish all labor, equipment and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property or causing nuisance as defined by the Engineer.
- C. The Contractor shall be responsible for any damage resulting from any dust originating from its operations.
- D. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.
- E. The use of water shall not be permitted as a substitute for sweeping or other methods of dust control. Only dry sweeping is allowed.
- F. Contractor shall broom sweep daily. The work area shall be left in a neat and presentable condition at the end of each workday.
- G. Contractor shall street sweep.

1.03 RUBBISH CONTROL

- A. Through all phases of construction, including suspension of work and until final acceptance of the project, the Contractor shall keep the worksite and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish and debris.
- B. Contractor shall properly dispose of all excess earth, concrete, asphaltic concrete and debris off job site and clean up the work area at the end of each workday. The work area shall be left in a neat and presentable condition.
- C. The Contractor shall keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Care shall be taken to prevent spillage on

haul routes. Contractor shall obtain all required truck route permits. Any such spillage shall be removed immediately and the area cleaned by the Contractor.

- D. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and the requirements of the OSHA Safety and Health Standards for Construction.

1.04 DRAINAGE CONTROL

- A. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the work.
- B. All stormwater discharged to storm drains shall be clean. Washing mud into storm drains will not be allowed.
- C. Provide adequate drainage facilities to prevent damage to the work, the site, and adjacent property.
- D. Maintain excavations free of water to prevent puddling or running water.
- E. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations.
- F. Contractor is responsible for the flooding of property due to his work under this project. Contractor is also responsible to make right any damages to work in progress that is caused by flooding. The means and methods the Contractor employs to meet the above requirements are at his discretion.

1.05 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage. Minimize the amount of bare soil exposed at one time.
- B. Provide temporary measures such as berms, dikes, silt fences, sediment traps, and drains, to prevent water flow.
- C. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures should erosion and sedimentation be detected.
- D. Perform control in accordance with State and local rules and regulations.
- E. If erosion occurs to trenches or work areas prior to restoration by the Contractor, the Contractor shall be responsible for repair of eroded areas.

1.06 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.
- B. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewer.
- C. Do not permit sediment, debris or other substances to enter sanitary or storm sewer.

1.07 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The Contractor shall be responsible for all storm water pollution prevention. Before starting any work on the project, the Contractor shall submit a SWPPP. The plan shall show the schedule for the erosion control work included in the contract and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of the operations upon adjacent streams and other bodies of water. The SWPPP shall be prepared by a Qualified SWPPP Developer (QSD).

The Engineer shall notify the Contractor of any revisions to water pollution control program within five (5) days of the revision. The City will not be liable for Contractor failure of implementing any portion of an originally submitted or revised water pollution control program, nor for any delays to the work due to the Contractor's failure to submit an acceptable SWPPP. The Contractor shall provide a Qualified SWPPP Practitioner (QSP) to oversee implementation of the SWPPP.

1.08 BEST MANAGEMENT PRACTICES

- A. Contractor shall implement best management practices identified in SWPPP to meet the specifications listed in these Contract Documents.
- B. Contractor shall provide, inspect, and maintain acceptable BMPs appropriate for the work, as necessary to control and prevent stormwater pollution for the duration of the project.
- C. Contractor shall properly dispose of all wastes and excess materials in a legal manner to the satisfaction of the Engineer.
- D. Upon completion of the project, Contractor shall remove all BMPs to the satisfaction of the Engineer.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not used.

****END OF SECTION****

SECTION 01 71 13

MOBILIZATION

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Mobilization shall include, but not be limited to the following items:
 - 1. Locating a Construction Staging area at the Contractor's expense.
 - 2. Moving on to the site all of Contractor's equipment required for first month operations.
 - 3. Having all OSHA required notices and establishment of safety programs.
 - 4. Having the Contractor's superintendent at the job site full time.
 - 5. Walking the project site with the Engineer prior to the start of construction and taking sufficient preconstruction digital photos or DVDs to document existing improvements and provide same to the City. At a minimum, one photograph must be obtained for each 100 feet of construction area with special attention given to environmentally critical areas and areas outside of the public right-of-way. Additional photographs shall be taken as necessary to adequately document the condition of existing improvements to remain. Photographs shall be labeled by station so that upon completion of the construction, or during construction, if necessary, subsequent photographs can be taken from the same control points.
 - 6. Conducting a site inspection and construction survey staking prior to construction to check that the proposed manhole locations and elevations conform to the Contract Drawings and to become familiar with all site conditions, and identify potential obstructions caused by other underground utilities. This also includes locating existing utilities by calling Underground Service Alert at 811 or 800-227-2600.
- B. Mobilization shall not exceed five (5%) percent of the contract total compensation amount for all improvements as defined in the Contract Documents.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

****END OF SECTION****

SECTION 02 41 00

DEMOLITION, ABANDONMENT, AND REMOVAL

PART 1 - GENERAL

1.01 SUMMARY

- A. This specification addresses demolition, removal and abandonment of trees and facilities and associated debris generated in the execution of the contract work, including clearing, grubbing and stripping.
 - 1. Do not begin demolition, removal and/or clearing and grubbing until authorization is received from the Engineer.
 - 2. Remove rubbish and debris from the job site daily.
 - 3. Store materials that cannot be removed daily in the Contractor's approved laydown and storage areas, following all requirements established by the property owner and associated permitting jurisdiction.
 - 4. Properly dispose of materials and debris removed from the Project. Disposal shall comply with all federal, state and local regulations.
- B. Related Sections:
 - 1. Section 01 57 00, TEMPORARY CONTROLS
 - 2. Section 01 55 26, TRAFFIC CONTROL

1.02 REFERENCES

- American National Standards Institute (ANSI):
 - ANSI A10.6 – Demolition Operations-Safety Requirements

1.03 SUBMITTALS

Submit to the Engineer the following in accordance with the contract documents.

- A. Demolition Plan, including proposed demolition, tree removal, clearing and grubbing, striping removal, temporary striping, and removal procedures. Demolition Plan shall include a detailed description of methods and equipment to be used for each operation and of the sequence of operations.
- B. A plan and coordinated construction schedule for the removal of any existing active facilities and the reconnection of existing system elements to the permanent facilities.

1.04 WORK AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. Work safety requirements shall conform to ANSI A10.6, Demolition Operations – Safety Requirements.

1.05 DUST AND DEBRIS CONTROL

- A. Prevent the spread of dust and debris, and avoid the creation of a nuisance or hazard in the surrounding area.
- B. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, flooding or pollution.
- C. Dry-sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicles.

1.06 PROTECTION

- A. Traffic Control Signs - Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Refer to the Contract Documents for additional requirements.
- B. Existing Work - Protect existing work which is to remain in place. Repair items which are to remain, and which are damaged during performance of the work to their pre-construction condition, or replace with new. Do not overload or damage pavements to remain; only rubber tired excavation equipment will be allowed. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement must have Engineer approval. Refer to the contract documents for additional requirements.
- C. Facilities - Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Refer to the contract documents for additional requirements.

1.07 BURNING AND EXPLOSIVES

Burning and the use of explosives will not be permitted.

1.08 RELOCATIONS

Perform removals and reinstallations of relocated items with workmen skilled in the trades involved. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by the Engineer and governing jurisdiction.

PART 2 - PRODUCTS

2.01 MATERIAL FOR FACILITY ABANDONMENT

- I. Slurry for abandonments: see Section 03 34 00 for cellular grout.

PART 3 - EXECUTION

3.01 EXISTING FACILITIES TO BE REMOVED

- A. Removal of Existing Sanitary Sewer Pipes, Manholes and Related Equipment:
Remove existing sanitary sewer pipes, manholes, manhole rungs, cleanouts and laterals to the horizontal limits shown on the Contract Documents. Existing alignments are shown based on record information. Actual locations of existing utilities may be different from that shown.
- B. Paving and Slabs:
 - 1. Remove asphaltic concrete paving and slabs, and concrete paving and slabs, including aggregate base in areas subject to proposed work.
 - 2. Trench wing (T-Cut) width shall be in accordance with typical trench and surface restoration details. Asphalt concrete paving shall be removed a distance from the edge of trench on both sides of the trench as specified in the typical trench and surface restoration details. Where the distance from the lip of concrete gutter to the saw cut edge of the trench is within the width specified in the typical trench and surface restoration details, the remaining pavement

- between the saw cut edge of the trench and the lip of the concrete gutter shall also be removed and replaced during this work.
3. Provide neat sawcuts at limits of pavement removal as indicated.
 4. Contractor shall comply with all environmental regulations and local codes and dispose of all material at State approved recycling facilities or landfills identified by the Contractor.
 5. Asphalt concrete paving and slabs may contain pavement reinforcing fabric. Contractor shall include the cost of removing and disposing of pavement reinforcing fabric in applicable items of work.
- C. Curb, Gutter (including valley gutter) and sidewalk and driveways:
1. Remove curb, gutters and sidewalks, including aggregate base in areas subject to proposed work. Remove at the score or expansion joint.
 2. Contractor shall comply with all environmental regulations and local codes and dispose of all material at State approved recycling facilities or landfills identified by the Contractor.

3.02 DISPOSITION OF MATERIAL

Title to Materials:

- A. Except where specified in other sections, or on the Contract Documents, all materials and equipment removed shall become the property of the Contractor and shall be removed.
- B. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Engineer of the contractor's demolition and removal procedures, and authorization by the Engineer to begin demolition.
- C. The City will not be responsible for the condition or loss of, or damage to, such property after notice to proceed.

3.03 CLEANUP

Debris (including plant material) and Rubbish:

- A. Remove and transport debris, plant material and rubbish in a manner that will prevent spillage on pavements, streets or adjacent areas.
- B. Clean up spillage from pavements, streets and adjacent areas.

****END OF SECTION****

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies reinforcing steel for use in reinforced concrete.
- B. Related Sections:
Section 03 30 00, CAST-IN-PLACE CONCRETE

1.02 REFERENCES

- A. City of Morgan Hill:
Standard Specifications and Details (latest edition).
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A185 –Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 3. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 4. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 5. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 6. ASTM A996 - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
 - 7. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
- C. American Concrete Institute:
ACI 315 – Details and Detailing of Concrete Reinforcement.
- D. American Welding Society:
AWS D1.4 – Structural Welding Code – Reinforcing Steel.
- E. Concrete Reinforcing Steel Institute:
 - 1. CRSI Manual – Manual of Standard Practice
 - 2. CRSI PRB – Placing Reinforcing Bars.

1.03 QUALITY ASSURANCE

Quality Control by Contractor:

- A. To verify conformance with the specified requirements for concrete reinforcement, the Contractor shall engage the services of an independent testing laboratory which complies with the requirements of ASTM E329, to the satisfaction of the City.

- B. The testing laboratory shall provide inspection services as specified herein, when testing is required. Costs of testing laboratory services shall be the Contractors responsibility.

1.04 SUBMITTALS

Provide reinforcement placing drawings conforming to the requirements of ACI 315. Placing drawings shall include bar lists, schedules, bending details, placing details, and placing plans and elevations as required to fully delineate this portion of the work.

PART 2 - PRODUCTS

2.01 BAR REINFORCEMENT

Reinforcing bars shall be deformed billet steel in conformance with ASTM A615, conforming to ASTM A706. ASTM A996 steel shall not be used. Bars provided as dowels for future construction and bars where specified shall be epoxy-coated in conformance with ASTM A775.

2.02 WIRE FABRIC

Wire fabric shall be welded steel mesh conforming to ASTM A185.

2.03 WIRE AND PLAIN BARS

Wire used as reinforcement and bars used as spiral reinforcement in structures shall be cold drawn steel conforming to ASTM A82.

2.04 TIE WIRE

The wire shall be minimum 16 gage annealed steel conforming to FEDSPEC QQ-W-461H.

2.05 BAR SUPPORTS

Bar supports coming into contact with forms shall be CRSI Class 1 plastic protected or Class 2 stainless steel protected and shall be located in accordance with CRSI MSP-1 and placed in accordance with CRSI PRB. Concrete block supports shall be provided for footing and slabs on grade. Stainless steel or plastic protected plain steel supports shall be provided for other work.

2.06 THREADED MECHANICAL COUPLERS

Threaded mechanical couplers shall be "Lenton" as manufactured by Erico Products, Inc., or "Grip-Twist" as manufactured by Dayton Barsplice Inc. or equal designed to develop one hundred twenty-five percent (125%) of the yield strength of the reinforcing steel.

2.07 PRODUCT DATA

Contractor shall submit the following in accordance with the Contract Documents.

- A. Certified mill test reports.
- B. Welder qualification certificate in accordance with AWS D1.4.

PART 3 - EXECUTION

3.01 FABRICATION

Reinforcing steel shall not be bent or straightened in a manner which will injure the material. Bars with kinks or with bends not shown shall not be used. Heating or welding bars shall be performed in accordance with AWS D1.4 and shall only be permitted where specified or approved by the Engineer. Bars shall not be welded at the bend.

3.02 PLACEMENT

- A. Place reinforcing steel in accordance with CRSI PRB and CRSI MSP-1.
- B. Position reinforcing steel accurately and secure against displacement by using annealed iron wire at intersections and shall be supported by concrete or metal chairs, spacers or metal hangers. Tack welding of cross bars is not acceptable. Bars shown on the drawings shall not be repositioned (buried) to act as support bars. Additional bars shall be provided as required for supports. Steel rods and pegs may be used to support reinforcing steel on rock foundations. Reinforcing steel shall be placed in such a manner as to not damage waterproofing membrane or plastic lining which has been previously applied or constructed. Reinforcing steel shall be shop-bent or slightly relocated where necessary to clear waterstop. Reinforcing steel shall not be placed on fresh concrete or forced into fresh concrete.
- C. Supports for embedded items shall not be welded to the reinforcement. Additional reinforcement may be provided for this purpose.

3.03 SPLICING

- A. Splice reinforcing steel as indicated. Additional splices may be provided where approved by the Engineer. Splices shall conform to ACI standards.
- B. In slabs, beams, girders and walls, reinforcing steel shall not be spliced in areas of maximum stress. Splices of adjacent bars shall be staggered at least one splice length, unless otherwise specified. Splices in welded wire fabric shall be at least 1-1/2 meshes wide.

3.04 CLEANING

Clean reinforcing steel of mill rust scale, dried concrete, or other coatings that may reduce bond. Reinforcement reduced in section is not acceptable. When concrete placement is delayed, reinforcement shall be cleaned by sandblasting if directed by the Engineer.

3.05 REPAIR OF EPOXY COATING

Epoxy coating damage need not be repaired in cases where the damaged area is 0.1 square inch or smaller. All damaged areas larger than 0.1 square inch shall be repaired in conformance with ASTM A775.

****END OF SECTION****

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies cast-in-place concrete for pavements, sidewalks, curbs, encasements, and miscellaneous structures.
- B. Related Sections:
 - 1. SECTION 03 40 00, PRECAST CONCRETE STRUCTURES
 - 2. SECTION 03 20 00, CONCRETE REINFORCEMENT
 - 3. SECTION 03 60 00, GROUT
 - 4. SECTION 33 01 30.81 MANHOLE REHABILITATION

1.02 REFERENCES

- A. City of Morgan Hill:
Standard Specifications and Details (latest edition).
- B. American Concrete Institute (ACI):
 - 1. ACI MCP – Manual of Concrete Practice.
 - 2. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - 3. ACI 301 - Specifications for Structural Concrete.
 - 4. ACI 304 – Guide for Measuring, Mixing, Transporting, and placing Concrete.
 - 5. ACI 305R – Guide to Hot Weather Concreting.
 - 6. ACI 306R – Guide to Cold Weather Concreting.
 - 7. ACI 318 – Building Code Requirements for Structural Concrete (ACI 318-11) and Commentary.
 - 8. ACI 347 – Guide to Formwork for Concrete.
- C. American Society for Testing and Materials (ASTM):
 - 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 C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - 6. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

7. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
8. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
9. ASTM C150 - Standard Specification for Portland Cement.
10. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
13. ASTM C467 - Standard Classification of Mullite Refractories
14. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
16. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.

1.03 QUALITY ASSURANCE

- A. Quality Control by Contractor:
 1. To verify conformance with the specified requirements for cast-in-place concrete, the Contractor shall engage the services of an independent testing laboratory which complies with the requirements of ASTM E329.
 2. Costs of testing laboratory services shall be the responsibility of the Contractor in accordance with the Contract Documents.
- B. Basis for Quality:
 1. Cast-in-place concrete shall conform to the requirements of ACI 301, except as modified.
 2. Unless specified otherwise, all formwork shall conform to ACI 347.

1.04 SUBMITTALS

- A. Submit concrete, mix designs, recent test data for the submitted mixes, and test data for mix components confirming that the mixes meet the requirements of this Section.
- B. Submit data on concrete accessories specified herein that the Contractor intends to install in the work.
- C. Submit the following in accordance with the Contract Documents:
 1. MANUFACTURER'S DATA: Copies of manufacturer's data shall be provided for the following:
 - a. Waterstops.
 - b. Retardants.
 - c. Curing compounds.
 - d. Bonding compounds.

- e. Admixtures.
- 2. TEST REPORTS: Three copies of reports from the concrete supplier shall be provided certifying that all concrete materials comply with the specifications and all test requirements.
- 3. READY-MIXED CONCRETE TRUCK DELIVERY TICKETS: Each load of ready-mixed concrete delivered to the job site shall be accompanied by a delivery ticket showing the information listed in ASTM C94, Section 14.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: Portland cement shall be ASTM C150, Type II or Type V, low alkali, containing less than 0.60 percent alkalies.
- B. Aggregates:
 - 1. GENERAL: Fine and coarse aggregates shall conform to ASTM C33. Fine and nonreactive and shall be washed before use.
When sources of aggregates are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing concrete work.
 - 2. FINE AGGREGATE: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine. Gradation shall conform to ASTM C33.
 - 3. COARSE AGGREGATE: Coarse aggregate shall be hard, dense and durable gravel or crushed rock free from injurious amounts of soft and friable particles, alkali, organic matter and other deleterious substances. Gradation of each coarse aggregate size specified in this Section, and shall conform to ASTM C33-Table 3.
- C. Admixtures:
 - 1. GENERAL: All admixtures shall be compatible with the concrete. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the concrete mix.
 - 2. WATER REDUCING RETARDER: Water reducing retarder shall be ASTM C494, Type D, and shall be BASF MasterSet R 300; Sika Chemical Corp., Plastiment; or equal.
 - 3. AIR ENTRAINING AGENT: Air entraining agent shall be BASF, MasterAir AE 90; W. R. Grace and Co., DaraVair; or equal. The air entraining agent added shall produce, in accordance with ASTM C260, an entrained air content specified in this Section for each class of concrete.
- D. Water: Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalies, and organic materials.

2.02 CONCRETE CHARACTERISTICS

- A. Mix Proportioning:

1. Concrete shall be normal weight concrete composed of specified cement, admixtures, aggregates and water proportioned and mixed to produce a workable, strong, dense, and impermeable concrete.
2. Concrete shall be provided in accordance with the following:

Concrete Class	ASTM Coarse Aggregate Size	Min. Cement Content, sacks/cu yd concrete	Maximum water/cement ratio by weight	Pozzolan percent by weight of Portland cement	Air/ Entraining	Maximum slump in inches	Minimum 28-day compressive strength, psi
B	#57	5.25	0.45	18-20	Yes	3-1/2	4000
C	#67	5.25	0.45	18-20	Yes	4	4000
E	#57	5.25	0.55	0	No	6	2000

Notes for table:

Compressive strength shall be determined at the end of 28 days based on test cylinders made and tested in accordance with ASTM C39.

3. Concrete mix for sidewalk, curb, and gutter shall include 1 pound of Lamp Black color admixture per one cubic yard of concrete.

- B. Concrete shall be provided by class for the corresponding use listed as follows:

Types of Use	Class of Concrete
Concrete 12 inches thick and greater	B
Concrete less than 12 inches thick	C
Conduit Encasement (duct banks) and concrete fill	E

- C. Control: Before beginning concrete work, the Contractor shall determine the proper proportions of materials for class of concrete B and C. Methods for selecting and adjusting proportions of the ingredients shall be in accordance with ACI 211.1. Reports from the concrete supplier of each mix design shall state whether the items reported comply with the specifications and shall show (1) the expected strength, (2) corresponding slump, (3) expected drying shrinkage, (4) weights and test results of the ingredients on the basis of field experience and/or trial mixtures in accordance with ACI 318, Chapter 5 with at least 30 tests, and (5) other physical properties necessary to check each mix design. Copies of the reports shall be submitted in accordance with the Contract Documents.

2.03 WATERSTOPS

Waterstops in construction or expansion joints shall be Greenstreak PVC waterstop by Sika Corporation; or approved equal.

2.04 EXPANSION JOINT MATERIALS

Expansion joint material shall be ¼-inch thick pre-molded expansion joint filler in conformance with ASTM D1751. Expansion joint material shall be shaped to fit the cross section of concrete being placed.

2.05 BONDING COMPOUNDS

- A. Epoxy resin bonding compounds shall be used for wet areas and shall Master Builders Technologies, Concresive series as applicable; Sika Chemical Corporation, Sikadur 35, Hi-Mod LV, Sikadur 32, Hi-Mod, or Sikadur 31, Hi-Mod Gel as applicable; or equal.
- B. Nonepoxy bonding compounds shall be used for dry areas and shall be Acrylic Bondcrete; Imperial Chemical Industrial, Inc., Thoro System Products, Acryl 60; Thorobond; or equal. Bonding compounds shall be applied in accordance with the manufacturer's instructions.

2.06 RETARDANT

Retardant for exposing aggregates for nonformed surfaces in construction joints shall be Sika Rugasol-S, Horn Aggretex-H, or equal. Retardant shall be applied in accordance with manufacturer's instructions sufficient to assure a minimum penetration of 1/8 inch.

2.07 CURING AND SEALING COMPOUNDS

Curing and sealing compound shall be BASF, Masterseal; A. C. Horn Inc., Horn Clearseal EM180; Burke Company Spartan-Cote WB Cure Seal Hardener; or equal; conforming to ASTM C309. Curing compounds shall be clear and shall be applied in accordance with the manufacturer's instructions, except as otherwise specified.

PART 3 - EXECUTION

3.01 GENERAL

Construction of cast-in-place concrete shall be in accordance with the pertinent recommendations contained in ACI Manual of Concrete Practice of 300 Group.

3.02 CONCRETE

- A. Concrete shall be truck-mixed, ready-mixed concrete conforming to the applicable portions of ASTM C94. Materials shall be proportioned by weighing. The Contractor shall be responsible for producing concrete of the specified characteristics.
- B. Concrete shall be delivered to the site of work, and discharge shall be completed within 1-1/2 hours after introduction of the water to the mixture.

3.03 CONVEYING AND PLACING CONCRETE

- A. Conveying Concrete: Concrete shall be conveyed from the mixer to the forms in accordance with ACI 301, Chapter 8. Concrete which has segregated in conveying shall be removed from the site of the work.
- B. Placing Concrete:
 - 1. GENERAL: Concrete shall be placed in accordance with ACI 301, Chapter 8, and ACI 304, Chapter 6. Pumped concrete shall be the class and consistency specified in the Contract Documents.
 - 2. PLACING CONCRETE IN HOT WEATHER: In hot weather (above 85 degrees F), concrete shall be placed in accordance with ACI 305R.
 - 3. PLACING CONCRETE IN COLD WEATHER: In cold weather (below 45 degrees F), concrete shall be placed in accordance with ACI 306R.

3.04 CONCRETE FORMWORK

Formwork shall be installed in accordance with ACI 347.

3.05 CURING AND SEALING

A. General

1. Concrete curing shall be completed by water curing or by using a clear membrane curing compound or by a combination of both methods. Repairs or treatment of concrete surfaces shall be coordinated so that interruption of the curing will not be necessary.
2. Concrete surface temperature shall be maintained between 50 degrees F and 80 degrees F for at least 5 days. Curing concrete in hot weather (above 85 degrees F) shall be in accordance with ACI 305R. Curing concrete in cold weather (below 45 degrees F) shall be in accordance with ACI 306R.

B. Water Curing: When water curing is used, concrete shall be kept wet continuously for a minimum of ten (10) days after placement. Burlap mats or fabric may be used to retain moisture during the curing period.

C. Curing Compound:

1. When curing compound is used, it shall be applied as soon as the concrete has set sufficiently so as not to be marred by the application or immediately following form removal for vertical and other formed surfaces. Preparation of surfaces, quantities used, application procedures, and installation precautions shall be followed in strict compliance with the manufacturer's instructions.
2. Curing compound shall not be used on concrete surfaces to be coated, waterproofed, or moisture-proofed.

3.06 PROTECTION

Concrete shall be protected from injurious action by sun, rain, flowing water, frost and mechanical injury.

3.07 CONSTRUCTION JOINTS

- A. Construction joints shall be located and formed as specified. A rough surface of exposed concrete aggregates shall be produced using a surface retardant at construction joints. The limit of the treated surfaces shall be 1 inch away from the joint edges. Within 24 hours after placing, retarded surface mortar shall be removed either by high pressure water jetting or stiff brushing or combination of both so as to expose coarse aggregates. A rough surface of exposed aggregate may also be produced by sandblasting followed by high pressure water jetting. Sandblasting, if used, shall remove 1/8 inch of laitance film and shall expose coarse aggregate to insure adequate bond.
- B. Reinforcing steel and welded wire fabric shall be continued across construction joints. Waterstops shall be provided in construction joints at locations as specified.

3.08 INSERTS AND EMBEDMENTS

A. Inserts:

1. Where pipes, castings or conduits are to pass through structures, the Contractor shall place such pipes or castings in the forms before placing the concrete, or he may provide openings in the concrete for subsequent insertion of such pipes, castings or conduits. Such openings shall be provided with waterstops and V-shaped construction joint as shown and shall have a slight flare to facilitate grouting and permit the escape of entrained air during grouting

2. Additional reinforcement shall be provided around large openings as shown on the Drawings. The grout shall be non-shrink grout as specified in the Contract Documents.
- B. Embedments: Gate frames, gate thimbles, special castings, channels or other miscellaneous metal parts that are to be embedded in the concrete shall be set and secured in the forms prior to concrete placement. Unless otherwise specified, anchor bolts and inserts shall be embedded in concrete as shown. The Contractor shall provide inserts, anchors or other bolts necessary for the attachment of piping, valves, metal parts and equipment. Operators or sleeves for gate or valve stems shall be positioned to clear reinforcing steel, conduit and other embedments, and to align accurately with equipment.

3.09 EXPANSION JOINTS

Expansion joints shall be as specified. Reinforcement or other embedded metal items bonded to the concrete shall not extend through expansion joints. Waterstops shall be provided in expansion joints as specified in this Section.

3.10 WATERSTOPS

Waterstops shall be provided at the specified locations. Waterstops shall be securely held in position during placing of concrete. If, after placing concrete, waterstops are materially out of position or shape, the surrounding concrete shall be removed, the waterstop reset, and concrete replaced in accordance with this Section.

3.11 MODIFICATION OF EXISTING CONCRETE

Existing concrete shall be removed and the remaining surfaces resurfaced as specified. The remaining concrete shall be protected from damage. Clean lines shall be made by sawing through the existing concrete. The concrete may be broken out after initial saw cuts in the event thickness prevents cutting through. Where it is not possible to use a saw, the initial cuts shall be made with chipping hammers. These cuts shall be sufficient to prevent damage to the remaining concrete. In general, an opening in existing concrete shall be oversized 1 inch on all sides and built back to the correct dimension with an epoxy grout. Where oversized openings cannot be made, the concrete shall be cut to the correct dimension, with the exposed reinforcing cut back an additional 1 inch and the resulting hole filled with epoxy grout. Cut or broken concrete surfaces shall be resurfaced with an epoxy grout. Concrete surfaces to be coated shall be dry. Where new concrete adjoins existing concrete surfaces or surfaces which have been cut, such surfaces shall be cleaned by sandblasting to remove laitance, loose coatings and foreign materials, and coated with the bonding compound just prior to the placement of the new concrete. Bonding compounds shall be as specified in this Section. Unless otherwise specified, continuity of reinforcing steel shall be obtained across the joint either by exposing existing bars to provide sufficient laps with new bars or by welding existing bars with new bars. Dowels shall be drilled and set with epoxy grout into existing concrete.

3.12 FORMED SURFACE FINISHES

- A. Repair of Surface Defects: Surface defects, including tie holes, minor honeycombing or otherwise defective concrete shall be repaired in accordance with ACI 301, Chapter 9. Areas to be patched shall be cleaned. Patches on exposed surfaces shall be finished to match the adjoining surfaces after they have set. Patches shall be cured as specified for the concrete.

B. Finishing:

1. FINISH A: Finish A shall be a grout clean finish in accordance with ACI 301, Section 10.3.2. Surfaces shall be lightly sandblasted prior to sacking. For interior areas not exposed to moisture or weather, water used in the mortar shall be mixed with a PVA bonding compound as recommended by the manufacturer. Unless otherwise specified, Finish A shall be provided for all surfaces exposed to view, both painted and unpainted.
2. FINISH B: Finish B shall be the same as Finish A, except that the final burlap rubbing may be omitted, providing the steel trowel scraping removes the loose buildup from the surface. Finish B shall be provided for waterproof and moisture-proof coated surfaces.
3. FINISH C: Finish C shall be a finish which has surface imperfections less than 3/8 inch in any dimension. Surface imperfections greater than 3/8 inch shall be repaired or removed and the affected areas neatly patched. Finish C or smoother shall be provided for interior surfaces of tanks and channels from 1 foot below minimum water surfaces and down and otherwise unfinished interior surfaces.
4. FINISH D: Unless otherwise specified, Finish D shall be the finish for surfaces not exposed to view in the finish work or by other construction, which may be left as they come from the forms, except that tie holes shall be plugged and defects greater than 1/2 inch in any dimension shall be repaired.

3.13 SLAB FINISHES

- A. General: Where finish is not specified, floor slabs shall receive steel troweling. Dry cement shall not be used on new concrete surfaces to absorb excess moisture. Edges shall be rounded to a radius of 1/2 inch. Joints shall be grooved to a radius and depth of 1/4 inch each.
- B. Float Finish: Float finish shall conform to ACI 301, Section 11.7.2. Floating shall be performed with a hand or power-driven float. Floating of any one area shall be the minimum necessary to produce the finish specified. Floating shall compact and smooth the surface and close any cracks and checking of surfaces. Float finish shall be applied to surfaces of channel and tank bottom slabs and to footings.
- C. Steel Trowel Finish: Steel trowel finish shall conform to ACI 301, Section 11.7.3. Immediately after final troweling, the surface shall be cured and protected as specified in this Section. Steel trowel finish shall be provided on floors unless specified otherwise.
- D. Broomed Finish: Broomed finish shall conform to ACI 301, Section 11.7.4. Broomed finish shall be provided for walks, tops of walls, slabs on grade exposed to atmosphere, and where otherwise specified.

3.14 FIELD SAMPLING AND TESTING OF CONCRETE

- A. General: Field sampling and testing shall be performed by the independent testing laboratory specified in this Section. Samples of concrete shall be taken at random locations and at such times to represent the quality of the materials and work throughout the project. The laboratory shall provide the necessary labor, materials and facilities for sampling, casting, handling and storing the concrete samples at the site of work. The minimum number of samples and tests are specified in this Section.

- B. Sampling: Concrete shall be sampled as follows and tested in accordance with this Section. Samples of plastic concrete shall be obtained in accordance with ASTM C172. Samples for pumped concrete shall be taken at the hose discharge point. Samples for other concrete shall be taken at the hopper of transit mix truck.
- C. Testing: Services of a certified concrete testing laboratory shall be provided at the City's expense to confirm compliance of cast-in-place concrete and CLSM with these Specifications. Failure of the concrete to meet the specified requirements shall be grounds for removal and replacement of the failing concrete, and re-testing at the Contractor's expense.
 - 1. STRENGTH TESTS: The strengths specified for the design mix shall be verified by the testing laboratory during placement of the concrete. Verification shall be accomplished by testing standard cylinders of concrete samples taken at the job site.

Standard cylinders shall represent the concrete placed in the forms. One set of three standard cylinders shall be cast for each 50 cubic yards, or fraction thereof, for concrete placed in structures, building slabs and footings, but at least three cylinders shall be taken from any one batch. Casting, handling and curing of cylinders shall be in accordance with ASTM C31. Additional cylinders shall be provided when an error in batching is suspected. For the first 24 hours after casting, the cylinders shall be kept moist in a storage box constructed and located so that its interior air temperature will be between 60 and 80 degrees F. At the end of 24 hours, the cylinders shall be transported to the testing laboratory.

Testing of specimens for compressive strength shall be in accordance with ASTM C39. Tests shall be made at 7 and 28 days from time of casting. One test cylinder from each group of three shall be tested at the end of 7 days, and two shall be tested at the end of 28 days. Each strength test result shall be the average of the strengths of two test cylinders at 28 days, except that if one cylinder in a set of two shows evidence of low strength due to improper sampling, casting, handling or curing, the result of the remaining one cylinder shall be used.

The average of any three consecutive 28-day strength test results of the cylinders representing each class of concrete shall be equal to or greater than the specified strength and not more than 10 percent of the strength test results shall have values less than the specified 28-day strength for the total job concrete. No individual strength test results shall be less than the specified strength by more than 500 pounds per square inch.

Certified reports of the test results shall be provided directly to the Engineer. Test reports shall include sufficient information to identify the mix used, the stationing or location of the concrete placement, and the quantity placed. Slump and ambient temperature shall be noted.

If the 28-day test results fall below the specified compressive strength for the class of concrete required for any portion of the work, adjustment in the proportions, water content, or both, shall be made as necessary at the Contractor's expense. Changes and adjustments shall be reported in writing to the Engineer.

If compressive test results indicate concrete in place may not meet structural requirements, tests shall be made to determine if the structure or portion thereof is structurally sound. Tests may include, but not be limited to, cores in

accordance with ASTM C42 and any other analyses or load tests acceptable to the Engineer. Costs of such tests shall be borne by the Contractor.

2. TESTS FOR CONSISTENCY OF CONCRETE: The slump shall be as specified when measured in accordance with ASTM C143. Samples for slump determination shall be taken from the concrete during placing. Slump tests shall be performed whenever standard cylinders are cast.

- D. Final Laboratory Report: A final report, prepared by the testing laboratory, shall be provided at the completion of all concreting. This report shall summarize the findings concerning concrete used in the project and provide totals of concrete used by class and structure.

3.15 CLEANUP

Upon completion of the work and prior to final inspection, clean all concrete surfaces, except outside sidewalks or paved areas and those having curing and sealing compound.

****END OF SECTION****

SECTION 03 34 00

BACKFILL GROUT

PART 1 GENERAL

1.1 DESCRIPTION

A. Furnish all designs, tools, equipment, materials, and supplies and perform all labor required to complete the Work as indicated on the Contract Drawings and specified herein.

B. Related Sections:

1. Section 01 10 01, Project Records and Submittals
2. Section 33 05 31.14, Fusible Polyvinyl Chloride Pipe
3. Section 33 05 07.24, Steel Casing Pipe
4. Section 33 05 07.23, Horizontal Auger Boring

C. Definitions: (NOT USED)

D. Design Criteria:

1. Cellular grout mix shall be designed in accordance with the requirements of ACI 523.1R, ACI 523.3R, and as specified herein. In the event of conflict between the requirements of the listed documents and those specified herein, the requirements of this Section shall prevail.
2. Mixes shall be adjusted in the field as necessary to meet the requirements of these specifications.
3. Maximum allowable injection pressure shall use a factor of safety not less than the greater of 2.0 or that recommended by the carrier pipe manufacturer.

E. Performance Requirements:

1. 7- and 28-day compressive strength range per ASTM C 495 of the cellular grout shall be:
 - a. 7 days: 300 psi minimum;
 - b. 28 days: 500 psi minimum;
2. Dry density shall be between 50 and 55 pounds per cubic foot (pcf), unless a higher density is required to achieve strength requirements.

3. Preformed foam shall be generated by combining controlled quantities of air, water, and foaming agent under pressure. Foam shall retain its stability until the cement sets to form a self-supporting matrix. The concentration of foam agent shall be in accordance with the foaming agent material manufacturer's recommendations.

1.2 SUBMITTALS

A. General

1. Submittals shall be made in accordance with Section 01 10 01 and as specified herein.
2. Backfill grout submittals shall be coordinated with all relevant submittals, assembled and submitted as a single, comprehensive submittal.
3. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.

Product Data:

1. Mix designs for each cellular grout mix proposed for use. Each mix design shall include the following:
 - a. Type, brand, source, and amounts of cement, pozzolans, admixtures, and other additives.
 - b. Amount of water.
 - c. Combined grading of aggregates.
 - d. Specific gravity of all materials.
 - e. Compressive strength test results.
2. Provide material specifications and manufacturer's mixing instructions for each design mix ingredient.
3. Provide sample testing results of each proposed mix design, including the following:
 - a) Three (3) sets of compression test cylinders (3.0 inches by 6.0 inches), three (3) cylinders per set. One set of three (3) cylinders shall be tested at an age of 7 days, another other set shall be tested at an age of 28 days, and the last set shall be tested at an age of 56 days.

- b) Total air content in accordance with ASTM C 796.
- c) Unit weight in accordance with ASTM C 567.

Shop Drawings: (NOT USED)

Method Statements and Working Drawings:

- a) Calculations of estimated volume of backfill grout by lift and reach.
- b) Calculations of maximum allowable injection pressure by lift and reach so as to prevent buckling.
- c) Estimated heat of hydration and written statement from carrier pipe manufacturer that the carrier pipe can withstand the calculated heat of hydration.

QUALITY CONTROL

- 1. Provide field testing results as specified herein.
- 2. Provide records documenting cement content.
- 3. Provide records of injected volume and maximum injection pressure at point of injection by lift and reach.

1.3 QUALITY ASSURANCE

A. Comply with the following industry standards effective at time of bid:

- 1. ACI 523.1R Guide for Cast-in-Place Low-Density Cellular Concrete
- 2. ACI 523.3R Guide for Cellular Concretes above 50 lb/ft³.
- 3. ASTM C 150 Specifications for Portland Cement
- 4. ASTM C 494 Standard Specification for Chemical Admixtures for Concrete
- 5. ASTM C 495 Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
- 6. ASTM C 567 Standard Test Method for Unit Weight of Structural Lightweight Concrete
- 7. ASTM C 796 Standard Method of Testing Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam
- 8. ASTM C 869 Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete
- 9. Standard Specifications for Public Works Construction (SSPWC), Section 201-1.

Foaming agent manufacturer shall have at least five (5) years of experience manufacturing for similar types of installations.

Sample testing shall be performed by a certified laboratory.

The foaming agent manufacturer's field services representative shall approve all changes to the proposed mix designs in the field.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide Portland Cement conforming ASTM C 150, Type II or V.

Provide potable water free from deleterious amounts of alkali, acid, and organic materials which would adversely affect the setting time or strength of the cellular grout. Conform to SSPWC 201-1 with pH not less than 6.7.

Concrete Admixtures:

1. Shall not contain chlorides that promote corrosion.
2. Retarder/Water Reducer: Conforming to ASTM C 494, Type D.
3. Plasticizer/Water Reducer: Conforming to ASTM C 494, Type A.
4. Admixtures shall only be used with foaming agent when specifically approved in writing by foam agent manufacturer.

Foaming Agent:

1. Shall comply with ASTM C 869 when tested in accordance with ASTM C 796.

PART 3 EXECUTION

3.1 GENERAL

- A. Perform work in accordance to accepted submittals.
- B. Cellular grout shall be mechanically mixed to produce a uniform distribution of materials.
- C. Follow the manufacturer's recommendations concerning the order of charging the mixer with the various ingredients.
- D. The admixture content, batching method, and time of introduction to the mix shall be in accordance with the manufacturer's written recommendations for minimum shrinkage and for compliance with these specifications.
- E. Compare field test results to submitted test results and modify mix design as necessary to meet requirements specified herein.

- F. Obtain field measurements as specified herein.

3.2 CARRIER PIPE BACKFILL

- A. No lift is to exceed 80% of the maximum allowable pressure measured at the tunnel invert or 42 inches of head, whichever is less.
- B. Provide backfill injection and sampling port at the tunnel invert.
- C. Provide overflow stand pipe mounted at the tunnel crown and extending at least 2.0 feet above tunnel crown.

3.3 FIELD QUALITY CONTROL

A. TESTING

- 1. Each set of compression test cylinders shall be marked or tagged with the date and time the samples were made, stationing of placement, batch number, and the unit weight (wet density) measured at the point of placement, unless otherwise specified herein.
- 2. Specimens shall be collected at the point of injection, unless otherwise specified herein.
- 3. Each proposed mix shall be tested in accordance with ASTM C 796.
- 4. Test specimens shall be made, cured, stored, and tested in conformity with ASTM C 495.
- 5. Sample testing of each specimen collected on the field shall include:
 - a. Provide one (1) set of four (4) test samples for each shift when backfill grout is placed. Two (2) samples from each set shall be tested at an age of 28 days. The other two (2) samples shall be tested at an age of 56 days.
 - b. Provide one (1) set of four (4) test samples from the overflow after excess water and approximately one (1) cubic yard of cellular grout has been wasted. Testing shall be the same as above.
 - c. Measure as-cast unit weight (wet density) at point of injection.
 - d. Measure as-cast unit weight (wet density) at point of overflow after excess water and approximately one (1) cubic yard of cellular grout has been wasted.
- 6. Compressive strength of cellular grout shall be considered satisfactory if conditions 1 and 2 are both met or condition 3 is met:

- a. Average of all 28-day compressive strength tests within a single reach equal or exceed the specified unconfined compressive strength of 500 psi.
- b. No individual 28-day unconfined compressive strength test is less than 400 psi.
- c. All 56-day unconfined compressive strengths within a single reach average greater than 450 psi.

B. INSPECTION, MAINTENANCE, AND REPAIR (NOT USED)

C. INSTRUMENTATION AND MONITORING (NOT USED)

****END OF SECTION****

SECTION 03 40 00

PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish and install all prefabricated manholes, and other structures, complete with grade rings, frames, covers, pipe connections, preformed joint sealant, and cast-in-place bases, and any other necessary appurtenances, in accordance with the requirements of the Contract Documents.
- B. Related Sections:
 - 1. SECTION 31 23 00, EARTHWORK
 - 2. SECTION 33 01 30.41, SANITARY SEWER SYSTEM TESTING AND CLEANING
 - 3. SECTION 03 20 00, CONCRETE REINFORCEMENT
 - 4. SECTION 03 30 00, CAST-IN-PLACE CONCRETE
 - 5. SECTION 33 01 30.81 MANHOLE REHABILITATION
 - 6. SECTION 33 01 30.83, MANHOLE FRAMES AND COVERS

1.02 REFERENCE

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C150 - Standard Specification for Portland Cement.
 - 2. ASTM D3212 - Standard Specification for Drain and Sewer Plastic Pipes Using Elastomeric Seals3. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
 - 3. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.

1.03 SUBMITTALS

Furnish, in accordance with the Contract Documents, complete Shop Drawings for all precast manhole sections, sewer inlets, and manhole appurtenances for review by the Engineer.

1.04 QUALITY ASSURANCE

After installation, the Contractor shall demonstrate that all manholes, drainage inlets, and other precast concrete structures have been properly installed, level, with tight joints, at the correct elevations and orientations, and that the backfilling has been carried out in accordance with the Contract Documents. All manholes shall be tested in accordance with the Contract Documents.

PART 2 - PRODUCTS

2.01 CONCRETE

Concrete for cast-in-place concrete manhole base shall be as specified in the Contract Documents.

2.02 REINFORCING

Reinforcing for cast-in-place concrete manhole base shall be as specified in the Contract Documents.

2.03 MANHOLE FRAMES AND COVERS

Manhole frames and covers shall be as specified in the Contract Documents.

2.04 MATERIALS

- A. Precast Concrete Sections: Manholes, drainage inlets, and other precast concrete structures, shall be constructed of precast concrete sections and shall conform to ASTM C478 and the Contract Documents.
- B. Precast concrete sections shall be manufactured by a process that will produce a dense, homogeneous concrete of first quality. The sections shall be steel reinforced and have a minimum wall thickness of four (4) inches. Cement used in manufacturing the sections shall be Type V, Portland cement, as specified in ASTM C150. Precast concrete sections, cones, and grade rings shall be joined using preformed joint sealant only. Use of mortar will not be allowed. All manholes shall have precast concrete bases and channels with inverts to match the adjoining pipes.
 - 1. Manhole Manufacturers, or Approved Equal: Hanson Pipe and Precast, Sacramento, California.
 - 2. Joint-Seal Material, or Approved Equal: Ram-Nek, K.T. Snyder Company.
- C. Castings: Castings for manhole frames and covers and drainage inlet frames and grates shall conform to Contract Documents.
- D. Concrete Sealant: Concrete sealant and waterproofing compound shall be applied to the interior and exterior of the manhole barrel prior to backfill. Sealant material shall be Tegaproof, Xypex, Bituminous material, or equal.

2.05 DESIGN LOADS

- A. Vertical Loads: Design all precast manhole rings and accessories to support an AASHTO H-20 truck loading, in addition to soil weight above sloping ring sections and the dead load of all material supported above.
- B. Lateral Loads: Lateral loads shall be as dictated by the following formula or the geotechnical report requirements, whichever are more stringent.
 - 1. Operating: $95 \times H$ (psf) triangular equivalent fluid pressure for dead load plus a live load surcharge from an H-20 truck, including impact.
 - 2. Seismic: $23 \times H^2$ (psf) uniform pressure distribution.
 - 3. Where H = depth below finished grade.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. Manholes shall be sound watertight structures, constructed as shown on the Contract Documents. The type of manhole and its location is to be as shown on the Contract Documents. The manhole shall be constructed to the rim elevations shown on the Contract Documents. In paved areas, the Contractor shall set the manhole rim after backfill and site settlement to match the proposed finish pavement elevation based on pavement restoration and pavement overlay requirements, if applicable.
- B. Manhole Protection:

1. Particular care must be taken to protect new and existing manholes from damage and to keep rock, dirt, or debris from entering the sewer.
 2. On new manholes, or manholes that have had frame and cover removed, a steel cover of adequate strength, close fitted and well secured, shall be installed over the manhole opening until the frame and cover are permanently installed.
 3. Ground or surface water shall not be allowed to drain into or be discharged to existing sewers. Temporary watertight plugs shall be installed by the Contractor to affect this protection.
 4. Protective measures to prevent construction debris from entering the sewer system, such as "false bottoms" placed in the manhole, shall be installed when construction work is being performed at manholes that are in service.
- C. Precast Manhole Base:
1. In location(s) show in the plans, the base shall be pre-cast with Class A ASTM C478 concrete and shall be as specified in the Contract Documents.
 2. Precast manhole base shall not be allowed unless shown on the plans or unless approved, in writing, by the Engineer.
- D. Precast Manhole Shaft:
1. The manhole shaft shall be composed of precast concrete sections.
 2. Precast concrete sections for manholes shall be in accordance with the Contract Documents and shall conform to the requirements of ASTM C478. The cone section shall be concentric unless eccentric is specified elsewhere or directed by the Engineer and placed as shown on the Contract Documents. Manhole shaft shall be coated with a 100 percent solids epoxy mortar coating to protect the concrete from corrosion caused by hydrogen sulfide. The coating shall be Hydro-pox 212 and Hydro-pox 251 (primer) as manufactured by Con-Tech of California, (209) 941-8324 or approved equal. Surface preparation and application shall be performed as recommended by the coating manufacturer.
 3. Joints between precast concrete sections shall have a "Ram-Nek" flexible plastic gasket installed between the tongue and groove joint to make a watertight joint. "Ram-Nek" sections shall be overlapped a minimum of 3 inches. After the shaft is in place, the joint shall be trimmed smooth with a sharp tool on the inside of the manhole.
 4. Manhole sections shall be ordered without rungs.
 5. The grade rings installed height shall not exceed 12 inches, and a minimum number of grade rings shall be used. Grade rings shall be coated with a 100 percent solids epoxy mortar coating to protect the concrete from corrosion caused by hydrogen sulfide. The coating shall be Hydro-pox 212 and Hydro-pox 251 (primer) as manufactured by Con-Tech of California, (209) 941-8324 or approved equal. Surface preparation and application shall be performed as recommended by the coating manufacturer.
- E. Manhole Collar:
1. Unless otherwise specified by the Engineer, a concrete collar shall be poured around the frame and shaft so as to securely anchor the frame to the shaft. The collar shall extend to the bottom of the lowest grade ring, as shown on the Contract Documents.

2. Concrete shall be poured around the manhole frame and shaft as shown on the Contract Documents.
- F. An approved rubber waterstop gasket shall be installed for all pipe at all manhole connections. For new manhole construction, the waterstop shall be placed in the manhole base and centered under the manhole wall. The waterstop shall be firmly fitted around the pipe exterior and cast into the structure base.
- G. Precast concrete sections shall be set so as to be vertical, with sections in true alignment. The joint of the previously set section shall be covered with sealing compound primer and joint sealant before the next section is placed.
- H. Connections to manufactured, precast items shall be made by casting sections of pipe into the items, using nonshrink grout, and using an approved resilient connector as shown on the Contract Documents.
- I. All precast concrete structures shall be installed in strict conformance with the manufacturer's written instructions, on a well-compacted foundation, as specified in the Contract Documents. After installation of concrete manholes and concrete manhole risers on junction structures, the Contractor shall apply concrete waterproofing sealant to the interior and exterior of manhole barrels and manhole risers. The Contractor shall allow sufficient time for sealant to cure, prior to backfill, in accordance with the manufacturer's written instructions.
- J. Concrete manhole collars shall be installed as indicated on the Contract Documents. Paving around the manhole shall be in accordance with the Contract Documents. Openings in manholes shall be protected from construction loads, debris, and unauthorized entry.
- K. Core drill, carefully chip out, or remove bricks to create openings to existing manholes where new pipes are to connect. The new pipe shall be inserted into the opening with a GPK sanded manhole adapter, or approved equal, conforming to this Section and as shown on the Drawings, fitted around the pipe exterior. The annular space between the pipe outside diameter and the cored opening shall be packed with nonshrink grout. After connection the Contractor shall rechannel the inside of the existing manhole base to provide a smooth flow channel transition to the newly installed pipe. The Contractor shall plug any holes remaining from abandoned lines with concrete or nonshrink grout.

3.02 TESTING

All precast concrete structures shall be tested in accordance with the Contract Documents.

****END OF SECTION****

SECTION 03 60 00

GROUT

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section specifies grout for structural and miscellaneous uses.
- B. Related Sections:

SECTION 03 30 00, CAST-IN-PLACE CONCRETE

1.02 QUALITY ASSURANCE

Quality control by contractor:

To verify conformance with the specified requirements for grout, the Contractor shall engage the services of an independent testing laboratory which complies with the requirements of ASTM E329. The testing laboratory shall sample and test grout materials as required in this Section.

1.03 REFERENCES

American Society of Testing and Materials (ASTM):

- A. ASTM C33 - Concrete Aggregates.
- B. ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
- C. ASTM C88 - Organic Impurities in Fine Aggregates for Concrete.
- D. ASTM C117 - Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate Material Finer Than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing.
- E. ASTM C136 REV A - Sieve Analysis of Fine and Coarse Aggregates.
- F. ASTM C150 – Portland Cement.
- G. ASTM C289 - Potential Reactivity of Aggregates (Chemical Method).
- H. ASTM C494 - Chemical Admixtures for Concrete.
- I. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

- J. ASTM E329 REV C - Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.04 SUBMITTAL

Contractor shall submit grout, mix designs, recent test data for the submitted mixes, and test data for mix components confirming that the mixes meet the requirements of this Section.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Cement:

Portland cement shall be ASTM C150, Type II or Type V, low alkali, containing less than 0.60 percent alkalies.

B. Aggregate:

1. GENERAL: Aggregate shall be nonreactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing grout work.
2. FINE AGGREGATE: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C33 as modified herein. When tested in accordance with ASTM C136, gradation shall be such that 100 percent by weight will pass a standard No. 8 mesh sieve and no less than 45 percent by weight will pass a standard No. 40 mesh sieve.
3. Variation from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the permissible variation listed below:

<u>U.S. standard sieve size</u>	<u>Permissible variation in individual tests, percent</u>
30 or coarser	2
50 or finer	0.5

4. Other tests shall be in accordance with the following specifications:

Test	Test method	Requirements
Organic Impurities	ASTM C40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C117	3% maximum by weight
Soundness	ASTM C88	10% maximum loss with sodium sulfate
Reactivity	ASTM C289	Innocuous aggregate
Sand Equivalent	ASTM D2419	Minimum 80

C. Admixtures:

Admixtures shall be compatible with the grout. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the grout mix.

D. Water:

Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalies, and organic materials; shall not contain more than 1000 mg/l of chlorides as Cl, nor more than 1300 mg/l of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than 5 percent in the compressive strength of the grout at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the grout.

E. Grout:

1. NONSHRINK GROUT: Shall be nonmetallic aggregate grout: Five Star Products, Inc. Five Star Grout, Master Builders Masterflow 713, Burke Company Non-Ferrous, Non-Shrink Grout, or equal.
2. EPOXY GROUT FOR CRACK REPAIR: Epoxy grout shall be a high modulus, two-component, moisture insensitive, 100 percent solids, thermosetting modified polyamid epoxy compound. The consistency shall be a paste form capable of not sagging in horizontal or overhead anchoring configurations. Material shall conform to ASTM C881, Type 1, Grade 3, such as Master Builders Technologies Concrecive series, Sika Corporation Sikadur Hi-Mod Series, Adhesive Technology Corporation Solidbond 200, or equal, and shall have a heat deflection temperature in excess of 130 degrees F. Epoxy for pressure grouting/crack injection shall be a two-component, moisture insensitive, high modulus, injection grade, 100 percent solids, blend of epoxy-resin compounds. The consistency shall be as required to achieve complete penetration in hairline cracks and larger. Material shall conform to ASTM C881, Type 1, Grade 1, such as Sika Corporation Sikadur 52, Adhesive Technology Corporation SLV 300 series, or equal.

PART 3 – EXECUTION

3.01 NONSHRINK GROUT

Nonshrink, nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates and bearing plates.

3.02 EPOXY GROUT

Epoxy grout shall be used for repairing cracks by pressure grouting or gravity flow, and repairing structural concrete. Concrete shall be primed in accordance with the grout manufacturer's instructions.

****END OF SECTION****

SECTION 31 23 00

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes all earthwork required for construction of the Work. Such earthwork shall include, but not be limited to, the loosening, removing, loading, transporting, depositing, grading, moisture-conditioning, and compacting in its final location of all materials, as required for the purposes of completing the work specified in the Contract Documents. This work shall include, but not be limited to, the furnishing, placing, and removing of sheeting, shoring and bracing necessary to safely support the sides of all excavation; supporting structures above and below ground; all pumping, ditching, draining, dewatering, and other required measures for the removal or exclusion of water from the excavation; filling and compacting to elevations shown on the Contract Documents; all backfilling around structures and pipe and all backfilling of trenches and pits; the disposal of excess and unsuitable excavated materials; borrow of materials to make up deficiencies for fills; and all other incidental earthwork, all in accordance with the requirements of the Contract Documents.
- B. The elevations shown on the Contract Documents of existing features are taken from the best available data and are intended to give reasonably accurate information. The Contractor is responsible to verify provided elevations for more accurate determinations of quantities.
- C. Pits and fills used for the erection of the Contractor's construction facilities shall be filled or removed upon the completion of the work and leveled to meet the existing contours of the adjacent ground.
- D. After all structures have been completed, the ground surface shall be brought to the finished grade elevations with the relative compaction indicated on the Contract Documents.
- E. All finished ground surfaces shall be bladed and dressed to present a surface not varying over 0.10 foot at local humps or depressions and to the satisfaction of the Engineer. Local depressions where water could accumulate in the future shall be no more than 0.05 foot deep.
- F. Contaminated Soil and Contaminated Groundwater: Contaminated soils and contaminated groundwater is not expected to be encountered by the Contractor for this project.

1.2 REFERENCES

City Standard Details – Trench Restoration

The State of California - California Labor Code Industrial Standards:

- A. ASTM C 136 - Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- B. ASTM D 422 - Test Method for Particle-Size Analysis of Soils.
- C. ASTM D75 - Standard Practice for Sampling Aggregates.
- D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of soil Using Modified Effort.
- F. ASTM D 1633 - Test Method for Compressive Strength of Molded Soil-Cement Cylinders.
- G. ASTM D2166 - Test Method for Unconfined Compressive Strength of Cohesive Soils.
- H. ASTM D2419 - Standard Test Method for Sand Equivalent of Soils and Fine Aggregate.
- I. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
- J. ASTM D 2435 - Test Method for One Dimensional Consolidation Properties of Soils.
- K. ASTM D 2487 - Classification of Soils for Engineering Purposes.
- L. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- M. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- N. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
- O. ASTM D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
- P. ASTM D 4829 - Test Method for Expansion Index of Soils.

- Q. ASTM G51 - Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing.
- R. Caltrans Test 417 - Method of Testing Soils and Waters for Sulfate Content.
- S. Caltrans Test 422 - Method of Testing Soils and Waters for Chloride Content.
- T. Caltrans Test 643 - Method for Estimating the Service Life of Steel Culverts, Part 1 "Method of Field Resistivity Survey and Sampling for Laboratory Tests" and Part 4 "Laboratory Method of Determining Minimum Resistivity".

1.3 RELATED SECTIONS

- A. Section 02 41 00, Demolition, Abandonment and Removal
- B. Section 32 12 16, Asphalt Concrete Paving
- C. Section 31 23 23.33, Controlled Low Strength Material

1.4 GEOTECHNICAL REPORT

- A. Boring logs can be found in the Geotech Report.
 - 1. The Geotechnical Investigation Report dated February 26, 2021 provides recommendations to the design team and those recommendations have been incorporated in these plans and specifications. The report is provided, and the Contractor is responsible for familiarizing itself with the factual aspects of that report. The Contractor is reminded that actual conditions encountered may vary, and that the hierarchy of contractual documents applies as outlined in the Contract Documents.
 - 2. Geotechnical Investigation Report by Cornerstone Earth Group, dated February 26, 2021 is attached and made a part of the contract.

1.5 SUBMITTALS

- A. Submit data in accordance with General Provisions Section 2.5 and Section 01 10 01, Project Records and Submittals.
- B. The Contractor's attention is directed to the provisions for Shoring and Bracing Drawings in Section 6705 of the California Labor Code and Standard Specifications for Public Works Construction (SSPWC) Section 306-1.1. The Contractor, prior to beginning any trench or structure excavation 5 feet deep or over shall submit to the Engineer and shall be in receipt of the Engineer's written acceptance of the Contractor's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, and other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation. The plans shall be prepared by a qualified civil or structural engineer licensed in the State of

California and employed by an independent design consultant firm insured against errors and omissions to the extent required by the Engineer. The submittal(s) shall include a site location map referencing existing features; detailed plans; elevations, and various sections indicating all excavation slopes, shoring components and connections and showing all structures and utilities potentially influenced by the performance of shoring, trenching or structure excavation along with supporting calculations; notes including sequence of construction, materials, and other clarification as required by the California Labor Code, SSPWC, and the contract documents.

- C. The Contractor shall submit for the Engineer's review, drawings and data showing his proposed design and plan for dewatering of all work areas, which shall include the planned method of dewatering, excavation and shoring, the location and capacity of such facilities as dewatering wells, well points, pumps, sumps, collection and discharge lines, points of discharge, the standby units proposed, protective fills and ditches required for control of groundwater and surface water, and sealing measures of desilting tanks for odor control, if applicable.
- D. Review by the Engineer shall not relieve the Contractor of the responsibility for the adequacy of the dewatering and excavation plan or for furnishing all equipment, labor, and materials necessary for performing the various parts of the work. If, during the progress of the work, it is determined by the Engineer that the dewatering system and excavation plan are inadequate or the Contractor's plan of construction inoperative, the Contractor shall, at his expense, furnish, install and operate such additional dewatering equipment as may be necessary to perform the work in a manner satisfactory to the Engineer.
- E. Submit backfill and compaction procedures.
- F. Submit material certifications for each material specified and used in this section.
- G. Submit utility support plan for existing utilities 16-inch outside diameter and larger that are anticipated to cross the proposed pipe, any box structure crossing the proposed pipe, and any infrastructure which parallels or roughly parallels the proposed pipe and is anticipated to be within 3 feet clear from the edge of the proposed trench.

1.6 DEFINITIONS

- A. Pavement Zone: The pavement zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill and on either side of the edge of trench.
- B. Street Zone: The street zone is the top 30 inches of the trench immediately below the pavement zone in paved areas beneath paved portions of the right-of-way, curbs, gutters and sidewalks.
- C. Trench Zone: The trench zone includes the portion of the trench from the top of the pipe embedment zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.

- D. **Pipe Embedment Zone:** The pipe embedment zone shall include the full width of trench from the bottom of the pipe or conduit to 6 inches above the top of the pipe, as specified below. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipe.
- E. **Pipe Bedding Zone:** The pipe bedding zone shall be defined as a layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width on which the pipe is bedded to a depth of 6 inches below the base of the pipe. Thickness of pipe bedding zone shall be as follows unless otherwise shown in the Plans or otherwise described in the specifications for the particular type of pipe installed or otherwise required by permit.
- F. **Rock Excavation:** Rock excavation within a trench is defined as excavation in material that cannot, in the Engineer's opinion, be reasonably loosened or ripped with a hydraulic excavator with a net minimum flywheel rating of 300 horsepower fitted with a narrow bucket and teeth, such as a Caterpillar 345B L Series II UHD; and which must be systematically drilled and broken by a power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal. Rock excavation outside a trench is defined as excavation in material that cannot, in the Engineer's opinion, be reasonably loosened or ripped with a track mounted tractor with a net minimum flywheel rating of 300 horsepower fitted with a single tooth ripper, such as a Caterpillar D8T; and which must be systematically drilled or broken by a power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal. Blasting is not allowed. The term "rock excavation" does not necessarily correspond to "rock" as implied by names of geologic formations.
- G. The Engineer shall make the determination as to whether material is classified as rock.

1.7 SAFETY MEASURES

- A. Safe conditions shall be maintained at the jobsite meeting all provisions of the California OSHA and all other applicable safety codes. Barricades and lighting meeting the requirements of all agencies having jurisdiction shall be placed at each end of all excavations and at such places as may be necessary along excavations to protect and warn all pedestrians and vehicular traffic of such excavations. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until such excavation is entirely backfilled, compacted, and paved. This fence shall be constructed to prevent any person from entering the excavation. Signs stating "Danger, Deep Hole" shall be clearly displayed on all sides of the excavation.
- B. Safe and suitable ladders that project 2 feet above the top of the trench shall be provided for all trenches greater than 4 feet in depth. A minimum of one ladder shall be provided for each 50 feet of open trench.

1.8 QUALITY ASSURANCE

- A. The Contractor shall perform the compaction tests. If any compaction fails to meet the relative compaction requirements set forth, the Contractor shall pay for subsequent

compaction tests by deducting their costs from the Contract amount or as directed by the Engineer.

- B. Should the Engineer elect that the Contractor provide its own compaction testing due to repeat failure of Contractor meeting relative compaction requirements, the Engineer will monitor soils compactions efforts by the Contractor using a testing facility of the Engineer's choice at Contractor's expense.
- C. The Contractor shall make all necessary excavations for compaction tests as directed by the Engineer, and all work in connection with compaction testing by the Contractor shall be included in the various contract bid prices, and no additional allowance will be made therefore. The Contractor shall stop work as required to provide safe access to conduct the tests.
- D. In accordance with SSPWC, soil material is required to be compacted to a percentage of maximum dry density. The maximum dry density at optimum moisture content will be determined in accordance with the latest version of ASTM D 1557. In-place field density tests will be performed in accordance with ASTM D 1556, (sand cone) and/or ASTM D 6938 (nuclear gauge). The type, number and location of field density tests will be determined by the Engineer. One sand-cone test (ASTM D 1556) will be taken for every four nuclear tests (ASTM D 6938). If soil material is not within two (2) percentage points of optimal moisture content, the Contractor shall either add water or dry the soil material by moving the soil to aerate it sufficiently such that the optimum moisture content is achieved at no additional cost to the City.
- E. All imported fill material shall be sampled at the Contractor's expense and shall be subject to approval by the Engineer.
- F. Where imported fill material is required to possess certain gradation, strength, and settlement properties, the grain size distribution of soils will be determined using ASTM D 422, the gradation of concrete aggregate and base materials will be determined using ASTM C 136, the sand equivalent of soils will be determined using ASTM D 2419, the consolidation of soils will be determined using ASTM D 2435, the unconfined compressive strength of soils will be determined using ASTM D 2166, and the expansion index of soils will be determined using ASTM D 4829.
- G. Testing of soils shall also comply with any permit conditions included as part of this contract.

PART 2 – MATERIALS

2.1 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

- A. General: Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, and free from grass, roots, brush, or other vegetation; contamination; or deleterious material. Onsite excavated soil shall be tested for contamination prior to processing or reuse. All contaminated soil regardless of type shall be hauled off site for proper disposal at no additional expense to the City.

- B. Suitable materials may be obtained from onsite excavations, may be processed onsite materials, or may be imported provided these materials meet all the requirements in the contract documents. All required testing and test reports associated with suitable materials shall be at no additional expense to the City.
- C. Select material: Select material shall be free from organic matter or debris. All of the material shall pass through a 1-1/2-inch screen. Not more than 10 percent by weight shall pass the No. 200 sieve and the material shall have sufficient gradation to compact as directed in the tabulation in Article 3.13.E of this specification section. Use of select material shall be subject to the Engineer's approval.
- D. Unclassified fill: Unclassified fill shall consist of all fill unless separately designated.
- E. Granular Soil: Wherever the term "granular soil" or "granular fill" is used in the Contract Documents, it shall be defined as a soil having a minimum sand equivalent of 30 as determined in accordance with the latest revision of ASTM D 2419 and not more than 20 percent of it by weight will pass through a No. 200 sieve. The following types of suitable granular materials are designated and defined as described below:
 - 1. Crushed Aggregate Base (CAB) shall conform to the requirements of Section 6 of the State Standard Specifications.
 - 2. Crushed Miscellaneous Base (CMB) shall conform to the requirements of Section 6 of the State Standard Specifications.
 - 3. Crushed Rock: Crushed rock shall be the product of crushing rock or gravel. Fifty percent of the particles retained on a 3/8-inch sieve shall have their entire surface area composed of faces resulting from fracture due to mechanical crushing. Not over 5 percent shall be particles that show no faces resulting from crushing. Less than 20 percent of the particles that pass the 3/8-inch sieve and are retained on the No. 7 sieve shall be waterworn particles. Gravel shall not be added to crushed rock.

Where crushed rock is specified on the Contract Documents, it shall conform to the following gradation:

3/4-inch Maximum Crushed Rock

Sieve Sizes	% Passing
2 inches	-
1 1/2- inches	-
1 inch	100
3/4 inch	90-100
1/2 inch	30-60
3/8 inch	0-20
No. 4	0-5
No. 8	-

4. Gravel: Gravel shall be defined as particles that show no evidence of mechanical crushing, are fully waterworn and are rounded. For pipe bedding where gravel is specified, crushed rock may be substituted or added. Where gravel is specified on the Contract Documents, the material shall have the following gradations:

New Sanitary Sewer Manhole	1-inch Max. Gravel % Passing	3/8-inch Max. Gravel % Passing
2 inches	-	
1 1/2- inches	100	-
1 inch	90-100	-
3/4 inch	60-80	100
1/2 inch	-	-
3/8 inch	0-15	90-100
No. 4	0-5	0-15
No. 8	-	0-5

5. Drainrock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. The material shall be uniformly graded and shall meet the following gradation requirements:

Sieve Size	% Passing
1-inch	100
3/4-inch	90 – 100
3/8-inch	40 – 100
No. 4	25 – 40
No. 8	18 – 33
No. 30	5 – 15
No. 50	0 – 7
No. 200	0 – 3

The drainrock shall have a sand equivalent value not less than 75. The finish-graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth surface upon which to construct reinforced concrete floor slabs.

2.2 NOT USED

2.3 IMPORTED SAND

- A. Imported sand shall have the following gradation:

Sieve Size	% Passing
1/4 inch	100
No. 4	70 – 100

No. 16	35 – 75
No. 50	10 – 40
No. 200	0 – 10

- B. Imported sand shall have a coefficient of permeability greater than 0.014 measured in accordance with ASTM D2434 or a minimum sand equivalent of 30 per ASTM D2419.
- C. Minimum resistivity for "Imported Sand" backfill shall be 2,000 ohm-cm in accordance with Caltrans Test 643. Imported sand shall have a maximum chloride concentration of 200 mg/l in accordance with Caltrans Test 422 and maximum sulfate concentration of 500 mg/l in accordance with Caltrans Test 417.

2.4 PIPE BEDDING, PIPE EMBEDMENT, TRENCH BACKFILL ZONES AND SHAFTS

- A. Pipe bedding and pipe embedment zone material shall be imported sand as shown on the Drawings and as described in these specifications.
- B. Trench/shaft backfill materials shall ¾-inch maximum, Class II Aggregate Base (Class II AB). ¾-inch maximum Class II AB material shall conform to Section 26-1.02A of the State Standard Specifications, and City Standard Specifications.
- C. ¾-inch maximum Class II AB shall be free from roots, vegetable matter, or other deleterious substances and shall be of such nature and so graded that it will bind readily when watered and compacted to the requirement specified herein.
- D. When tested in accordance with Section 6 of State Standard Specifications, the material shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the following gradation:

Sieve Size	Percent Passing
1 inch	100
¾ inch	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-9

- E. The material shall also conform to the following quality requirements:

Tests	California Test Method No.	Requirements (Min.)
Resistance (R-value)	301	78
Sand Equivalent	217	22

- F. The material shall be compacted as shown on the Drawings, as determined by California Test Method No. 216 or California Test Method No. 231.

2.5 ROCK REFILL FOR FOUNDATION STABILIZATION AND OVEREXCAVATION

- A. Rock refill shall be 1" crushed or natural rock meeting the following requirements and having the following gradation.
- B. The portion of the material that is larger than will pass a 3/8 sieve shall contain at least 50 percent of particles having three or more fractured faces. Not over 5 percent shall be pieces that show no such faces. Of that portion which passes the 3/8 sieve, but is retained on the No. 4 sieve, not more than 10 percent shall be gravel particles.

Sieve Size	% Passing
1-1/2inch	100
1 inch	90 - 100
3/4 inch	30 - 60
1/2 inch	0 - 20
No. 4	0 - 5

2.6 CONCRETE FOR PIPE ENCASEMENT

Concrete for pipe encasement shall be per Section 03 30 00 Cast-In-Place Concrete unless otherwise shown on the Contract Documents.

2.7 WATER FOR COMPACTION

Water used in compaction shall have a maximum chloride concentration of 500 mg/l as measured by Caltrans Test 422, maximum sulfate concentration of 500 mg/l as measured by Caltrans Test 417 and shall have a pH of 7.0 to 9.0 as measured by ASTM G51. Water shall be free of organic materials injurious to the pipe coatings.

2.8 GEOTEXTILE FABRIC

The geotextile shall be non-woven, needle punched construction, and consist of long-chain polymer fibers or filaments composed of polypropylene, polyethylene, or polyamide. The fibers and filaments shall be oriented into a stable network whereby they retain their positions with each other. The textile shall be free of any chemical treatment or coating which reduces permeability. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot-proof, and resistant to ultraviolet light.

The geotextile fabric shall also conform to the following physical properties:

Property	Test value	Test method
Tensile strength	160 lb (min.)	ASTM D4632
Elongation at break	50% (max.)	ASTM D4632
CBR Puncture strength	410 lb (min.)	ASTM D6241

Permittivity	1.4 sec-1 (min.)	ASTM D4491
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PART 3 – EXECUTION

3.1 CLEARING, GRUBBING AND STRIPPING

- A. Clearing, grubbing and stripping, if any, shall be performed in accordance with Section 02 41 00 Demolition, Abandonment and Removal.

3.2 GRADING AND STOCKPILING

- A. The Contractor shall control grading in a manner to prevent water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water flow is not interrupted in existing gutters, and other surface drains, or temporary drains. Storm water management plans shall be as specified in the Standard Specifications, General Conditions and Special Conditions of these Specifications. Material for backfill or for protecting excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, water gates, meters, and private drives. Stockpiling of excavated material is not allowed in the street right-of-way.
- B. Finished grading at any point shall not vary more than 0.10 foot above or below the grade established by the Contract Documents.

3.3 STRUCTURE, ROADWAY, AND EMBANKMENT EXCAVATION

- A. General: Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the work. The removal of said materials shall conform to the lines and grades shown or ordered. Unless otherwise provided, the entire construction site shall be stripped of all vegetation, debris, and all deleterious materials and such materials shall be removed from the site prior to performing any excavation or placing any fill. The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations, and all pumping, ditching, or other measures for the removal or exclusion of water, including taking care of storm water, groundwater (dewatering if required), and wastewater reaching the site of the work from any source so as to prevent damage to the work or adjoining property. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State of California safety requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926), and the Contract Documents.
- B. Structure excavation shall conform to the dimensions and elevations indicated on the Contract Documents for each structure including trenching for adjacent piping. In locations where soil of suitable bearing value is encountered at a different elevation from that indicated on the Contract Documents, the Engineer may direct in writing that the excavation be carried to elevations above or below those indicated on the Contract Documents. Excavation shall extend at least 24 inches from walls and footings to allow for placing and removal of forms, installation of services, and inspection. Undercutting will not be permitted.
- C. Where a structure would be located partially on fill and partially on undisturbed native material, the entire area shall be over-excavated to a depth of 5 feet below the elevations indicated and re-

compacted as directed in the tabulation in Article 3.11.E of this specification section.

- D. Safe and suitable ladders that project 2 feet above the top of the trench shall be provided for all trenches greater than 4 feet in depth. A minimum of one ladder shall be provided for each 50 feet of open trench.
- E. Excavation Beneath Structures and Embankments: Except where otherwise specified for a particular structure or ordered by the Engineer, excavation shall be carried to the grade of the bottom of the footing or slab. Where shown or ordered, areas beneath structures or fills shall be over-excavated. The subgrade areas beneath embankments shall be excavated to remove not less than the top 8 inches of native material and where such subgrade is sloped, the native material shall be benched. When such over-excavation is shown, both over- excavation and subsequent backfill to the required grade shall be performed by the Contractor. When such over-excavation is not shown on the plan and not specified but is ordered by the Engineer, such over-excavation and any resulting backfill will be paid for under a separate unit price bid item if such bid item has been established and approved by the Engineer prior to commencing the work; otherwise payment will be made in accordance with a negotiated price. After the required excavation or over-excavation has been completed, the exposed surface shall be scarified to a depth of 8 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain the required relative compaction.
- F. Excavation in Poor Soil: If excessively wet, soft, spongy, unstable, or otherwise unsuitable material, as determined by the Engineer, is encountered at the bottom of the excavation or the surface upon which the pipe bedding material is to be placed including the vertical sides of a specified pipe trench, the unsuitable material shall be removed to a depth as required by the Engineer, disposed of, and replaced with approved fill or bedding material. Removal and replacement of material so ordered shall be paid for by the City as "Extra Work" unless provided for in the Schedule of Prices. The Contractor shall maintain adequate dewatering procedures to ensure that an otherwise stable foundation will not be rendered unfit due to accumulation or movement of water in the excavation. If the necessity for such additional excavation and material has been occasioned by an act or failure to act on the part of the Contractor, the Contractor shall bear the full expense of the additional excavation and backfill to the required depth.
- G. Over excavation: Where excavation is carried below the limits shown on the Contract Documents, adjustments shall be made as determined by the Engineer to meet requirements incurred by the deeper excavation beneath pipe or structure. Over depth excavation in such locations shall be rectified by backfilling with approved fill or bedding material or other means specified. Over excavation not required by the Contract Documents or directed by the Engineer shall be rectified at the expense of the Contractor.
- H. Excavation Beneath Paved Areas: Excavation under areas to be paved shall extend to the bottom of the aggregate base, if such base is called for; otherwise it shall extend to the paving thickness. After the required excavation has been completed, the exposed surface shall be scarified to a depth of at least 12 inches, brought to optimum moisture content, and rolled with heavy compaction equipment to obtain a minimum percent of compaction as directed in the tabulation in Article 3.11.E of this specification section.
- I. Excavation Subgrade and Below Subgrade:
 - 1. Excavate and shape subgrade to line, grade, and cross-section shown on Drawings. Following receipt of written acceptance for the subgrade by the Engineer and local building official, compact the

subgrade with approved equipment until the top 6-inches is compacted to 95 percent of maximum dry density at optimum moisture content as determined by ASTM D 1557, depending upon the appropriate zone or location of fill in accordance with the requirements of the tabulation in Article 3.11.E Compaction Requirements of this specification section. Remove all soft, loose, or otherwise unsuitable material and replace with suitable sandy material. The finished subgrade shall be firm, hard and unyielding. The subgrade shall be considered to extend over the full width of the base course. Compaction shall extend 18 inches beyond the edge of paving, curb, or form.

2. Where the Engineer deems subgrade material to be unsatisfactory, excavation below subgrade will be required to such depths as necessary to remove the unsatisfactory material. Excavation below grade shall be of the same classification as that above it, provided it is removed in the same operation as the normal excavation. Special equipment or hand excavation may be required because of the presence of shallow utilities or other unforeseen conditions.
- J. Notification of the Engineer: The Contractor shall notify the Engineer at least 2 working days in advance of completion of any structure excavation and shall allow the Engineer a review period of at least one day before the exposed foundation is scarified and compacted or is covered with backfill or with any construction materials.

3.4 PIPELINE AND UTILITY TRENCH EXCAVATION

- A. Trench Width: the overall trench width shall be as depicted on the Contract Documents. Excavating and trenching shall be true to line so that the pipe is centered within the trench and a clear space of not more than as depicted on the Contract Documents. The largest outside diameter shall be the outside diameter of the bell, on bell and spigot pipe.
- B. Limit of Open Trench: Except by express written permission of the Engineer, the maximum amount of open trench permitted in any one location shall be 500 feet, or the length necessary to accommodate the amount of pipe installed in a single day, whichever is less. All trenches shall be fully backfilled and base paved with the first course of pavement at the end of each day or, in lieu thereof, shall be covered by non-skid heavy steel plates adequately braced and capable of supporting vehicular traffic in those locations where it is impractical to backfill at the end of each day. Base paving finished to grade shall be flush with existing grade and finished smooth to create a smooth ride. The above requirements for backfilling or use of steel plate will be waived in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure. In such cases, however, barricades and warning lights meeting OSHA requirements shall be provided and maintained. The maximum working length allowed without the first course of pavement is 500 feet unless approved in advance by the Engineer.
- C. Trench Bottom: The bottom of the trench shall be excavated uniformly as shown on the Contract Documents. The pipe bedding shall be placed on the trench bottom and shall be given a final trim, using a string line for establishing grade, such that each pipe section when first laid will be continually in contact with the pipe bedding along the extreme bottom of the pipe. Trench bottom raked by toothed excavators is not acceptable.
- D. Trench Over-Excavation: Where the Contract Documents indicate that trenches shall be over-excavated, they shall be excavated to the depth shown, and then backfilled to the grade of the bottom of

the pipe.

- E. Excavation in Poor Soil: If excessively wet, soft, spongy, unstable, or otherwise unsuitable material, as determined by the Engineer, is encountered at the bottom of the excavation or the surface upon which the pipe bedding material is to be placed including the vertical sides of a specified pipe trench, the unsuitable material shall be removed to a depth as required by the Engineer, disposed of, and replaced with approved fill or bedding material. Removal and replacement of material so ordered shall be paid for by the City as "Extra Work" unless provided in the schedule of prices. The Contractor shall maintain adequate dewatering procedures to ensure that an otherwise stable foundation will not be rendered unfit due to accumulation or movement of water in the excavation. If the necessity for such additional excavation and material has been occasioned by an act or failure to act on the part of the Contractor, the Contractor shall bear the full expense of the additional excavation and backfill to the required depth.
- F. Where pipelines are to be installed in embankment or structure fills, the fill shall be constructed to a level at least one foot above the top of the pipe before the trench is excavated.
- G. Obtain the Engineer's approval before beginning excavation. Complete clearing and grubbing prior to the start of trenching. Do not permit excavated materials to cover brush or trees prior to disposal.

3.5 OVER-EXCAVATION NOT ORDERED, SPECIFIED, OR SHOWN

Any over-excavation by the Contractor carried below the grade not ordered, specified, or shown, shall be backfilled to the required grade with the specified material and compaction. Such work shall be performed by the Contractor at his own expense.

3.6 EXCAVATION IN VICINITY OF TREES

Except where trees are shown to be removed, trees shall be protected in place. The Contractor shall replace all trees that die that are shown on the Contract Documents as being protected in place.

3.7 DISPOSAL OF EXCESS EXCAVATED MATERIAL

- A. The Contractor shall remove and legally dispose of all excess excavated material to a site selected by the Contractor and reviewed by the Engineer. All incurred expenses including soil handling, transportation and tipping fees, if applicable, shall be borne by the Contractor.
- B. Unsuitable material shall be defined as material containing excessive amounts of organic matter, peat, blue clay, trash or debris; or as designated by the Engineer; or debris produced by clearing, grubbing, and demolition of existing structures, pavement, or pipe; or soil classified by test method ASTM D2486 as groups OL, CH, MH, OH or PT; or not meeting the grading or classification specified for the work.
- C. Excess unsuitable and surplus materials shall be kept separated from materials of other Contractors working in the same area. All excavated soil shall be off-hauled immediately; no trench excavation material shall be stored on-site or used as trench backfill. It shall be the Contractor's responsibility to dispose of trench excavations off-site in a safe and legal manner at a site approved in writing by the engineer prior to start of excavations.

Contractor shall be responsible for disposal of trench excavation material at Class II and III landfills or disposal sites as approved by the Engineer. Contractor shall be responsible for all necessary testing of excavated soils prior to disposal and its associated costs.

3.8 PROTECTION OF SUBGRADE

- A. After preparing the subgrade as specified, all traffic on the subgrade shall be avoided. Should it be necessary to haul over the prepared subgrade, the Contractor shall drag and roll the traveled way as frequently as may be necessary to remove ruts, cuts, and breaks in the surface. All cuts, ruts, and breaks in the surface of the subgrade that are not removed by the above operations shall be raked and hand tamped. All equipment used for transporting materials over the prepared subgrade shall be equipped with pneumatic tires.
- B. Continued use of sections of prepared subgrade for hauling, so as to cut up or deform it from the true cross-section, will not be permitted. The Contractor shall protect the prepared subgrade from all traffic.
- C. The Contractor will be required to plank the subgrade before hauling materials or equipment over it.
- D. The subgrade shall be maintained in the finished condition until placement of the next succeeding feature.
- E. The Engineer has the right to test the reworked subgrade and approve or disapprove the subgrade depending on its condition.

3.9 BACKFILL – GENERAL

- A. Backfill consists of the preparation and placement of materials for structural foundations, pipeline bedding, backfill for excavations and fill for roadways and embankments. In public rights-of-way, the requirements of the City of Morgan Hill shall be adhered to.
- B. Backfill shall not be dropped directly upon any structure or pipe. Backfill shall not be placed around or upon any structure until the concrete has attained specified strength to withstand the loads imposed.
- C. Material used in the work shall be uniform and shall contain no trash, wood, vegetation, sludge, peat and no rocks or clods larger than the size allowed by the Contract Documents. No material greater than 4 inches in any dimension shall be placed within 1 foot of any pipe, manhole or structure. Excavated material and material from borrow sites may be used where they meet the requirements of the Contract Documents. Blending or other processing may be necessary before a material is acceptable to the Engineer. Borrow sites shown on the Plans shall be excavated within the limits indicated. All costs for testing, processing and transporting materials are included in the Contract price.
- D. Except for drainrock materials being placed in over-excavated areas or trenches, backfill shall be placed after all water is removed from the excavation.
- E. Where pipelines are installed on grades exceeding 4 percent, and where backfill materials are graded such that there is less than 10 percent passing a Number 4 sieve, soil cement trench plugs shall be provided at minimum intervals of 200 feet.

3.10 PLACING AND SPREADING OF BACKFILL MATERIALS

- A. Backfill materials shall be carefully placed, leveled and compacted in horizontal layers of the depth specified in the Contract Documents. When compaction is achieved using mechanical equipment the layers shall be evenly spread in loose lifts not exceeding 8 inches in thickness so that when compacted each layer shall not exceed 6 inches in thickness. Each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is placed. The moisture content of the material shall be controlled and water shall be applied as necessary to achieve the specified compaction at optimum moisture content and for the prevention of dust nuisance. No fill or rock shall be placed on standing water in any excavation.
- B. Fill under Structures: The fill under structures, including fill to replace unsuitable material removed below the specified excavation or unauthorized over-excavation, shall be constructed in horizontal layers of select material not to exceed 8 inches in depth, or if under footings, the heights of the walls or footings shall be increased, or space shall be refilled with concrete at the expense of the Contractor, as may be directed by the Engineer. Any fill material used shall be compacted to a minimum relative compaction as directed in the tabulation in Article 3.11.E of this specification section.
- C. Where the underlying soil has been disturbed by any activity, such as clearing and grubbing, it shall be compacted to a minimum relative compaction as directed in the tabulation in Article 3.13.E of this specification section before placing any fill.
- D. Structural Backfill: All backfill around structures shall be made with select material or imported sand compacted up to the street zone to the required percent of maximum dry density at optimum moisture content as determined by ASTM D 1557, depending upon the appropriate zone or location of fill in accordance with the requirements of the tabulation in Article 3.11.E Compaction Requirements, of this specification section. Compaction shall be performed in horizontal layers not to exceed 8 inches in depth. No backfill shall be placed against concrete structures until the 28-day concrete strength has been reached as specified.
- E. During spreading each layer shall be thoroughly mixed as necessary to promote uniformity of material in each layer. Pipe zone backfill materials shall be manually spread around the pipe so that when compacted the pipe zone backfill will provide uniform bearing and side support.
- F. Where the backfill material moisture content is below the optimum moisture content, water shall be added before or during spreading until the proper moisture content is achieved.
- G. Where the backfill material moisture content is too high to permit the specified degree of compaction, the material shall be dried until the moisture content is satisfactory, at or slightly above optimum moisture content.

3.11 COMPACTION OF FILL, BACKFILL, AND EMBANKMENT MATERIALS, INCLUDING PIPELINE WORK

- A. Each layer of fill shall be mechanically compacted using proper compaction equipment (not rubber tire or wheel rolling) to the specified percentage of maximum dry density at optimum moisture content. 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.

- B. The backfill shall be placed in horizontal layers of the specified depths or of such depths approved by the Engineer and compatible with the compacting equipment being used and the backfill material being placed. In no case shall any layer exceed 8 inches in thickness during compaction efforts. Each layer shall be evenly spread, properly moistened, or dried as necessary and compacted to the specified relative compaction. Any damage or displacement to pipes or structures as a result of the Contractor's operation shall be repaired or replaced at the Contractor's expense.
- C. Flooding, ponding, or jetting shall not be used to densify any fill materials with the exception of holes remaining from the extraction of H-beams, plates and piles or otherwise approved by the Engineer.
- D. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time, but not less than 5 feet. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.
- E. Compaction Requirements: The following compaction test requirements shall be in accordance with ASTM D 1557. Where agency or utility company requirements govern, the highest compaction standards shall apply.

<u>Location or Use of Fill</u>	<u>Percentage of Maximum Density</u>
Pipe zone backfill of bedding material and over-excavated zones under bedding	90
Trench zone backfill material	95
Street zone backfill of compacted sub base and base material	95
Street zone final backfill, not beneath paved areas or structures	95
Street zone backfill of compacted aggregate base material	95
Embankments, not beneath paved areas or structures	85
Embankments, beneath paved areas or structures	95
Backfill beneath structures, hydraulic structures	95
Backfill around structures, on reservoir or structure roof	95

3.12 SIDEWALK, PAVEMENT, AND CURB REMOVAL AND REPLACEMENT

- A. The Contractor shall sawcut all bituminous and concrete pavements with a pavement saw prior to excavating the trenches. Width and depth of the pavement cut shall be in accordance with Section 32 12 16 Asphalt Concrete Paving. Haul pavement and concrete materials from the site. Do not use for trench backfill.
- B. Asphalt and paving shall be replaced in conformance with Section 32 12 16, Asphalt Concrete Paving for all other areas and the requirements of the local agencies having jurisdiction.

3.13 TRENCH WIDTHS

Minimum and maximum trench widths in the pipe zone shall be as shown on the Contract Documents.

3.14 DEWATERING

- A. Provide and maintain means and devices to remove and dispose of all water from any source entering the trench excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. These provisions shall apply during day as well as night hours. Dispose of the water in a manner to prevent damage to adjacent property and in compliance with NPDES requirements. Do not drain trench water through the pipeline under construction. Do not allow groundwater to rise around the pipe until backfilling is completed.
- B. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source. The Contractor shall assume full responsibility for any damage due to floating and shall pay for and perform the work required to restore and replace the pipe to its specified condition and grade.

3.15 LOCATION OF EXCAVATED MATERIAL

During trench excavation, place the excavated material only within the working area and beyond a 1:1 plane drawn upward from the lower of the base of shoring or excavation. Do not obstruct any roadways or streets. Conform to federal, state, and local codes governing the safe loading of trenches with excavated material.

3.16 LENGTH OF OPEN TRENCH

Comply with permit requirements. If there are no permit requirements regarding the length of open trench, the Contractor shall limit the amount of open trench to the length of pipe which can be installed and backfilled to final grade. At no time should the length of open trench exceed 1,000 feet on the entire project. Steel plates located within the traveled way shall be limited to 100 feet at each location and can be used only with the prior approval of the City. Complete backfilling and trench repaving within 2 working days of pipe laying.

3.17 FOUNDATION STABILIZATION

- A. After the required excavation has been completed, the Engineer will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation is conducted in all areas within the influence of the pipeline where unacceptable materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable material that exists directly beneath the pipeline to a width 24 inches greater than the pipe outside diameter and to the depth required. Backfill the trench to subgrade of pipe base with rock refill material for foundation stabilization. Place the foundation stabilization material over the full width of the trench and compact in layers not exceeding 6 inches deep to the required grade.
- B. Rock refill used by the Contractor for his convenience will not receive any additional payment.

3.18 CONCRETE FOR BELOW GROUND INSTALLATION

The Contractor shall encase pipe with concrete to the line and dimensions indicated or place concrete between the undisturbed ground and the pipe or fittings to be restrained or supported. Quantity or bearing area of the concrete against the undisturbed ground shall be as shown on the Standard Drawings, Plans, or as directed by the City. Provide temporary support on the pipe, fittings, or valves until the concrete has obtained a 2-day cure. Place concrete such that the pipe joints, fittings, or valves are accessible for repairs. Vibrate the concrete during placement to eliminate honeycombing. Backfilling of the trench adjacent to the concrete will not be allowed until at least 3 days after placement or until the hydration process has produced a concrete that is hard enough to be self-supporting. Allow concrete to cure for at least 7 days prior to subjecting the concrete to pipeline pressure.

3.19 TRENCH BACKFILLING

- A. Place the specified thickness of pipe bedding material over the full width of trench. Grade the top of the pipe bedding ahead of the pipe laying to provide firm, uniform support along the full length of pipe.
- B. After pipe has been laid, place pipe embedment zone material simultaneously on both sides of the pipe, keeping the level of backfill the same on each side. Carefully place the material around the pipe so that the pipe barrel is completely supported to 45 degrees each side of the pipe invert and so that no voids or uncompacted areas are left beneath the pipe. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.
- C. Compact material placed within 24 inches of the outer surface of the pipe by hand tamping only. Do not use any axle-driven or tractor-drawn compaction equipment until 3 feet of fill has been placed over the top of pipe.
- D. Push the backfill material carefully onto the backfill previously placed in the pipe embedment zone. Do not permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe.
- E. Backfill of trench above the pipe embedment zone shall not proceed until the required compaction in the pipe zone has been verified and accepted by the Engineer.
- F. When backfilling around existing utilities, for pipelines sizes 6-inch through 42-inch the following materials may be used in each zone unless noted otherwise:

<u>Zone</u>	<u>Allowable Material</u>
Pavement	Refer to Section 32 12 16, Asphalt Concrete Paving
Street	Sand Cement Slurry Imported Sand

Trench

Within pipe zone, Class II aggregate base

Sand Cement Slurry (as required on Drawings)

Pipe

Trench stabilization of trench bottom meeting the requirements of this Section, if needed due to site conditions

Within pipe embedment zone, imported sand

Pipe Bedding

Within pipe embedment zone, imported sand

3.20 BACKFILL COMPACTION

- A. Compact backfill to the specified relative compaction. Compact by using mechanical compaction or hand tamping. Do not use high impact hammer-type equipment. Do not use plate compaction equipment on hydraulic excavators.
- B. Compaction by jetting is generally not allowed for trench zone, but may be allowed for pipe and bedding zones in specific instances in areas approved by the City. Only imported sand materials backfilled in areas where foundation material is suitable will be allowed to be jetted.
- C. Backfill by wet or dry jetting is explicitly not allowed.
- D. On slopes too steep and trenches with inadequate drainage to consolidate backfill effectively, as determined by the Owner, the backfill shall be compacted by mechanical means.
- E. Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, and other structures.

3.21 TESTING FOR COMPACTION

- A. Tests specified below shall be performed by an engineer approved certified soil testing lab during the progress of the work to determine compliance with the compaction requirements specified herein, and the Contractor shall cooperate on the making of such tests by providing the labor and equipment necessary to obtain said tests at the required depth and allowing a reasonable time therefor.
- B. Additional testing by the City may be performed for verification that contract requirements are being met and is not for Contractor's quality control. The Contractor is responsible for adequacy of all backfill materials meeting contract requirements.

1. Determine the density of soil in place by the sand cone method, ASTM D1556 or by nuclear methods, ASTM D2922 and ASTM D3017.
 2. Determine laboratory moisture-density relations of soils by ASTM D1557.
 3. Determine the relative density of cohesionless soils by ASTM D4253 and ASTM D4254.
 4. Sample backfill materials by ASTM D75.
- C. The number of tests (depth and intervals) shall comply with the requirements of the pertinent permit. If there is no permit, or if the permit does not specify, the following shall be used.
1. For the pipe bedding zone, pipe zone, trench zone, and street zone, collectively 1 test for every 4-feet or fraction thereof of depth for every 250 feet of trench length. Backfill depth is from the bottom of the trench to the bottom of the pavement zone.
 2. For the pavement zone (aggregate base), 1 test for every 500 feet of trench length.
 3. For pit type excavations, at least 1 test within the pipe bedding shall be taken. In addition, at least 1 test for every 5 vertical feet shall be taken.
- D. "Relative compaction" is the ratio, expressed as a percentage of the in place dry density to the laboratory maximum dry density.
- E. Any test falling below the specified relative compaction shall be deemed not to comply with the specifications. The area should be reworked and/or rerolled until all tests in the area meet the specified relative compaction.
- F. Where compaction tests indicate a failure to meet the specified compaction, the Contractor shall take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire area between locations that have passed the tests until the specified compaction has been achieved. The Contractor shall pay the actual cost of all soil retests.
- G. The Contractor shall submit one or several procedures for the placement of backfill to achieve the required compaction. A test section shall be selected at the beginning of the project to experiment with proposed compaction procedures, using the equipment the Contractor plans to use on the project. Based on the results of the test section, one of the procedures may be used on the project. The procedures shall define maximum lift thickness and number of passes of the compaction equipment.
- H. Periodic monitoring: refer to General Provisions Sections 7.8, for testing responsibilities.

3.22 DISPOSAL OF EXCESS MATERIAL

Excess site excavated or wasted material shall be disposed of offsite on a timely basis by the

Contractor at his expense. No prearranged disposal site or related permits have been determined or secured by the City.

3.23 PERMITS

Refer to General Provisions for related permit information.

3.24 DIGALERT

The Contractor shall contact DigAlert (811) a minimum of three (3) days prior to any excavation.

3.25 OTHER AGREEMENTS

The Contractor shall obtain all required agreements with owners of utilities within 24-inches of this work in compliance with California law.

****END OF SECTION****

SECTION 31 23 23.33

CONTROLLED LOW STRENGTH MATERIAL

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. The Contractor shall provide Controlled Low Strength Material (CLSM), complete and in place, in accordance with the Contract Documents.
- B. CLSM shall consist of a mixture of aggregate, portland cement, mineral admixtures, water, and at the option of the Engineer, chemical accelerating admixtures.
- C. CLSM shall be placed where indicated and may be used, if the Engineer approves, for the following purposes:

Normal CLSM with high slump, non-segregating consistency that readily flows and fills voids and difficult to reach places: pipe zone fill, trench zone fill, existing utility support, pipe abandonment, structure backfill, and structure cavity fill. CLSM shall only be used in trenches as called for on the Drawings.

1.2 SUBMITTALS

Shop Drawings:

- A. CLSM mix designs which show the proportions and gradations of all materials proposed for each type of CLSM indicated. Each mix design shall be accompanied by independent laboratory test results of the indicated properties.
- B. If the Contractor proposes to provide lower strength CLSM with aggregates that do not conform to ASTM C 33 - Concrete Aggregate, Shop Drawings shall include a testing program that will be used to control the variability of the aggregates. The testing program shall be acceptable to the Engineer.

1.3 QUALITY ASSURANCE

- A. All testing will be done by a testing laboratory selected by the City at the City's expense, except as otherwise indicated.
- B. If tests of the CLSM show non-compliance with the specifications, the Contractor shall make changes as may be required to achieve compliance. Performing and paying for subsequent testing to show compliance shall be the Contractor's responsibility.
- C. Correlation Tests:
 - 1. The Contractor shall perform a field correlation test for each mix of CLSM used in pipe zone, trench

zone, existing utility support or backfill used in amounts greater than 100 cubic yards or when CLSM is required to support traffic or other live loads on the fill less than 7 days after placing CLSM.

2. Field correlation tests shall be performed in a test pit similar in cross section to the Work and at least 10-feet long at a location near the Work. The proposed location shall be acceptable to the Engineer.
3. Laboratory and field tests shall be performed on samples taken from the same CLSM batch mix. All tests shall be performed by a laboratory at the Contractor's expense.
4. Testing shall be performed once each 2 hours during the first 8 hours, once each 8 hours during the first week, and once each 24 hours until the CLSM mix reaches the maximum design strength.
 - a. Compression testing shall be in accordance with ASTM D 4832 - Preparation and Testing of Soil-Cement Slurry Test Cylinders.
 - b. Setting test shall be in accordance with ASTM C 403 - Time of Setting of Concrete Mixtures by Penetration Resistance.
 - c. Density tests shall be in accordance with ASTM C 138 - Unit Weight, Yield and Air Content (Gravimetric) of Concrete.

PART 2 - PRODUCTS

2.1 CONTROLLED LOW STRENGTH MATERIAL

- A. CLSM shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water, mixed in accordance with ASTM C 94 - Ready Mixed Concrete.
- B. Composition: The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.
 1. Mix proportions as necessary.
 2. Entrained air content shall be between 10 to 20 percent.
 3. Water reducing agent content as necessary.
- C. Properties:
 1. Density shall be between 120 PCF minimum and 145 PCF maximum.
 2. Slump shall be 5 to 8 inches.
 3. CLSM shall have a compressive strength not less than 100 or greater than 200 psi at 28 days.

2.2 CEMENT

Cement shall be Type II Modified in accordance with ASTM C 150 - Portland Cement. Mineral admixtures shall not be substituted for portland cement.

2.3 AGGREGATE

Aggregate shall conform to the quality requirements of Caltrans Section 90-1.02C, "Aggregates" and of these Specifications. Aggregate shall be well graded from coarse to fine. Aggregate shall have a Sand Equivalent, as tested by California Test 217, of not less than 40. Aggregate shall be of such size and gradation that, when mixed with Type II modified portland cement and mineral admixtures, and tested in accordance with ASTM C 39, the compressive strength of a sample will not be less than 100 or greater than 200 pounds per square inch at 28 days. The Contractor shall notify the Engineer, in writing, of the source and grading of the aggregate to be used in the CLSM. If material supplier is not approved by the City for CLSM, Contractor shall make such material available to the Engineer for sampling and testing at least 45 days prior to scheduled placing of the fill. Should the Contractor change his source of supply, he shall notify the Engineer in writing of the new source and grading, and make that material available for sampling and testing at least 45 days prior to intended use.

2.4 ADMIXTURES

- A. Air entraining admixtures shall be in accordance with ASTM C 260 - Air-Entraining Admixtures for Concrete.
- B. Water reducing admixtures (Type E) shall be in accordance with ASTM C 494 - Chemical Admixtures for Concrete.
- C. Accelerating admixtures (Type C) shall be in accordance with ASTM C494.

2.5 WATER

Water shall be potable, clean, free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

PART 3 - EXECUTION

3.1 PREPARATION

Subgrade and compacted fill to receive CLSM shall be prepared according to Section 31 23 00 - Earthwork.

3.2 BATCHING, MIXING AND DELIVERY

- A. Batching, mixing, and delivery of CLSM shall conform to ASTM C 94. CLSM shall be mixed at a batch plant acceptable to the Engineer and shall be delivered in standard transit mix trucks.
- B. The Portland cement content of the CLSM shall be not less than 47 pounds per cubic yard except that, after testing samples of the Contractor's proposed supply, the Engineer may order an increase in cement content, if necessary to meet the compressive strength requirement specified above. Proportioning for CLSM shall conform to the requirements for proportioning concrete mixes except that dividing of

aggregate into sizes will not be required.

- C. CLSM shall contain a non-calcium chemical accelerating admixture of at least 2% to decrease curing time. The actual mix proportions shall be submitted by the supplier of the CLSM, indicating the minimum and maximum compressive strengths and is subject to review and approval by the Engineer. The Contractor shall submit the CLSM mix to the Engineer.

3.3 PLACEMENT

- A. CLSM shall be placed by tailgate discharge, conveyor belts, pumped, or other means acceptable to the Engineer. CLSM shall be directed in place by vibrator, shovel, or rod to fill all crevices and pockets. Avoid over-consolidation which causes separation of aggregate sizes.
- B. CLSM shall be continuously placed against fresh material unless otherwise approved by the Engineer. When new material is placed against existing CLSM, the placement area shall be free from all loose and foreign material. The surface of the existing material shall be soaked a minimum of one hour before placement of fresh material but no standing water shall be allowed when placement begins.
- C. Temperature of the CLSM shall be between 50 and 90 degrees F, when placed. CLSM shall not be placed when the air temperature is below 40 degrees F. No CLSM shall be placed against frozen subgrade or other materials having temperature less than 32 degrees F.

3.4 FINISHING

The finish surface shall be smooth and to the grade indicated or directed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, and honeycombing. Finishing by wood float, steel trowel, or similar methods is not required.

3.5 CURING

CLSM shall be allowed to cure for at least 72 hours prior to placing asphalt concrete pavement of other surface material over it.

3.6 PROTECTION

- A. CLSM shall be protected from freezing for 72 hours after placement.
- B. If the placement of the CLSM is not completed early enough to allow for placement of temporary paving, the Contractor shall provide no-skid steel plates to the span of the trench to accommodate traffic until the temporary pavement can be placed.
- C. No fill or loading shall be placed on CLSM until probe penetration resistance, as measured in accordance with ASTM C 803 - Standard Test Method for Penetration Resistance of Hardened Concrete, exceeds 650 psi.

- D. CLSM shall be protected from running water, rain, and other damage until the material has been accepted and final fill completed.

****END OF SECTION****

SECTION 31 41 00 EXCAVATION SUPPORT SHORING AND BRACING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes design and construction parameters for the Contractor-designed temporary shoring as necessary for trenches or manhole structures.
- B. Shoring refers to providing all components of the excavation support system, including, but not limited to, bracing, steel soldier piles or sheet piles, struts, wales, or any other support including internal bracing, where applicable. Use other methods of support only when approved by the Engineer. Shoring shall be designed, provided, maintained, and where applicable, removed by the Contractor, in accordance with this Section and the Contract Documents.
- C. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the contract involves the excavation of any trench or trenches five (5) feet or more in depth, including temporary construction pits and manhole excavations, the Contractor shall submit to the Engineer a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plans vary from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety, in Title 8, Subchapter 4, Article 6, California Code of Regulations, the plans shall be prepared and signed by a registered civil or structural engineer employed by the Contractor.
- D. Shoring system plans for trenches or manhole structures in excess of five (5) feet or more in depth shall be prepared and signed by a civil or structural engineer, registered in California and employed by the Contractor. All costs therefore shall be included in the bid price named in the contract for completion of the work as set forth in the contract documents. Contractor/civil engineer shall review the Geotechnical report and provide the proper shoring as recommended by the Geotechnical report. Providing a shoring system less effective than recommended shall be the responsibility of the contractor (means and methods) and no additional compensation shall be allowed if the contractor's shoring system is unable to accommodate differing soil conditions.
- E. Nothing in this Section shall be deemed to allow the use of a shoring, sloping or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the City, Design Consultant, or any of their officers, agents, representatives, or employees.
- F. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.
- G. The sheeting, shoring, and bracing system shall be designed and constructed to meet all of the following minimum performance requirements:
 - 1. Protect personnel that enter excavations.
 - 2. Assure worker safety and optimal conditions for pipe installation.
 - 3. Protect adjacent existing utilities, pipelines, pavements, and structures.

4. Installation of support system shall not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures.
 5. Prevent lateral movement of excavation walls and associated loss of adjacent ground support and adjacent ground lateral shifting/settlement.
 6. Prevent heaving of the excavation bottom.
 7. When removal is permitted, allow for the removal of support system in a manner that does not damage the pipeline, cause settlement or heave of the ground surface, nor produce construction vibrations that cause damage to adjacent utilities or structures.
- H. Related Sections:
1. SECTION 31 23 00, EARTHWORK
 2. SECTION 03 60 00, GROUT
 3. SECTION 33 31 11, GENERAL PIPING

1.02 REFERENCE

- A. City of Morgan Hill Standard Specifications and Details (latest edition).

1.03 SYSTEM DESCRIPTION

- A. Design Requirements:
1. Design and construct the shoring system in accordance with all applicable codes, and in accordance with the specific requirements described herein.
 2. At all times furnish, install, and maintain sufficient shoring and bracing in trenches and pits to ensure safety of the workmen and to protect and facilitate the work. System shall be designed and constructed in accordance with the Contract Documents. The Contractor shall:
 - a. Design each member or support element to support the maximum lateral earth pressures, hydrostatic pressures, lateral loads from traffic, construction equipment, and spoils loads that can occur during construction with appropriate safety factors.
 - b. Design the support system to prevent raveling, running, and flowing of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement or existing trench material at utility crossings. Design the support system to retain non-cohesive granular soils subject to raveling, flowing, and/or running upon vibration from construction equipment including compaction of backfill.
 - c. Prevent heave and/or piping (boiling) of the excavation bottom.
 - d. Design excavation support systems in accordance with all CAL/OSHA, and OSHA, requirements.
 - e. Take into account all surcharge loadings. Surcharge loadings can be due to such items as material or soil stockpiles, sloping ground adjacent to shoring, and adjacent building foundations. Contractor shall assure that his assumed conditions and loadings are not exceeded in the field during construction.

- f. Design shoring to withstand any construction loading.
- g. The design of shoring shall conform to accepted engineering practice in this field. The Engineer's approval of the Contractor's plans and methods of construction does not relieve the Contractor of his responsibility for the adequacy of this support.

B. Performance Criteria:

- 1. The Contractor shall be solely responsible for, and bear the sole burden of cost for, any and all damages resulting from improper shoring or failure to shore.
- 2. The safety of workmen, the protection of adjacent structures, property and utilities, and the installation of adequate supports for all excavations shall be the sole responsibility of the Contractor.
- 3. The design, planning, installation, (and removal, if required) of all shoring shall be accomplished in such a manner as to maintain stability of the required excavation and to prevent movement of soil and rock that may cause damage to adjacent shoring systems, structures and utilities, damage or delay the work, or endanger life and health.

1.04 SUBMITTALS

A. Shop Drawings:

- 1. Submit plans for shoring to the Engineer for review at least ten (10) working days prior to commencement of work. No excavations shall be started until the Engineer has reviewed the Contractor's shoring design. The shoring and bracing system plans shall be in accordance with the Contract Documents and to permit the Engineer to review the overall completeness and effectiveness of the proposed system. Review of the shoring and bracing plans by the Engineer in no way relieves the Contractor of complete responsibility for providing effective and safe shoring and bracing of the construction area and/or pipeline under construction. Shoring and bracing submittals shall demonstrate coordination with the dewatering method and submittal.
- 2. Include:
 - a. Design assumptions, analyses, calculations, and information on Contractor's proposed method of installation (and removal, if required) of all shoring. The design and calculations shall be performed by, sealed by and signed by a professional engineer registered in the State of California and experienced in the design of earth retaining structures.
 - b. The maximum design load to be carried by the various members of the support system.
 - c. Detailed excavation support drawings, showing all pertinent dimensions, spacings, and relationships among the components of the shoring, as well as construction sequence and scheduling.
 - d. The method of bracing.

- e. The full excavation depth and depth(s) below the main excavation to which the support system will be installed.
 - f. Detailed sequence of construction and bracing removal and backfilling.
 - g. Detailed drawings and descriptions of the method to be used by the Contractor to monitor shoring and adjacent ground/structure movements.
 - h. Demonstrate coordination with interior (sump pumps) and exterior (dewatering wells) dewatering methods and dewatering submittal.
 - i. Calculations demonstrating that shoring has been designed for hydrostatic pressures if external dewatering wells are not planned to fully draw down the groundwater level behind the shoring to a minimum of 3 feet below the excavation bottom.
- B. Quality Control Submittals:
Submit proof of experience and qualifications required in this Section.
- C. Permits:
Contractor shall have up to date CAL/OSHA annual/construction activity permit for Trench and Excavation construction.

1.05 QUALITY ASSURANCE

- A. Work of this Section shall be performed by an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field) for at least five (5) years, which is regularly engaged in, and which maintains a regular force of workmen skilled in design, installation and maintenance of shoring.
- B. All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the type of materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local approved testing agency not more than six (6) months prior to commencing work; unless having been continuously employed in similar welding jobs since last certification. Machines and electrodes similar to those used in the work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

1.06 PROJECT CONDITIONS

- A. Existing Ground and Groundwater Conditions:
- 1. The Geotechnical Investigation Report dated February 26, 2021 provides recommendations to the design team and those recommendations have been incorporated in these plans and specifications. The report is provided for reference, and the Contractor is responsible for familiarizing itself with the factual aspects of that report. The Contractor is reminded that actual conditions encountered may vary, and that the hierarchy of contractual documents applies as outlined in the Contract Documents.
 - 2. Geotechnical Investigation Report by Cornerstone Earth Group, dated February 26, 2021 is provided as an attachment.

- B. Existing Utilities:
Contract Drawings do not show all utilities. Contractor shall notify the Underground Service Alert (USA) and field-check locations of utilities prior to commencing work. The Contractor shall protect any overhead wires and any sewer, water, gas, electric or other pipelines or conduits uncovered during work from damage caused by the work of this contract.
1. Where utilities are anticipated or encountered unexpectedly, excavate by hand or other excavation methods acceptable to the utility owner.
 2. If existing utilities identified interfere with Contractor's proposed method of support, any required modification or relocation shall be performed at no additional cost to the City.

PART 2 - PRODUCTS

- A. To be selected by the Contractor within the guidelines described in this Section.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. In accordance with Title 8, Construction Safety Orders, Section 15041.1, "Requirements for Protective Systems, Appendix A", "Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C." A 'Competent Person' is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."
- B. Verify Surface Conditions and utility locations. Protect utilities and improvements, as called for in the Contract Documents, or required by the Utility Company(s).
- C. Verify field measurements indicated on Contract Documents.
- D. Verify layout of work before beginning installation.

3.02 EXCAVATION

- A. Protect or repair utilities damaged by operations of this Section. Protect adjacent structures and property from damage and disfiguration.
- B. Provide necessary groundwater control and drainage for trenches and manhole structures in accordance with the Contract Documents. Contractor should expect that dewatering will be required to allow placement of shoring in soil under "dry" conditions and to prevent flowing, raveling, or running of soil, prior to shoring placement.
- C. The methods of constructing the temporary shoring are at the option of the Contractor and subject to review by the Engineer. Excavations shall be made to the lines, grade, and dimensions shown on the Contractor's Shop Drawings. If the excavation is found to be deviating from the true lines and grade, the Contractor shall immediately make the necessary changes in operation to bring the operation back to the correct position. Any excess deviation beyond that specified herein shall be remedied by the Contractor at their own expense.

- D. All materials encountered shall be regarded as unclassified and shall be excavated, regardless of the nature thereof, and all excavated material must be removed and disposed of as described in the Contract Documents.
- E. Complete excavation in such manner as to provide adequate support at all times to adjacent conduits, structures, or roads and so as to offer no hazard to train, truck or automobile operations. Bracing and shoring shall be substantial and safe, and all work shall be done in full conformity and subject to the inspection of all affected parties. If and when required and to the degree necessary, the Contractor shall provide additional support as may be necessary at no additional cost.
- F. Take every precaution to prevent the entry of water, mud and foreign matter into the excavation at all times. It is the intention of these Specifications that all construction work described herein shall be carried out under dry conditions. The Contractor shall promptly and continuously control water inflow and dispose of all water from any source that may accumulate in the excavation. This shall include all necessary pumping, bailing, draining and sedimentation prior to discharge.
- G. Any and all excess excavation or over-excavation performed by the Contractor for any purpose or reason, except as may be ordered in writing by the City, shall be at the expense of the Contractor. Any damage done to the work by the Contractor's operations shall be repaired by and at the expense of the Contractor and in a manner approved by the Engineer.
- H. Excavate only as much as can safely stand unsupported prior to installing shoring, but in no case more than 4 feet shall be left unsupported at any time. Install lagging immediately after excavation.

****END OF SECTION****

SECTION 31 73 13

CONTACT GROUTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies minimum requirements for contact grouting of the annular space of casing pipe installed by trenchless methods.

Related Sections:

1. Section 01 10 01, Project Records and Submittals
1. Section 33 05 21, Steel Casing Pipe
2. Section 33 05 07.23, Horizontal Auger Boring

Definitions: See Section 33 05 07.23.

Design Criteria:

1. Place contact grout in the annular space between the outside of the casing and excavated ground and where voids are anticipated or created.
2. Grout mix (water-cement) ratios shall be expressed in cubic feet of water per cubic foot of cement (94-pound bag). The water-cement ratio by volume shall be varied as needed to fill the voids outside the casing. The range of water-cement ratios shall be between 1:1 and 2:1 by volume.
3. Grout shall consist of Portland cement, not more than 2 percent bentonite by weight of cement, fluidizer as necessary, and water in the proportions specified herein or acceptable to the DESIGNER. Sand is an allowed additive to the grout mix in instances of very high grout takes, more than 1 cubic yard, or as accepted by the DESIGNER. The grout mix shall be limited to 1-part Portland cement to 5-parts sand by volume. In no case shall the grout mix contain less than six sacks of cement per cubic yard of grout. The addition of water or fluidizer is permitted when sand is added to the grout mix.

Performance Requirements:

1. Provide grout with a minimum unconfined compressive strength (UCS) of 100 pounds per square inch (psi) in 24 hours, 500 psi in 7 days, and 1,000 psi in 28 days.

1.2 SUBMITTALS

A. General:

1. Submittals shall be made in accordance with Section 01 10 01 and as specified herein.
2. Submittals shall be coordinated with all relevant submittals, assembled and submitted as a single, comprehensive submittal.
3. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.
4. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.

B. Product Data:

1. Details of grout mix proportions, admixtures, including manufacturer's literature, and laboratory test data verifying the strength and set time of the proposed grout mix.
2. Material Safety Data Sheets.
3. Results of grout strength tests for proposed mixes.

C. Shop Drawings:

1. Grout/lubrication piping diagram and shop drawing at point of injection.
2. Grout/lubrication one-way valves assemblies.

D. Working Drawings and Method Statements:

1. Calculations confirming planned injection pressures and maximum injection pressures at the location of least soil overburden height .
2. Contact grouting methods and details of equipment, grouting procedures and sequences, monitoring and recording equipment, methods of measuring and controlling grout pressure, methods of measuring placed volume, and provisions to protect pipe lining or shaft supports.
3. Schedule for all grouting operations and associated works by reach. Schedule shall be coordinated with overall schedule for the Contract.
4. Procedure for disposing of unused grout and flushing lines.

5. Sample Daily Grouting Log.

E. Quality Control

1. Workforce Qualifications: Submit verification that the workforce is qualified via the procurement of licenses, certifications, and other documentation, to complete the work of this Section and that the work will be effectively supervised by chain of authority from manager to foreman.
 - a. CONTRACTOR's Engineer: Engineer shall be a professional engineer licensed by the State of California. Experience of the engineer shall include five (5) projects within the last five (5) years performing similar grout pressure or hydrofracture calculations.
2. Certifications:
 - a. Certificate, dated with six months of use, from an independent laboratory that the calibration gauge is accurate to 1 psi.
3. Recordkeeping:
 - a. Daily Grouting Logs one work day after injection. Logs shall include:
 - i. Start and finish times.
 - ii. Name of logger.
 - iii. Diameter of port.
 - iv. Station of hole and clock position.
 - v. Groundwater inflow rate for each hole, if any.
 - vi. Groundwater backpressure for each hole, if any.
 - vii. Mix type and injection time for each hole.
 - viii. Identify holes which are "communicating" or "venting" for a specific grout connection.
 - ix. Amount of cement injected (bags or lbs.).
 - x. Gauge pressure.
 - xii. Reason to stop injection in each grout hole.
 - b. Cumulative test reports for each break within one work day after break.

4. Notifications: Notify the DESIGNER at least one work day in advance of starting contact grouting operations.

1.3 QUALITY ASSURANCE

A. Comply with the following industry standards effective at time of bid:

1. ASTM C31 - Standard Practice for Making and curing Concrete Test Specimens in the Field
2. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch Cube Specimens)
4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar
5. ASTM C150 - Standard Specification for Portland Cement
6. ASTM C937 - Standard Specification for Grout Fluidifier for Preplaced-Aggregate Concrete
7. NSF/ANSI Standard 060 - Drinking Water Treatment Chemicals – Health Effects

1.4 JOB CONDITIONS

A. See Section 23 05 23.16.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cement: Cement shall be Type II or Type V Portland cement conforming to ASTM C150. Type II cement shall meet Table 4 false set requirements of ASTM C150.
- B. Bentonite: Bentonite shall be a commercially processed powdered bentonite, Wyoming type; NSF/ANSI Standard 060 compliant.
- C. Water: Potable.
- D. Sand: Conform to ASTM C144 except:
1. Fineness modulus: Between 1.50 and 2.00 and

Grading Requirements:

Sieve Sizes	Percentage passing by Weight
No. 8	100
No. 16	95-100

Sieve Sizes	Percentage passing by Weight
No. 30	60-85
No. 50	20-50
No. 100	10-30
No. 200	0-5

- E. Fluidizer: Fluidizers, or fluidifiers, shall hold the solid constituents of the grout in colloidal suspension, be compatible with the cement and water used in the grouting work, and comply with the requirements of ASTM C937.
- F. Admixtures: Shall be accepted by the DESIGNER. If commercially available and acceptable to the product manufacturer all polymers, and additives, other than soda ash, shall be NSF/ANSI Standard 060 compliant.

2.2 EQUIPMENT

- A. Equipment for mixing and injecting grout shall be adequate to satisfactorily mix and agitate the grout and pump it into the annular space at a constant pressure.
- B. Provide a pressure gauge at the grout pump and a pressure gauge at the grout port. Periodically check the accuracy of the gauge with an accurately calibrated pressure gauge. Provide a minimum of two spare pressure gauges available on site at all times.
- C. Provide a flow meter to determine the volume of grout injected. Calibrate the meter in cubic feet to the nearest one-tenth of a cubic foot.
- D. Provide grouting hoses with an inside diameter of not less than 1 ½ inches or not more than 2 inches and capable of withstanding twice the maximum water and grout pressures to be used.
- E. Provide injection system with a grout recirculation hose.
- F. Provide one-way grout injection or lubrication valves.
- G. Maintain the grouting equipment in satisfactory operating condition throughout the course of the work to ensure continuous and efficient performance during grouting operations.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform all work in accordance with accepted submittals.
- B. Control the grout pressure so as to avoid damaging the jacking pipe, and to avoid movement of the surrounding ground or structures.

- C. Perform all grouting operations in the presence of the DESIGNER and provide the OWNER with access to the grouting operations.
- D. Maintain a copy of the Contract Documents at a location acceptable to the DESIGNER and accessible to the grout operator and CONTRACTOR'S Engineer.
- E. The CONTRACTOR shall take care to prevent the spill or escape of grout to the ground surface, into any water body, or into another underground facility. The CONTRACTOR shall closely monitor grouting operations to detect any spills or escape of grout to the surface, into any water body, or into another underground facility. Any such spill shall be immediately contained and cleaned-up.
- F. During grouting work, provide for adequate disposal of all waste and wastewater. Remove and properly dispose of all waste grout resulting from grouting operations. The contents of grout lines shall only be discharged into an appropriate container located on the surface.

3.2 MIXING AND INJECTION OF GROUT

- A. Provide materials free of lumps when added to the mixer.
- B. Agitate the grout mix continuously.
- C. Grout shall flow unimpeded and shall completely fill all of the annular space and voids.
- D. Make a hookup to every grout port.
- E. Dispose of unused grout and flushed grout in accordance with established procedures.
- F. Re-circulate grout mixes when any new previously approved mix is batched or after adding water, fluidizer, or sand to the mix. Re-circulate the mix for at least 2 minutes prior to pumping grout into the grout ports.
- G. Progress with grouting sequentially in a constant up-gradient direction.
- H. Immediately upon completion of the casing installation, attempt to perform contact grouting through the ports. Attempt to force cement grout in to the space outside the casing to fill voids to refusal at the maximum allowable pressure as determined by the Contractor's Engineer, but not to exceed 10-psi.
- I. Grouting in any single port shall be considered completed when less than 1.0 cubic foot of grout, of the accepted mix and consistency, is pumped in 5 minutes under the submitted maximum injection pressure or the grout flows through the next grout port, or shaft at the same rate as the rate of pumping.
- J. Dispose of grout not injected after 90 minutes of mixing.

3.3 FIELD QUALITY CONTROL

A. Testing:

1. Take grout for the cylinders or cubes from the nozzle of the grout injection line. Provide at least one set of four (4) samples for each 100 cubic feet of grout injected, but not less than one set for each batch in accordance with ASTM C31.
2. Prepare and test grout samples for 24-hour, 7-day, and 28-day compressive strength tests according to ASTM C39 for cylinders or ASTM C109 for cubes.

3.4 CLEANUP

- A. Place and weld each grout port plug to prevent any water seepage.
- B. Grind any material from inside casing that may impede on carrier pipe insertion.
- C. Clean grout and any deleterious material from inside the casing.
- D. Remove and properly dispose of all waste materials.

****END OF SECTION****

SECTION 31 75 00

SHAFT CONSTRUCTION

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies the requirements for excavating, sheeting, and shoring required to construct jacking and receiving shafts for horizontal auger boring.
- B. Assume sole responsibility for designing and sizing the shaft excavations to accommodate the construction method, all permanent structures, and conform to right-of-way limitations.
- C. Relocate, support, or bypass all utilities required in the performance of the Work.
- D. Related Sections:
 - 1. Section 01 10 01, Project Records and Submittals
 - 2. Section 01 71 13, Mobilization
 - 3. Section 01 57 00, Temporary Controls
 - 4. Section 31 23 00, Earthwork
 - 5. Section 33 05 07.23, Horizontal Auger Boring
 - 6. Section 33 05 07.24, Steel Casing
- E. Definitions
 - 1. Cave-in. The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.
 - 2. Bracing: Horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against wales.
 - 3. Sheeting: The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.
 - 4. Shield: A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure.

5. Shoring: A structure such as metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.
6. Support system: A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.
7. Wales: Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

F. Design Criteria:

1. Design shafts to conform to right-of-way limitations as shown on the Contract Drawings.
2. Design temporary shoring system to provide a minimum factor of safety of 2.0 against sliding and 1.5 against bottom heave. Design shaft sides and bottom sufficient to support CONTRACTOR's construction equipment and means and methods.
3. Coordinate the shaft design and construction with the requirements of Sections 33 05 07.23, 33 05 07.24, 33 05 07.40, the selected means and methods for performing the Work, and permanent structures and utilities shown on the Contract Drawings. These include but are not limited to: designing and constructing jacking shafts for the maximum allowable jacking forces; traffic loading; and Cooper E-80 railway loading, per AREMA, for any portions of the shaft wall below a projected 1:1 influence line from the edge of rail.
4. Design excavation support systems compatible with the subsurface ground conditions as provided in Section 33 05 07.23-1.4 – Job Conditions.
5. Upon completion of shaft excavation and removal of the water contained within the shaft, install sump pump(s) to remove all incidental, construction, and storm water.
6. All costs for shaft construction therefore shall be included in the bid price named for the associated bid schedule items as set forth in the contract documents. Contractor/civil engineer shall review the Geotechnical report and provide the proper shaft shoring as recommended by the Geotechnical report. Providing a shoring system less than recommended shall be the responsibility of the contractor (means and methods) and no additional compensation shall be allowed if the contractor's shoring system is not flexible enough to accommodate differing soil conditions.

G. Performance Requirements

1. Construct shafts using shoring support systems which apply positive ground support along the shaft walls to limit lateral movement to less than 0.5 inches and prevent the loss of ground. The shoring systems shall be used along all portions of the shaft perimeter walls. Shield systems will not be permitted for shaft construction.

1.2 SUBMITTALS

A. General:

1. Submittals shall be made in accordance with Section 01 10 01 and as specified herein.
2. Shaft submittals shall be coordinated with all relevant submittals and those identified in this Section, assembled and submitted as a single, comprehensive submittal.
3. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.
4. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.

B. Product Data:

1. Material Safety Data Sheets.
2. Product data for all shoring and bracing.
3. Manufacturer's mixing and handling requirements, personal safety equipment, first aid measures, and methods for proper storage and disposal of waste materials, including containers.

C. Shop Drawings:

1. Shop signed and stamped by CONTRACTOR's Engineer, shall include:
 - a. Drawings for all shoring and bracing.
 - b. Existing Site Plan: for each shaft location indicating utilities, structures, and vegetation that are to be protected in place.
 - c. Site Plan: for each shaft indicating the location, excavation dimensions, site grading, and site development details for the excavation and work areas, and the proposed limits of disturbance. Include details of types, amounts, and

positioning of materials and equipment required at each location. Show overhead utilities and other overhead conflicts.

- d. Methods, procedures, and sequence for preloading and installing bracing.
- e. Foundation details for all permanent structures.
- f. Sequence for removing shoring in conjunction with backfill placement.

D. Working Drawings and Method Statements:

- 1. Detailed work plan and calculations for all shoring, bracing, sloping of sides of excavation, or other provisions for worker protection against the hazard of caving ground during shaft excavation, tunneling and other work, prepared by the CONTRACTOR's Engineer. CONTRACTOR's attention is directed to the provisions for Shoring and Bracing Drawings in the California Labor Code.
- 2. Sample daily log forms.
- 3. Work plan shall include Loads, materials and equipment to be used, the method and sequence and timing of installation, and site restoration plan.
- 4. Shaft ventilation system details including fan size and operating parameters.
- 5. Electrical system, lighting system, and onsite power generation details.
- 6. Provide design calculations used to size shoring members, determinable material specifications and joint and connection details. Include stability evaluations at each stage of excavation, backfill and shoring removal, and invert stability. Indicate calculated deflections for allowable load limits.
- 7. 7. Provide City a copy of the pre-demolition, pre-excavation survey cited in Part 3.2 A of this Section as an AutoCAD file provided in electronic format, or other format, as agreed upon with the City.

E. QUALITY CONTROL

- 1. Plans
 - a. Contingency Plan: Describe the steps and actions needed to stabilize the excavation and excavation support systems if the excavation becomes unstable or the monitoring data indicate movements exceed the allowable limits. Include a list of contingency materials and equipment to be kept available on site for installation.

- b. Field Inspection Plan: For field verification of the shaft design that at a minimum, measures and records settlement, bottom heave, groundwater elevation, and shaft member deflections daily.
- 2. Workforce Qualifications
 - a. Qualifications of CONTRACTOR's Engineer and Surveyor.
- 3. Certifications:
 - a. Products described herein including Certificates of Compliance from the manufacturer.
 - b. Personnel trained in handling, mixing, injection, and disposal of materials.
- 4. Recordkeeping:
 - a. Provide shaft field inspection data on the same date as taken and interpretation by noon the following work day.
 - b. Provide daily Installation Logs, to include the following as applicable:
 - i. Shoring element number, location, length, plumbness, and bearing material.
 - ii. Concrete, grout, and steel properties.
 - iii. Dates for excavation completed and concrete placed.
 - iv. Diameter of top and bottom of shaft.
 - v. Elevations of top of ground, top of shoring elements, and bottom of shoring elements.
 - vi. Results of all tests and observations.
- 5. Notifications: (NOT USED)
- 6. As-Built Data: (NOT USED)

1.3 QUALITY ASSURANCE

A. Comply with the following industry standards effective at time of bid:

- 1. ASTM A36 – Standard Specification for Carbon Structural Steel
- 2. ASTM A328 – Standard Specification for Steel Sheet Piling
- 3. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

4. ASTM A572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
5. ASTM A992 – Standard Specification for Structural Steel Shapes
6. ASTM C33 – Standard Specification for Concrete Aggregates
7. ASTM C150 – Standard Specification for Portland Cement
8. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
9. AWS D1.1/D1.1M - Structural Welding Code - Steel
10. NSF/ANSI Standard 060 - Drinking Water Treatment Chemicals – Health Effects
11. American Railway Engineering and Maintenance-of-Way Association (AREMA): Manual for Railway Engineering.
12. Caltrans Department of Transportation Trenching and Shoring Manual.
13. California Labor Code
14. Union Pacific Pipeline Installation Engineering Specifications
15. City of Morgan Hill Standard Specifications

B. Qualifications:

1. Engineer: Excavation support systems shall be designed by a Civil or Structural engineer registered in the State of California who has a minimum of five (5) years of experience in shaft designs including shafts of similar size and in similar ground conditions as measured by ground type, N values, and depth of groundwater.
2. Surveyor: Surveying shall be performed by a California licensed surveyor who has surveyed a minimum of five (5) shafts in the last five (5) years.
3. Firm's experience in constructing jacking and receiving shafts. The installations must have been performed in the last five (5) years in similar ground conditions as measured by soil type, N value and hydrostatic head, as anticipated on this project,

1.4 SITE CONDITIONS

- A. See section 33 05 07.23.
- B. Not Used.

1.5 SAFETY

- A. See City of Morgan Hill Standard Specifications.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide all shoring materials in accordance with accepted submittals.
- B. Structural Steel:
 - 1. HP shapes: ASTM A 572, Gr. 50.
 - 2. Channels, angles and plates: ASTM A 36
 - 3. Wide flange: ASTM A 992.
 - 4. Hollow steel section: ASTM A 500.
 - 5. Sheet piles: ASTM A 328.
- C. Corrugated Metal Pipe (CMP): Zinc Coated.
- D. Concrete materials:
 - 1. Portland Cement: ASTM C 150, Type I or II.
 - 2. Fly Ash/Slag
 - a. Fly Ash Admixture: ASTM C 618, Class C or F
 - b. Ground Granulated Blast Furnace Slag: ASTM C 33, uniformly graded, $\frac{3}{4}$ in maximum aggregate size.
 - 3. Normal Weight Aggregate: ASTM C 33, uniformly graded, $\frac{3}{4}$ in maximum aggregate size.
 - 4. Water: Potable.
 - 5. Bentonite: High yield sodium bentonite; NSF/ANSI Standard 060 compliant.
 - 6. Admixtures: Shall be accepted by DESIGNER. If commercially available and acceptable to the product manufacturer all polymers, and additives, other than soda ash, shall be NSF/ANSI Standard 060 compliant.
- E. Timber:
 - 1. Unless otherwise noted, timber used for lagging or any other structural use shall be Douglas Fir No. 1 grade or better and of rectangular cross section.

- F. Welding: AWS D1.1/D1.1M.

PART 3 EXECUTION

3.1 GENERAL

- A. Perform all work in accordance with accepted submittals.
- B. Provide DESIGNER and OWNER with access to the shaft.
- C. Maintain a copy of the Contract Documents at a location acceptable to DESIGNER and accessible to the shaft construction CONTRACTOR and DESIGNER.
- D. Prior to beginning any shaft excavation five (5) feet deep or more, CONTRACTOR shall provide all submittals required in this Section to DESIGNER and shall be in receipt of written acceptance by the DESIGNER.
- E. Treat and dispose of all water in accordance with the requirements specified in Section 31 23 00 Earthwork.

3.2 INSTALLATION

- A. Prior to beginning demolition or excavation, perform a survey in accordance with City Standard Specifications that identifies and locates facilities within 50 feet of the shaft excavation.
- B. Shaft Size and Location
 - 1. Shaft locations are as shown on the Contract Drawings.
 - 2. Proposed shafts at locations other than where shown on the Contract Drawings shall comply with the following conditions:
 - a. Alternate, rescue, or additional shaft locations shall be defined as alternate shaft locations proposed by CONTRACTOR.
 - b. Alternate shaft locations shall not be located in cross streets, within UPRR ROW, or block a sole entrance or exit to a property.
 - c. All alternate shaft locations shall be acceptable to DESIGNER.
 - 3. Obtain and provide all approvals and permits for alternate shaft locations to DESIGNER.
 - 4. Surveyor shall stake locations of the shaft elements and guide frames as required and in accordance with Standard Specifications.
- C. Excavation

1. Locate all utilities in accordance with Section 31 41 00 and Section 01 71 13 before commencing excavation.
2. All earthwork shall be in accordance with Section 31 23 00.
3. Fill and compact with class II aggregate base backfill in accordance with Section 31 23 00.

D. Shaft Construction: General

1. Protect existing structures, utilities, vegetation, and facilities before commencing shaft excavation.
2. Construct instrumentation as specified in Section 33 05 07.23 before shaft excavation.
3. If settlement or deflections of supports or shaft bottom indicate the support system requires modification, CONTRACTOR's Engineer shall redesign and resubmit revised shop drawings and design calculations.
4. Construct jacking shafts with shoring flush with the existing ground surface or extending not more than 4 feet above the existing ground surface.

E. Shaft Construction: Internal Bracing Support System

1. Construct the internal bracing support system using walers, struts, and/or shores as required by the design accepted in CONTRACTOR's submittals.
2. Construct and maintain all bracing support members in intimate contact with other support members and with the ground.
3. Preload bracing members by jacking struts to 50 percent of the design load if necessary to control shoring movement.
4. Preload bracing members in accordance with methods, procedures, and sequence as described on the shop drawings.
5. Use procedures that produce uniform loading of bracing members without eccentricities or over-stressing and distortion of members or system.

F. Methods: Section of an appropriate shaft shoring and construction method(s) shall be the responsibility of CONTRACTOR. The selected method(s) shall meet the design and performance requirements specified herein. Potential methods are provided in the Geotechnical Report.

3.3 FIELD QUALITY CONTROL

A. Provide quality control, testing, and inspection as required in these Contract Documents and the accepted submittals.

3.4 REMOVAL OF SUPPORT SYSTEM/SITE RESTORATION

- A. After all equipment and excavated materials for the horizontal auger boring have been removed from the jacking shaft, CONTRACTOR shall prepare the bottom of the shaft in the same manner as a pipe foundation, CONTRACTOR shall remove all loose and disturbed materials below pipe grade to undisturbed ground and re-compact the material in accordance with Section 31 23 00.
- B. Remove excavation support to a minimum of 4 feet below grade during shaft backfill operations. Perform removal in a manner that avoids ground settlement and damage to adjacent facilities.
- C. Site restoration shall be completed at all shaft locations restoring site to its original pre-construction condition in its entirety per Section 02 41 00, Section 32 12 16 and City Standard Detail for trench restoration.

****END OF SECTION****

SECTION 32 12 16

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section addresses the installation of asphalt concrete for roadways in which pipeline construction is performed, as required in these Contract Documents. Other roadway or pavement areas requiring asphalt concrete as indicated on the Contract Drawings or to be determined later, shall also be governed by these specifications.
- B. Related Sections:
SECTION 31 23 00, EARTHWORK

1.02 REFERENCES

- A. City of Morgan Hill:
Standard Specifications and Details (latest edition).
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop.
 - 3. ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 - 4. ASTM D2172 - Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.
- C. State of California, Department of Transportation (Caltrans):
 - 1. California Test Method 304 – Method of Preparation of HMA for Test Specimens
 - 2. California Test Method 339A – Determination of Distributor Spread Rate.

1.03 SUBMITTALS

- A. Submit the following in accordance with the Contract Documents.
 - 1. Job-mix formula for each type of asphaltic concrete fourteen (14) days before asphalt concrete placement. Ensure formula is within the specified design range.

2. Copies of weighmaster's certificates or certified delivery tickets for each truck load of material.

B. Certificates:

1. Aggregates for base course and asphalt concrete.
2. Asphalt cement.
3. Liquid asphalt.
4. Asphaltic emulsion.
5. Paint.

1.04 QUALITY ASSURANCE

Materials and workmanship specified herein with the referenced State Standard Specifications shall be in accordance with the referenced articles, sections and paragraphs of the Standard, except that contractual and payment provisions do not apply.

1.05 TESTING

Testing will be conducted by the Contractor to determine compliance with the specified degree of compaction and moisture content.

1.06 ENVIRONMENTAL CONDITIONS

Install hot mix asphaltic concrete in accordance with City of Morgan Hill Standard Details and Standard Specifications.

1.07 EQUIPMENT

Mixing Plant and Construction Equipment shall comply with Section 39 of State Standard Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Aggregates:

1. Base Course: In accordance with Section 26 of State Standard Specifications, **Class 2, 3/4-inch maximum size gradation.**
2. Asphalt Concrete: In accordance with Section 39 of the State Standard Specifications, **Type A, 3/4-inch maximum, coarse gradation.**
3. Asphalt Concrete Surface Course: In accordance with Section 39 of the State Standard Specifications, **Type A, 1/2-inch maximum, coarse gradation.**

B. Asphalt Materials:

1. Asphalt Cement: In accordance with Section 92 of State Standard Specifications, PG 64-10.
2. Asphaltic Emulsion: In accordance with Section 94 of State Standard Specifications, Grade SS-1h.
3. Asphalt Concrete Surface Course: Asphalt concrete shall be hot mix and conform to Section 39-2.02 of State Standard Specifications. Asphalt Binder shall be viscosity graded asphalt in accordance with Section 92 of the State Standard Specifications.

All streets:

- a. Aggregate: **Type A, 1/2-inch maximum, coarse gradation** (Final Lift), **Type A, 3/4-inch Maximum**, (Base Lift)
- b. Asphalt Binder: PG 64-10.
- c. Asphalt binder mixed with aggregate shall be such that the air void content of the resulting asphalt concrete shall be not less than 3 percent or more than 5 percent.
- d. Stabilometer value as determined by California Test Method No. 366 shall be 38 minimum.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Subgrade:
 1. Requirements for subgrade are specified in Section 31 23 00, Earthwork.
 2. Prior to construction of base course, clean previously constructed subgrade or subbase of foreign substances.
- B. Asphalt Concrete Preparation:
 1. Uniformly mix mineral aggregate with bituminous material in a central plant in accordance with Section 39 of State Standard Specifications.
 2. The percentage of asphalt cement binder shall be between five and seven percent.

3.02 INSTALLATION

- A. The Contractor shall place final asphalt concrete following completion of the Work at each project site in accordance with City Standard Detail "Trench Restoration" and approval from the City.
- B. Base and Subbase Course Installation:
 1. Place aggregate base in accordance with requirements of Sections 25 and 26 of State Standard Specifications.

2. Grade and compact in 3-inch layers to at least ninety-five percent (95%) of maximum density, ASTM D 1557 Method D.
 3. Maintain base course in proper condition until asphaltic concrete is in place, including drainage, rolling, shaping, and watering.
 4. Maintain sufficient moisture at the surface to prevent a dusty condition by light sprinkling with water.
 5. Recondition, reshape, and recompact areas of completed base course damaged by freezing in accordance with the specified requirements.
- C. Prime Coat:
1. Prior to application of asphaltic concrete, apply a prime coat.
 2. Apply by pressure distributors.
 3. Allow sufficient time before placing asphalt concrete to permit prime coat to penetrate base.
Asphalt Emulsion Application: Apply emulsion at a rate of 0.10 gallon per square yard.
- D. Tack Coat - Apply asphaltic emulsion to the existing pavement surfaces in accordance with Section 39 of State Standard Specifications.
- E. Asphalt Concrete Installation:
1. Placing - Deliver bituminous mixtures to the roadbed at temperatures specified in Section 39 of State Standard Specifications. Spread in accordance with Section 39 of State Standard Specifications.
 2. Compaction - Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be in accordance with Section 39 of State Standard Specifications. Compaction by vehicular traffic shall not be permitted.
 3. Joining Pavement - Carefully make joints between old and new pavements and of successive days' work in such manner as to ensure a continuous bond between old and new sections of the course. Expose and clean edges of existing pavement. Cut edge to straight, vertical surfaces. Paint joints with a uniform coat of tack coat before the fresh mixture is placed. Prepare joints in the new pavement in accordance with Section 39-6 of State Standard Specifications.

3.03 FIELD QUALITY CONTROL

- A. All field quality control tests shall be performed by the Contractor. Testing frequency may differ from condition listed below. Where finished work does not meet specified requirements and follow up testing is required, Contractor will be responsible for all follow up testing costs for that item.
- B. Base Course Finish Surface:
1. Surface tolerance shall conform to Section 26 of State Standard Specifications.

2. When base course is constructed in more than one layer, specified smoothness requirements apply only to top surface.
- C. Pavement Smoothness:
 1. Test wearing course in accordance with Section 39 of State Standard Specifications.
 2. Make one test for each 300 square yards of pavement.
- D. Pavement Thickness:
 1. Pavement thickness shall be as shown on the Contract Documents.
 2. One test for each 300 square yards of completed pavement will be taken.
 3. Contractor shall replace pavement where samples are removed.
- E. Gradation:
 1. Base Course Gradation
 - a. Base course gradation tests will be completed in accordance with ASTM C 136.
 - b. One test for each 100 tons of material will be taken.
 2. Asphalt Concrete Gradation:
 - a. Asphalt concrete gradation tests will be completed in accordance with ASTM C136.
 - b. One test for each 50 tons of material will be taken.
- F. Base Course Density:
 1. ASTM D 1557, Method D. In place density tests will be performed in accordance with ASTM D 1556.
 2. One maximum density test for each gradation will be taken.
 3. One set of two tests each for in place density for each three hundred (300) square yards of surface area will be taken.
- G. Asphalt Content of Asphalt Concrete:
 1. Percent asphalt content by extraction will be measured in accordance with ASTM D 2172, Method A.
 2. One test for each fifty (50) tons of material will be taken.

3.04 PROTECTION OF PAVEMENT

- A. After final rolling, the Contractor shall not permit vehicular traffic on the pavement until pavement has cooled and hardened and in no case less than six (6) hours.
- B. Additional requirements are as shown in the Contract Documents.

3.05 TEMPORARY PAVEMENT

- A. Temporary asphalt concrete shall be provided on all backfilled trenches. Overnight plating of backfilled trenches is not acceptable. Only HMA may be used for asphalt paving at the conclusion of each day for backfilled trenches.
- B. Temporary pavement restoration shall be as shown on the Contract Documents.

- C. Temporary asphalt concrete section shall be as shown on the Contract Documents.
- D. Before the trenching area is opened for traffic, all excess dirt, rock and debris shall be removed and the street surface shall be swept clean.
- E. Temporary surfacing shall be maintained. At no time shall there be any mudholes.
- F. The surface shall not settle below one inch (1") or be raised more than one inch (1") from the existing pavement grade.

** End of Section **

SECTION 32 12 16.1

ASPHALT CONCRETE OVERLAY (2 INCHES)

a. Description: A 2-inch thick asphalt concrete layer shall be placed along Fifth Street between Depot Street and Monterey Road. This work shall include any wedge grinding required to conform to existing pavement surface. Wedge grinding at each end transition to prevent abrupt elevation changes within the roadway.

The surface, when compacted, shall be smooth, dense, well bonded, and of uniform texture and appearance. The compacted surface course of asphalt concrete shall be free from ruts, humps, depressions or irregularities. When a straightedge 3.6 meters (12 feet) long is laid on the finished surface and parallel with the centerline of the road or driveway, the surface shall not vary more than .006 meters (0.02 foot) from the lower edge of the straightedge. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.02 foot are present when tested with a straight-edge 12 feet long laid in a direction transverse to the center line and extending from edge to edge of a 3.05 meter (10 foot) pass.

Any ridges, indentations or other objectionable marks left in the surface of the asphalt concrete shall be eliminated by rolling or other means. The use of any equipment that leaves ridges, indentations or other objectionable marks in the asphalt concrete shall be discontinued. Asphalt concrete pavement shall include the application of a paint binder.

In addition to the requirements in Section 39-5.01, "Spreading Equipment," of the CSS, asphalt-paving equipment shall be equipped with automatic screed controls and a sensing device or devices. When placing asphalt concrete the automatic controls shall control the longitudinal grade and transverse slope of the screed. Grade and slope references shall be furnished, installed and maintained by the Contractor. Ski devices shall be a minimum length of at least 30 feet with a rigid one-piece unit whereby the entire length activates the sensor.

When placing contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance.

Should the method and equipment furnished by the Contractor fail to produce a layer of asphalt concrete conforming to the above requirements, including straightedge tolerance of Section 39-6.03, the paving operations shall be discontinued upon notice of the Engineer, and the Contractor shall modify his equipment or furnish substitute equipment within three (3) working days of such notice of the Engineer.

The area to which paint binder has been applied shall be closed to public traffic. All possible care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction. A drop-off of more than 0.10-foot will not be allowed at any time between adjacent lanes open to public traffic.

The Contractor shall be responsible for temporary pavement delineation and markings as required by the Engineer for the maintenance of a safe traveled way. The Contractor shall be responsible for providing a safe and well-marked roadway. This shall include providing temporary striping during evening and weekend hours if specified by the Engineer.

b. Materials: The asphalt concrete for overlay shall be Type A, 12.5 mm (½") medium maximum gradation, in accordance with CSS. Asphalt binder shall be PG 64-10. **No percentage of RAP (Reclaimed Asphalt Pavement) shall be permitted in the asphalt concrete placed as the final lift/wearing course on the project.**

c. Paint Binder (Tack Coat): Paint binder shall be applied to all horizontal and vertical surfaces to receive asphalt concrete surfacing. Paint binder shall be furnished and applied in accordance with Sections 39-4.01 "Subgrade", and Section 93 "Liquid Asphalts", and Section 94 "Asphaltic Emulsions".

SECTION 32 12 16.2

FULL DEPTH ASPHALT PAVEMENT REPAIR

a. Description: Areas designated by the Engineer, and/or shown on the plans, shall be dug out to a depth of 150 mm (6 inches) at all locations, (milling is recommended and preferred) removed and replaced with full-depth AC, unless otherwise directed on the contract plans. The AC shall be placed in two or three lifts with the uppermost lift of not less than 0.15 ft. or more than 0.20 ft. The minimum width of any repair shall be as field marked. **Surface lift (2") shall be 12.5 mm (1/2") medium, no RAP, per City standards.**

The Contractor shall make all arrangements for disposal of excavated materials. All edges shall be saw-cut unless otherwise approved by the Engineer. Asphalt concrete in repair sections shall be placed in lifts in accordance with Section 39-6 "Spreading and Compacting", and shall be Type A, 3/4" maximum, medium gradation per Section 39-2, "Materials" of the CSS. Removed materials shall be disposed of legally.

The material remaining in place, after removing surfacing and base, to the required depth, shall be graded to a plane, watered and compacted to 95 percent relative compaction. After compaction and prior to the placing of asphalt concrete, the vertical edges of the existing pavement shall receive a tack coat. The finished surface of the remaining material shall not extend above the grade established by the Engineer.

b. Unsuitable Material: In the event that the underlying subbase material is unsuitable, it shall be excavated below the depth required above and disposed of. The limits of removal shall be designated by the Engineer and shall be in one-inch increments. Compensation shall be at a per inch price based on the bid for a 6-inch deep pavement repair divided by 6 for each additional inch of depth. The resulting space shall be filled with a single lift of asphalt concrete.

Unsuitable material is defined as material the Engineer determines to be:

- A. Of such unstable nature as to be incapable of being compacted to specified density using ordinary methods at optimum moisture content; or
- B. Too wet to be properly compacted and circumstances prevent suitable in-place drying prior to incorporation into the work; or
- C. Otherwise unsuitable for the planned use.

****END OF SECTION****

SECTION 32 17 23

TRAFFIC STRIPES AND PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to apply traffic stripes and pavement markings at all locations where existing striping is disturbed or removed or where designated by the Engineer, and as specified in these Specifications.
- B. All existing traffic stripes and pavement markings shall be replaced in kind. Equipment, mixing, surface preparation, application, and tolerances for painting traffic stripes and pavement markings shall conform to Section 84 of the State of California, Department of Transportation Standard Specifications, except as amended by these Technical Specifications. Temporary layout marks and "cat tracking" (premarking) shall be placed by the Contractor for all striping (including limit lines and stop bars).
- C. Pavement markers shall be placed as they existed prior to trenching or application of the asphalt concrete overlay. All traffic stripes, pavement markings (legends) and pavement markers covered by any asphalt concrete overlay shall be replaced by the Contractor.
- D. Protection from Damage: All pavement markers in place (outside the limits of the work) at the time of the asphalt overlay shall be protected from damage and shall be clean and undamaged after completion of asphalt concrete overlay. Any damaged pavement markers shall be replaced in accordance with Section 81-3 of the State Standard Specifications at the Contractor's expense.

1.02 REFERENCE

Related Sections: SECTION 01 55 26, TRAFFIC CONTROL

1.03 SUBMITTALS

- A. Specifications of primer to be used for application.
- B. Manufacturer's recommendation for type of epoxy to be used when installing markers.
- C. Samples of each thermoplastic pavement marking.
- D. Request for City Engineer field review and approval of Contractor applied "cat-tracking" of pavement traffic striping and markings.

PART 2 – PRODUCTS

2.01 TRAFFIC STRIPES, PAVEMENT MARKINGS (LEGENDS), AND PAVEMENT MARKERS

- A. Pavement markers shall conform to the provisions in Section 81-3, Pavement Markers, of the State Standard Specifications and these Technical Specifications.
- B. All traffic stripes and markings (legends) shall be thermoplastic. Specifications are as follows:

DESCRIPTION	EXTRUSION MATERIAL		SPRAY MATERIAL	
	White	Yellow	White	Yellow
Glass Beads, AASHTO M247, Type 1, percent by weight	30 min.	30 min.	30 min.	30 min.
Titanium Dioxide (TiO ₂), percent by weight	10 min.		10 min.	
Lead Chromate, medium heat stabilized, percent by weight	2.5 min.		2.5 min.	
Binder, percent by weight	18 min.	18 min.	18 min.	18 min.
Specific Gravity	2.15 max.	2.15 max.	2.15 max.	2.15 max.
Daylight Luminous Reflectance	75 min.	45 min.	75 min.	45 min.
Yellowness Index	0.13 max		0.13 max.	
Bond Strength to Concrete, psi	180 min.	180 min.	150 min.	150 min.
Ring & Ball Softening Point, degrees F	210 – 240	210 – 240	200 – 240	200 – 240
Impact Resistance, inch-pounds	10 min.	10 min.	10 min.	10 min.
Flowability, percent residue, stirred	18 max.	18 max.	15 max.	15 max.
Low Temperature Stress Cracking Resistance at 30 degrees F	No Crack	No Crack	No Crack	No Crack
Indentation	4575	4575	4575	4575
Color Match	Fed. Std. No. 595a, Color No. 13538		Fed. Std. No. 595a, Color No. 13538	
Bond Strength to Concrete with Manufacturer's Primer, psi	120 min.	120 min.	120 min.	120 min.

- C. A maximum 4 percent by weight, of the total thermoplastic material mixture may be additives passing the 100-mesh sieve. Pigment, other than titanium dioxide or lead chromate, shall be calcium carbonate.

- D. Yellow thermoplastic material shall closely match Color No. 13538 of Federal Standard No. 595a, after being heated for 4 hours at 425 degrees F, and then cooled to 77 degrees F.
- E. Thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.100 inch.
- F. Glass beads to be applied to the surface of the molten thermoplastic materials shall conform to the requirements of State Specification 81-010-22L-22 (Type II), or AASHTO Designation: M247 (Type 1). Copies of State Specification 8010-22L-22 are available at the Transportation Laboratory located in Sacramento, California.

PART 3 – EXECUTION

3.01 CONSTRUCTION EQUIPMENT

- A. Use equipment manufactured for pavement marking. Use workers experienced in operating such equipment.
- B. Locate bead applicator directly behind and synchronized with marking applicator.
- C. For thermoplastic paint materials, use equipment that is designed to agitate the paint to prevent scorching, discoloration, or excessive high temperatures.

3.02 PREPARATION

- A. Broom or flush the surface to remove dirt, loose stones, or other foreign material immediately prior to applying.
- B. Begin pavement painting and marking operations not later than 24 hours after receipt of written order by Engineer.
- C. Apply all materials in accordance with manufacturer's and Engineer's directions.
- D. Temporary layout marks and "cat tracking" (premarking) shall be placed by the Contractor for all striping (including limit lines and stop bars). Layout marks shall be approved by the Engineer prior to "cat tracking". Temporary "cat tracks" shall be approved by the Engineer prior to final striping.

3.03 THERMOPLASTIC PAINT STRIPING

- A. Clean off dirt, glaze, and grease before prestriping.
- B. Do not use materials which produce fumes that are toxic, obnoxious, or injurious to persons or property.
- C. Apply so that finish lines have well-defined edges free of waviness.

3.04 WORDS AND OTHER MARKINGS

When no longer required for the direction of public traffic, as determined by the City, the temporary traffic stripe and pavement marking tape and temporary pavement markers, applied to existing pavement, the top layer of new pavements or any other paved surface where the previously placed pavement delineation conflicts with the new traffic pattern, shall be removed and disposed of in accordance with the provisions of Section 12, Temporary Traffic Control, of the State Standard Specifications, and all lines and marks used to establish the alignment for the temporary traffic stripes, pavement markings and temporary pavement markers shall be removed from the pavement.

3.05 RAISED PAVEMENT MARKERS

All raised pavement markers, removed or destroyed during construction, including blue markers for fire hydrants, shall be replaced per Caltrans standards and manufacturers recommendations.

3.06 PLACEMENT OF STRIPING, PAVEMENT MARKINGS, AND RAISED PAVEMENT MARKERS

- A. Permanent traffic stripes and pavement markings shall be installed no sooner than two (2) days, and no later than fourteen (14) days after paving.
- B. Raised pavement markers shall be installed no sooner than seven (7) days, and no later than fourteen (14) days after paving.

****END OF SECTION****

SECTION 33 01 30.01

SEWAGE FLOW CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Project consists of construction of new main sewer, removal and replacement of an existing main sewer, abandonment of an existing main sewer, and transfer of existing building sewer connections from existing main sewer to new main sewer. It shall be the Contractor's responsibility to maintain at all times the sewer flows, regardless of volume, through the Project site and from the adjacent properties.
- B. Provide bypass pumping during removal, abandonment, and installation of the main sewer. Accommodate flows at all times from collector and trunk sewer connections at manholes, where they occur. NO SEWAGE FLOW into the trench shall be allowed.
- C. Coordinate directly with residents and businesses to minimize wastewater flows during the scheduled work.
- D. The Contractor may work with residents and businesses to minimize discharge to the sewer and may utilize temporary plugging or flow stoppage from the building sewers (laterals) during the work period if no adverse back up of sewage occurs at connected buildings, otherwise the Contractor shall actively bypass pump from building sewer (lateral) connections and/or cleanouts.
- E. Provide sewer outage notifications per the project Technical Specifications.
- F. This Section specifies the requirements for temporary bypassing, dewatering, and disposal of water and wastewater from the sewer facilities as required to perform the work. Extract, pump, and/or dispose of wastewater from bypassing and dewatering gravity sanitary sewer pipelines, building sewers (laterals), and cleanouts as required.
- G. Sewer flow discharges shall be to the sanitary sewer system.
- H. Dewatering requirements for grading, excavation, backfilling, and compacting are specified elsewhere in the Contract Documents.
- I. Work shall include a mandatory field meeting, conducted to discuss the traffic control prior to design and submittal of the traffic control plan and the sewage bypass pumping plan. The meeting shall be attended by the Contractor (foreman, project manager, and person in charge of bypass pumping), the Engineer, and the City.

1.02 PROJECT REQUIREMENTS

- A. Provide labor, materials, and full-time supervision, as required, to set up necessary equipment, and contain, bypass, dewater, and dispose of raw wastewater, treated wastewater, and storm drain flows, as necessary, for abandonment, television inspections, spot repairs, replacements, connections, rehabilitation, and other modifications made to complete the work.
- B. The Work shall not result in spills into the work area. **Spill of sanitary wastewater can result in costs and/or fines levied against the City.** In the event that there is a spill, the Contractor shall be responsible for fines, penalties and charges due to sanitary

- sewer spills resulting from the Contractor's operations and/or failure of bypass pumping.
- C. The work shall not result in water or wastewater flows to surcharge, shall not result in damage to sewers, and shall protect public and private property from damage and flooding. Surcharge shall be defined as the condition where the depth of flow exceeds the crown elevation in any pipe in any existing gravity pipe systems. Water or wastewater discharges or disposals identified in the Bypass Pumping Plan shall be disposed of to the sanitary sewer system.
- D. Related Sections:
1. SECTION 01 57 00, TEMPORARY CONTROLS
 2. SECTION 01 14 16, SEWER OUTAGE NOTIFICATIONS
 3. SECTION 02 41 00, DEMOLITION, ABANDONMENT, AND REMOVAL
 4. SECTION 31 23 00, EARTHWORK
 5. SECTION 01 55 26, TRAFFIC CONTROL
 6. SECTION 33 31 11, GENERAL PIPING

1.03 NOT USED

1.04 SUBMITTALS

- A. Within five (5) days of Notice to Proceed and at least fourteen (14) days prior to initiating bypass activities, submit a detailed Bypass Pumping Plan consisting of drawings and complete design data in accordance with the Contract Documents. Submittal shall show all proposed methods, layout, equipment, and discharge locations for bypassing and dewatering.
- B. The Submittal shall include the following information:
1. A site plan showing the size and layout of pumps, valves, and temporary pipelines. Layout shall show how temporary facilities will be protected during use.
 2. Narrative description of system staffing, monitoring, and controls.
 3. Catalog data on pump controls and audible alarms.
 4. Catalog data for portable generators when electric pumps are used.
 5. Drawings indicating the locations of temporary plugs, taps, pumping systems, suction and discharge piping, and locations of sanitary sewers and manholes to receive discharges of raw or treated wastewater.
 6. Data that includes the locations and elevations of existing sanitary sewer systems, and the capacities of duty and standby pumps, prime movers, power and standby power, and other equipment.
 7. Design calculations that prove the adequacy of the bypassing, dewatering, and disposal system(s) and selected equipment. Design calculations shall confirm that the bypassing and pumping operations shall not cause surcharge in any portion of the existing sanitary sewer system. Design calculations shall be signed and sealed by a civil engineer registered in the State of California qualified to perform said analysis.
 8. An emergency response plan that provides, in detail, the procedure to be followed in the event of a failure of the bypass pumping systems. The plan shall include the name and telephone number of the person who will be in charge of the response in an accidental spill and is required to:
 - a. Make the maximum effort to stop the spill immediately.
 - b. Verbally notify the City of Morgan Hill within 15 minutes of

- knowledge of the accidental spill.
- c. Submit a written report within 15 working days of knowledge of the accidental spill explaining the cause, nature, volume and duration of the accidental spill, and the procedures taken to clean up the spill.
- d. If the accidental spill enters the storm drain system or a stream, immediately conduct a sampling and analysis program of the contaminated water body demonstrating up to 21 consecutive days that the stream has recovered to its natural state. The first sample result shall be submitted within 30 days of the accidental spill.

9. Odor mitigation plan.

1.05 JOB CONDITIONS

- A. Available Data:
 - 1. The Contractor shall be responsible for flow verification, design, construction, and operation of an adequate and properly functioning bypass and dewatering system.
 - 2. Any testing or gathering of flow data is the responsibility of the Contractor.
 - 3. Coordinate all sewer bypassing and dewatering operations with the Engineer.
- B. Protection:
 - 1. Where bypassing is required, ensure that service for connecting laterals is not disrupted. All bypassed flow shall be discharged into the nearest (downstream) sanitary sewer manhole. Take appropriate steps to ensure odor control at the discharge manholes.
 - 2. Bypassing and dewatering operations resulting in discharges to the ground surface, streams, creeks, culverts, ditches, storm drains, or groundwater shall not be permitted. Perform work so as to protect the public from potential health hazards, and work shall be performed to protect the environment from contamination.
- C. Scheduling:
 - 1. The bypassing and dewatering systems shall not be shut down between shifts, during work stoppages, or during any periods when flows through the main sewer have not been properly restored.
 - 2. Provide fourteen (14) days written notice to the Engineer prior to performing all bypassing, dewatering, and disposal work.
- D. Permits and Approvals:
 - 1. Obtain approval from the Engineer for the proposed Bypass Pumping Plan.
 - 2. If the Engineer determines that the Contractor's diversion plan is inadequate, the Contractor shall provide equipment, materials, and labor to develop a viable diversion and pumping plan.
 - 3. Prior to plugging any lines, the contractor shall notify the project manager and project inspector, at least 24 hours in advance. Included in this item of work is pumping of local depressions in the pipe that may or may not be shown on the plans.

PART 2 - PRODUCTS

2.01 PUMPS AND GENERATORS

- A. The Contractor shall provide suitable “trash-type” primary sewage pumps capable of bypassing all flows around the worksite.
- B. Pumps shall be variable rate units, rated for continuous duty, and shall be capable of pumping the specified flow range without surging, cavitation, or vibration.
- C. A minimum of two primary pumps are required for each flow control system. If two pumps are used, each pump and generator must be able to handle the peak flows. If three are used, each pump and generator must be able to handle at least 50% of the peak flows.
- D. Keep all generators fueled at all times.
- E. Generators shall be placed on spill guard mats or other approved double containment devices to eliminate the possibility of fuel spills to ground surface.

2.02 PIPING

- A. In order to prevent the accidental spillage of flows all exposed discharge piping systems installed on the ground surface for temporary bypass pumps shall be constructed of either rigid pipe with positive, restrained joints (Yellowmine pipe or approved equal), or ribbed, heavy duty hard suction hoses with flanged couplings and driveway ramps at all existing driveways. Under no circumstances will aluminum "irrigation" type piping or glued PVC pipe be allowed for exposed piping systems. Discharge hose will only be allowed in short sections and by specific permission from the Engineer. Collapsible discharge hoses will not be permitted.
- B. Pipe crossing roadways shall be installed in temporary slit trenches, bedded, backfilled, and paved as shown on the details in the Contract Drawings.
- C. The sewage flow control piping shall be completely leak free. Any drips or leaks shall be repaired by the Contractor immediately.
- D. A minimum of two pipes is required for all sewer bypasses. Each pump may be piped separately to the discharge point, or the pump discharge lines can be manifolded together.

2.03 TEMPORARY BULKHEADS AND PLUGS

- A. Design and provide bulkheads and plugs to withstand anticipated upstream differential head without leakage or displacement.
- B. A watertight seal is required to prevent sewage from entering the work area.
- C. The Contractor shall provide double bulkheads and plugs, both able to withstand upstream head, upstream of locations where persons will be entering the sewer and at all flow diversions. Coordinate installation and removal of bulkheads and plugs with the Engineer.

2.04 STANDBY EQUIPMENT

- A. The Contractor shall have available onsite sufficient equipment and materials to ensure continuous and successful leak-free operation of the sewage flow control system.
- B. The Contractor shall have available onsite sufficient number of valves, tees, elbows, connections, tools, sewer bulkheads for different pipe sizes as needed, piping and other parts of system hardware to ensure immediate repair or modifications of any part of the system as necessary.
- C. The Contractor shall have on site one standby pump with capacity equal to or greater than the largest primary pump. If the standby pump is electric, a standby generator shall

- be provided on site. The standby pump shall be operational and shall be connected to the bypass piping to allow immediate standby service at all times.
- D. Generator shall be fueled at all times. Generators shall be placed on spill guard mats or other approved double containment devices to eliminate the possibility of fuel spills to ground surface.
 - E. Bypassing and dewatering systems shall have one hundred percent (100%) redundancy.

PART 3 - EXECUTION

3.01 PLUGGING, BLOCKING, AND PUMPING

- A. Flow control will be required for this Project. Bypass pumping will be allowed only during Contractor's working hours. At the end of every working day, flows must be properly restored to the sanitary sewer. Any emergency pumping operations that are required outside of the Contractor's working hours must be approved in advance by the Engineer.
- B. Furnish, install and operate pumps, plugs, conduits, and other equipment to dewater existing sewer pipelines or to divert the flow of wastewater around the pipeline reach in which work is to be performed, and to maintain service to all properties connected to the sewer being replaced. Plugs shall be so designed that all or any portion of the wastewater can be released. Plugs shall be provided with a tag line.
- C. The pumping system shall be of sufficient capacity to manage existing flows plus additional flow that may occur during a rainstorm. If pumping is required outside normal working hours, engines shall be equipped and/or shielded in a manner to keep noise to a minimum. Noise level shall conform to the noise ordinance requirements of the governing jurisdiction.
- D. Engines shall be equipped with mufflers and/or shall be enclosed to comply with all local noise ordinances. Pumps and bypass lines shall be of adequate capacity and size to handle the flows. All bypassed flow shall be discharged to the nearest downstream manhole.
- E. Bypass pumping shall be completed in such a manner as will not damage private or public property or create a nuisance or public health menace. The pumped wastewater shall be in an enclosed hose or pipe that is adequately protected from traffic and shall be redirected into the sanitary sewer system. Dumping or free flow of wastewater on private property, gutters, trenches, streets, sidewalks, or into storm sewers is prohibited. The Contractor shall be liable for all damages associated with this work. After the work is completed, flow shall be restored to original conditions and temporary facilities removed.

3.02 SEWER DEWATERING

- A. Extract, pump, and/or dispose of wastewater from dewatering the existing sewers.
- B. Dewater all sagged or submerged portions of the existing sewer as required for abandonment, or as otherwise required to complete the work.
- C. Dewatering of excavations shall be conducted in accordance with the Contract Documents.
- D. Coordinate all work with the Engineer. Comply with the Contract Documents for work outage requests related to City's existing facilities.

3.03 SEWER BYPASSING

- A. Where Contractor's work on constructing the project pipeline requires sanitary sewers to be removed temporarily from operation, sewer bypassing shall be accomplished by pumping or diverting the upstream flow around the Contractor's work in accordance with this Section.
- B. Unless otherwise specified, sewer flow shall be bypassed around the work whenever the Contractor's equipment is operating in the sewer, or when work related to the sewer provides an obstruction or otherwise restricts flow and causes the depth of flow as measured at the inlet pipe to the upstream manhole adjacent to the Contractor's work to exceed half of the diameter of the pipe.
- C. The use of storm sewers for purposes of diverting or pumping sanitary sewer flows shall not be permitted.

3.04 DAMAGES

The Contractor shall pay for all fines and repair without cost to the City any damage that may result from the Contractor's negligence, inadequate or improper installation, maintenance and operation of bypassing and a dewatering system including mechanical or electrical failures and sewage flow into the trench. Contractor shall also be responsible for all costs associated with reporting the spill, performing the cleanup after a spill, fines, criminal prosecution, and work stoppage.

3.05 MONITORING

- A. Provide monitoring of flow levels and pump operation to assure continued operation of bypass pumping.
- B. Monitoring by Contractor's personnel shall take place at all times that bypass pumps are in operation (including 24-hour, around-the-clock operation if required during an emergency). An audible alarm system shall be installed to notify workers when the pumps fail to operate.
- C. In the event the pumps fail, workers shall immediately evacuate trenches until the bypass pumping system is operational.

3.06 ODOR MITIGATION

- A. In accordance with the Contract Documents, submit an odor mitigation plan.
- B. When working inside manholes and sewer lines, exercise caution and comply with CAL/OSHA requirements when working in the presence of hydrogen sulfide. Contractor is warned that the existing sewers and the structures associated with the project may contain high levels of hydrogen sulfide gas, a natural gaseous by-product of sanitary sewage. Take all the necessary precautions, such as portable hydrogen sulfide detectors per CAL/OSHA requirements, to ensure that the environment is safe for those at the work site.
- C. A complete Health and Safety Plan shall be submitted to the Engineer as described in the contract documents. No entry to any of the existing facilities will be permitted until appropriate work crews are certified for confined space entry and the Health and Safety Plan is reviewed. The Health and Safety Plan shall be developed specifically for the project.
- D. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work.
- E. To minimize the dispersal of sewer odors above ground the Contractor shall:

1. Seal all open sanitary manholes or access openings in the sewers when his operations have been suspended for a period of two hours or more.
 2. During construction operations when open manholes or access openings cannot be sealed, vent and filter hydrogen sulfide gases upstream of the openings in the sewer.
- F. Odor related to construction around the work shall be controlled through the use of filters, chemical addition to the wastewater, and masking agents as needed to limit the levels of hydrogen sulfide gas to 5 ppm (by volume) 25 feet from the source or at the outside wall of any habitable structure.
- G. Payment for compliance with this Section shall be deemed included in the various other items of work, and no additional compensation will be allowed therefore.

****END OF SECTION****

SECTION 33 01 30.02

BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for locating and connecting to existing building sewers (laterals).
- B. This work will include replacing portions of the existing building sewer and extending the existing building sewer to connect with the new or rehabilitated main sewer installed under this Contract.
- C. The Contractor shall provide written notification of work activities and sewer outages to all local users in accordance with the project Technical Specifications.
- D. The Contractor may work with residents and businesses to minimize discharge to the sewer and may utilize temporary plugging or flow stoppage from the building sewers (laterals) during the work period if no adverse back up of sewage occurs at connected buildings, otherwise the Contractor shall actively bypass pump from building sewer (lateral) connections and/or cleanouts.
- E. Sewer lateral connections shall be reestablished to each user as quickly as possible, and shall not exceed eight (8) hours from the initial disconnection of the building sewer from the sewer main or from the initial service interruption to the user.
- F. All existing laterals shall be reconnected to the rehabilitated, replaced or newly installed sewer main. Diameters of laterals shall be confirmed by the Contractor and replaced in-kind, unless directed otherwise by the Engineer.
- G. Related Sections:
 - 1. SECTION 01 14 16, SEWER OUTAGE NOTIFICATIONS
 - 2. SECTION 33 01 30.01, SEWAGE FLOW CONTROL
 - 3. SECTION 33 31 11, GENERAL PIPING

1.02 REFERENCES

City of Morgan Hill:
Standard Specifications and Details (latest edition)

PART 2 - PRODUCTS

2.01 SUBMITTALS

Submit, in accordance with the Contract Documents, installation instructions and details of all pipe, joints, fittings, metallic pipeline marking tape, and appurtenances to be used in the work including the following.

- A. Catalog cuts showing all piping, cleanouts, and fittings.
- B. Connection details for all building sewers and existing systems.
- C. Connection and termination details for all new 4-inch lateral connections.

PART 3 - EXECUTION

- A. Sewer laterals shall be video inspected prior to construction. Condition of lateral shall be coordinated with the Engineer. Laterals determined to be in acceptable condition shall remain in place and be reconnected to the new sewer main. Laterals determined to be in unacceptable condition shall be replaced as directed by the Engineer.
- B. **Contractor shall construct new sewer lateral from new main to a cleanout at the property line, per the Contract Documents. Private building sewers currently in service shall be connected to the sewer lateral. The excavation process shall be completed by mechanical means as defined in the Contract Documents and by hand digging as required.**
- C. The Contractor may construct sewer laterals in accordance with City Standard Details.
- D. Connection to existing service laterals shall be made after the existing sewer main has been replaced and successfully tested. It is the Contractor's responsibility to make sure that all service connections are reconnected.
- E. Reconnection of existing services to the sanitary system shall be completed as described below:
All building sewers shall be connected to the sanitary sewer main line at a wye (PVC or HDPE pipe) installed on the main line. The connection of the new building sewer pipe to the existing building sewer will be made with suitable adapters or couplings with corrosion-resistant stainless steel shear bands.
- F. It is the Contractor's responsibility to locate building sewers and to determine lateral sizes, and whether building sewers are live or have been abandoned.
- G. All efforts have been made to show existing service building sewers on the drawings, however, the City cannot ensure that there may be others not shown or shown in other locations. Some project sewer line videos are available on request to aid the Contractor in locating all building sewers; however, the City does not guarantee the completeness or accuracy of the video logs. Sewers laterals shall be video inspected at the Contractor's expense prior to construction.
- H. The existing building sewer connections to the main sewer may be encased in mortar, concrete or reinforced concrete. There will be no additional compensation for demolition of this material.

****END OF SECTION****

SECTION 33 01 30.11

CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SANITARY SEWER SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

- A. All new sewers, structures, manholes, and new laterals installed as shown in the Contract Documents shall be visually inspected by means of closed-circuit television (CCTV) and video recorded after testing and cleaning activities. The inspections and assessment shall be in compliance with the National Association of Sewer Service Companies' (NASSCO) Pipe and Manhole Assessment and Certification Programs (PACP and MACP).
- B. The inspections shall be completed one sewer section at a time. A section may be from one manhole to another or a section may be an individual sewer lateral.
- C. Flows shall be controlled as specified herein while the inspection work is in progress.
- D. The City requires the use of NASSCO's PACP, LACP, and/or MACP version 7.0 or later collected on the POSM inspection software program.
- E. Related Sections:
 - 1. SECTION 33 01 30.41, SANITARY SEWER SYSTEM TESTING AND CLEANING
 - 2. SECTION 33 31 11, GENERAL PIPING

1.02 REFERENCES

- A. All main line inspections shall be performed in accordance with the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment and Certification Program (PACP) version 7.0 format or later. All lateral inspections shall be performed in accordance with the National Association of Sewer Service Companies' (NASSCO) Lateral Assessment Certification Program (LACP) version 7.0 format or later. Inspections conducted or submitted in other formats that do not meet all the requirements of this specification are subject to being rejected. Any survey that is rejected must be re-televised to meet the guidelines for CCTV Inspections.

1.03 SUBMITTALS

- A. Furnish including product literature for all digital video equipment including, but not limited to cabling, camera, monitor, footage counter, digital video titling device, and recorder.

- B. Furnish one color video recording on memory stick or portable hard drive, with audio, for each section of main sewer and building sewer inspected, and prints of all photographs taken during the inspection. Videos shall also be non-proprietary and able to be viewed with Windows Media Player. Include a location map outlining facilities inspected and clearly indicate street names, addresses (if needed), manhole numbers, Pipe Segment Reference numbers (Facility ID's), and length surveyed.
- C. The recording shall show the date the work was performed and the location/street name and City designation of the entry manhole.
- D. The recording shall indicate cumulative footage from the entry manhole, as verified by the camera-mounted transmitter and receiver.
- E. Furnish a report and photos indicating the location of all laterals and connections encountered the location of any breaks, obstructions, offsets, high points, sags or other major defects, and the condition of manholes.

Digital video files shall follow City naming convention:

"Facility_ID"_"Upstream_MH"_"Downstream_MH"_"Direction"_"Date.Where

- Facility ID shall be coordinated with City prior to start of work.
- Upstream/Downstream Manhole ID
- Yymmdd = date of inspection
- D = camera direction (D or U)

Example:

A downstream inspection from AH/51 to AH/52 conducted on August 13, 2010 shall be named, AH51_AH52-100813-D.mpg.

Photograph naming format shall be generated using a concatenation of standard PACP database fields in the format Facility_ID"_"Upstream_MH"_"Downstream_MH"_"Direction"_"PACP_Code"_"Distance" (multiple digital still images may have "-01", "-02", "-03" at end of file name).

- F. Pre and post video reports shall include rating for sag severity:

0 = less than 1 inch

1 = 1 inch – 1/4 pipe

2 = 1/4 – 1/2 pipe

3 = > 1/2 pipe

- G. All reports shall be neatly typed.

- H. Databases shall be submitted in an unlocked Microsoft Access Database in accordance with PACP, LACP, and MACP guidelines.
- I. Post construction video reports shall be submitted for review within two weeks after completion of each section.

1.04 SAFETY

- A. Have a documented safety program in place which meets all applicable occupational safety and health standard, rules, regulations and orders established by the State of California.

1.05 EXPERIENCE

- A. The person conducting the CCTV inspection shall have a minimum of five years' experience in the television inspection of sanitary sewers.
- B. The recordings shall be reviewed by a person having a minimum of five years' experience in evaluating and repairing problems in sanitary sewers.
- C. All surveyors and/or operators must have a valid PACP and LACP certification from the National Association of Sewer Service Companies prior to assessing and televising sewer mains or laterals within the City sewer system.

PART 2 – PRODUCTS

2.01 TELEVISION CAMERAS

- A. The television camera used for inspection work shall be color format, specifically designed and constructed for use in sewers. Pan and tilt camera shall pan 275 degrees and rotate 360 degrees for close up viewing. The technician shall have the capability to: adjust the brilliance of the built-in lighting system; change the focus of the television camera by remote control; control the pan, tilt, and zoom features of the camera; control the forward and reverse motion of the camera; and determine the camera's position, at any time.
- B. Lighting and camera quality shall allow a clear, in-focus picture of the entire periphery of the pipe for a minimum distance of six feet.
- C. The camera shall have a 480 line per inch, or greater, resolution.
- D. The camera shall be operative under 100 percent humidity conditions.
- E. Cameras for use in sewers 8-inches in diameter and larger shall be of the “articulating head” type to allow laterals and defects to be viewed directly.

- F. To ensure acceptable picture quality under all possible conditions that may be encountered during the inspection, a variable intensity control for lighting, and a remote adjustment for camera focus, shall be provided for the operator.
- G. The camera, television monitor, and other components of the video system shall be capable of producing a color picture of quality adequate to identify major defects and locate laterals accurately.
- H. A push camera with color display shall be available for use at all times during construction to inspect laterals or otherwise inaccessible pipelines.

2.02 CLEANING EQUIPMENT

Cleaning may be accomplished by jetting; however, contractor shall have mechanical cleaning equipment available for use at all times to remove hardened deposits or large objects.

PART 3 - EXECUTION

3.01 REQUIRED FREQUENCY OF CCTV INSPECTION

- A. Inspect all existing laterals from the sewer to the cleanout/property line prior to start of construction.
- B. Inspect after open cut construction is complete, after final air or leakage testing, cleaning, and after the "subbase" or "base" material portion of the paving is satisfactorily compacted but before pavement is installed.
- C. New laterals shall be inspected as directed by the Engineer.

3.02 CLEAN

"Clean" in this specification is defined as the removal of all accumulations including sludge, dirt, sand, rocks, asphalt, concrete, grease, roots and any other items that might be found in the sewer.

3.03 FLOW CONTROL

General:

- A. When sewer line depth of flow at the upstream manhole of the section being inspected is above the maximum allowable depth shown under "Allowable Depth of Flow," the flow shall be reduced by operation of pump stations, temporarily plugging or blocking of the flow, or by pumping and bypassing of the flow.
- B. Allowable Depth of Flow – No flow shall be allowed from the upstream manhole into the sewer being televised.
- C. Plugging or Blocking:
 - 1. A sewer plug shall be inserted into the line upstream of the section being inspected.
 - 2. The plug shall be so designed that all or any portion of the sewage can be released.

3. During CCTV inspection, flow shall be reduced to the limits specified herein.
 4. After the work has been completed, flow shall be restored to normal.
- D. Flow Control Precautions:
1. When flow in a sewer is plugged, blocked, or bypassed, precautions shall be taken to protect all sewers from damage that might result from sewer surcharging.
 2. Precautions shall also be taken to ensure that flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

3.04 INSPECTION PROCEDURES

- A. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the condition of the sewer.
- B. In no event will the television camera be pulled at a speed greater than 30 feet per minute.
- C. Manual winches, power winches, TV cable, and power rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.
- D. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communications between members of the crew.
- E. The importance of accurate distance measurements is emphasized.
- F. Measurement for location of defects shall be made by means of a camera-mounted transmitter and aboveground receiver. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. The footage counter device shall be accurate to plus or minus 2 feet in 1,000 feet and be subject to approval by the City.
- G. Marking on the cable, which requires interpolation for depth of the manhole, will not be permitted.
- H. To establish criteria for video picture quality to be maintained throughout the project, the Contractor shall furnish a recording of a previous sewer inspection that meets these specifications for quality. This recording shall become the property of the City. It will be used as a standard to judge the acceptability of recordings produced on this project.
- I. The audio portion of the inspection report, recorded at the time of inspection, shall be intelligible in its entirety. The information contained on the audio recording shall include (1) the location of the sewer, (2) the City's designation for the manholes involved, (3) the direction of travel, (4) a description of conditions in the sewer as they are encountered, and (5) the location and entrance condition of service laterals.

- J. The video shall include legible on-screen continuous indications of the following items during the entire inspection (1) date and time of inspection, (2) upstream and downstream manhole designations and direction of travel related to flow, (3) current location footage, and (4) sewer diameter.
- K. Each digitally encoded inspection video shall begin with the camera facing towards the bottom of the manhole and oriented so that the outgoing sewer connection is at the 6 o'clock position. This position shall be held during video recording for a minimum of five (5) seconds then followed by the operator panning then tilting the surrounding above ground area of the entrance manhole prior to lowering the camera to the bottom of the manhole. The CCTV video shall include the view of the camera as it is placed within the manhole, the size measurement of the pipe that is to be inspected, and clearly show which pipe the CCTV camera is inserted. Any notable defects present within the manhole are to be coded as General Observations (MGO's) and to be catalogued only after the initial access point and water level observations have been coded.
- L. When the Contractor elects to "pull through" a manhole during a CCTV and/or Sonar Inspection, a new inspection will be started at the manhole "pulled through", and the footage re-set to zero (0.0) at the manhole wall where the pipe exits/enters the manhole. The video shall begin with the camera being centered within the "pull through" manhole looking down the line segment to be televised. The Consultant/Contractor shall begin the inspection by cataloguing the initial PACP access and water level codes followed by slowly panning then tilting the camera around the manhole for no less than 5 seconds. The Consultant/Contractor shall also be required to visually capture and catalogue the field measurement of the pipe size at any "pulled through" manhole location.
- M. The Contractor shall adjust the camera height as necessary to ensure that the camera is centered in the pipeline at the beginning of the inspection. A position tolerance of $\pm 10\%$ of the vertical sewer pipeline diameter dimension will be allowed (i.e. for an 8-inch diameter pipeline the camera shall be centered within ± 0.8 inches of the center of the pipeline). Inspections of any pipe sections in which the camera, in the opinion of the City, is skewed or not properly centered within the main shall be re-televised at no additional cost to the Sewer Utility.
- N. When beginning a CCTV inspection, the operator shall verify the diameter of the pipeline to be inspected by inserting a tape measure or surveying rod into the manhole and measure the pipeline diameter to the nearest $1/10^{\text{th}}$ inch. Video proof of this measurement shall be captured during the CCTV inspection after the camera has been adequately positioned so that this measurement can be clearly read. This measurement is also to be recorded in the "height" field of the inspection database.
- O. All CCTV surveys must list all required PACP information in their respective fields in addition to but not limited to the following information:
 - 1. Drainage Area
 - 2. Pipe Segment Reference
 - 3. Total Length
 - 4. Length Surveyed

5. Pipe Material (Original material if lined)
6. Lining Method (If lined)
7. Year Installed
8. Purpose
9. Media Label (CCTV Contractor Co.)
10. Location Code
11. Weather

P. The Consultant/Contractor shall televise all sanitary and storm sewer mainlines utilizing a crawling camera with full pan, tilt, & zoom capabilities. Inspections televised via other means or methods will be rejected unless directed to do so otherwise. If picture quality is unsatisfactory, the Consultant/Contractor may attempt to re-televise the segment(s) utilizing satisfactory equipment and/or methods. Unsatisfactory inspections will be rejected by the City. No payment will be made for an unsatisfactory inspection.

1. All distances and time stamps called out for each PACP code, observation, or defect must be listed as a positive, rational number. Surveys that do not list positive numbers for distances and time stamps will be rejected.
2. At the start of each sewer length, a data generator shall electronically generate and clearly display on the viewing monitor and subsequently on the final recording a record of data in alpha-numeric form containing the following minimum information:
 - i. Automatic update of the camera's footage position in the sewer line from adjusted zero.
 - ii. Sewer dimensions in inches
 - iii. Manhole numbers (must conform to Owner's identification number)
 - iv. Date of survey
 - v. Road name (nearest)/location
 - vi. Direction of survey, i.e., downstream or upstream
 - vii. Time of start of survey
 - viii. Material of construction of the pipe
 - ix. Contractor
3. The size and position of the data display shall be such as not to interfere with the main subject of the picture.
4. Once the survey of the pipeline is under way, the following minimum information shall be continually displayed:
 - i. Automatic update of the camera's footage position in the sewer line from adjusted zero.
 - ii. Sewer dimensions in inches
5. Manhole numbers (must conform to Owner's identification number)
6. Direction of survey, i.e., downstream or upstream

- Q. While in motion, the CCTV camera is to be fully zoomed out and fixed to the “home position” where the camera head is kept at the level horizon and is centered and pointed true down the alignment of the pipe for the duration of each CCTV survey. Only when necessary to fully capture defects/observations or to avoid getting the camera lens dirty should the camera be allowed to leave the home position or use the zoom, pan, or tilt features. After the flow conditions have normalized in the pipe or the full extent of an observation/defect has been captured the camera must return to the level home position.
- R. Excessive use of the pan, tilt, or zoom features, including using any of the features simultaneously, shall be avoided. The operator shall not use the pan, tilt, or zoom features of the camera until the camera tractor is at a full and complete stop.
- S. The operator shall bring the camera to a complete stop at all suspected defects, noted observations, and service connections, panning then tilting the camera as necessary to closely view the defect/observation in question. The full extent of the defect/observation shall be observed.
- T. When coding any defect or observation, the operator shall adjust the camera back to the “home position” as best as possible while showing the defect/observation in its entirety in relation to the pipe. The operator shall cease all movements of the camera head and tractor to allow for a clear photograph of the defect/observation while the observation is being cataloged.
- U. At each coded observation, the following minimum information shall be displayed:
 - 1. The PACP code and/or PACP code description.
 - 2. The footage position of the defect.
 - 3. The “Additional_Info” field in any cases where it is utilized.
- V. During the CCTV inspection, lighting intensity shall be adjusted as necessary to minimize glare and maximize viewing ability.
- W. Upon reaching an end point manhole or other access point, the camera shall be maneuvered to the center of the manhole and tilted upward and slowly panned for a minimum of 5 seconds in order to view the interior of the manhole in full detail. Any notable defect observed within the manhole or access point shall be coded as a General Observation (MGO) and be catalogued prior to coding the manhole (AMH) to close out the inspection.
- X. If for any reason the Contractor’s equipment becomes disabled or lodged inside the sewer and cannot further proceed, the Consultant/Contractor shall be responsible for retrieving the equipment and restoring the sewer at no additional cost to the Owner.

3.05 DEFICIENCIES

Deficiencies in need of correction prior to acceptance of work shall conform to the requirements of section 33 31 11, General Piping.

3.06 PAYMENT FOR REPAIR OF DEFICIENCIES AND ADDITIONAL INSPECTION

- A. Any portion of the sewer system found not to conform with these Specifications shall be corrected by the Contractor at no additional cost to the City. Sewers so corrected shall be re-inspected by Contractor in accordance with this Section at no additional cost to the City.
- B. Price of CCTV inspection shall be included in the unit price bid for pipe, structures, and manholes and no additional payment shall be made therefor.

****END OF SECTION****

SECTION 33 01 30.41

SANITARY SEWER SYSTEM TESTING AND CLEANING

PART 1 - GENERAL

1.01 SUMMARY

- A. Contractor shall perform all pipeline flushing and testing for sanitary sewerage systems in accordance with the Contract Documents.
- B. Contractor shall be responsible for obtaining, conveying, and properly disposing of water used in the testing operations.
- C. Related Sections
NOT USED.

1.02 REFERENCES

- A. City of Morgan Hill
Standard Specifications and Details (latest edition)
- B. American Society for Testing and Materials (ASTM)
ASTM C1244-05 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- C. Uni-Bell PVC Pipe Association
Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe, current Uni-B-6 pamphlet

1.03 SUBMITTALS

- A. In accordance with the Contract Documents, a testing plan and schedule shall be submitted in writing to the Engineer for approval a minimum of seventy-two (72) hours before testing is to start.
- B. Calibration certifications for test gauges used on this project shall be submitted.

PART 2 - PRODUCTS

2.01 MATERIALS REQUIREMENTS

- A. Furnish compressors, piping, hosing, valves, test gages, test plugs, joint test apparatus, power, stop watch, and personnel required for conducting the test.
- B. Test gauge shall be 0 to 15 psi with max 0.5 psi increments.
- C. Furnish a valved connection for the City to attach a gauge. The Engineer will witness the test.
- D. Provide temporary valves, bulkheads, plugs, and other pressure-testing equipment materials subject to the Engineer's review.
- E. No materials shall be used which would be injurious to the public, personnel, adjacent improvements, nor the pipeline structure and future function. Air test gauges shall be laboratory-calibrated test gauges and shall have been recalibrated by a certified laboratory, within three (3) months, prior to the leakage test for this project. Any necessary recalibration for gauges that do not have calibration certificates within three (3) months of leakage testing shall be done at the Contractor's expense.

PART 3 - EXECUTION

3.01 GENERAL

- A. All pipelines shall be cleaned by balling, flushing, and/or other approved methods prior to testing. Debris shall be removed from the downstream manhole until all pipelines are clean.
- B. All testing operations shall be performed in the presence of the Engineer.

3.02 TESTING OF PIPING

- A. General: All gravity sewer pipes and service laterals shall be tested for exfiltration and or infiltration and deflection, as specified. All manholes shall be tested for leakage, as specified. Manholes shall be tested prior to backfill placement, whereas all pipe shall be backfilled prior to testing. All leakage tests shall be completed and approved prior to placing of permanent resurfacing. When leakage or infiltration exceeds the amount allowed by the Contract Documents, the Contractor at its expense, shall locate the leaks, submit a repair procedure(s) for the Engineer's review, and make the necessary repairs or replacements in accordance with the Contract Documents to reduce the leakage or infiltration to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests. Pipe joint leakage repair solely with cement grout will not be permitted.
- B. Leakage Tests
 - 1. The Contractor shall, in the presence of the Engineer, test the water tightness of all main sewer lines in accordance Contract Documents. The test will be made between each adjacent structure.
 - 2. The Contractor shall use the Air Test as described below.
When Tested:
The pressure test shall be made after the backfill is satisfactorily compacted.
 - 3. The test, as noted in item 1 or 2, above, is considered the "official test."
However, preliminary testing is strongly recommended and may be conducted by the Contractor at any time prior to the "official test."
 - a. AIR TEST REQUIREMENTS: A sudden expulsion of a poorly installed plug during air testing can be dangerous. The Contractor shall meet the following requirements:
 - i. The Contractor shall be fully responsible and take all precautions necessary to ensure the safety of their workers.
 - ii. All plugs shall be adequately braced to support the full load developed.
 - iii. No workers shall be allowed in the excavation or manhole while the line is under pressure. The Contractor shall make provisions for reading the pressure at the ground surface and for safely releasing the air pressure without entering the manhole or excavation.
 - iv. Each section of sewer main shall be tested between successive manholes by plugging and bracing all openings in the sewer lines. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again.

- v. The final leakage test of the sewer main line shall be conducted in the presence of the Engineer.
4. Leakage Test Acceptance
 - a. Where the actual leakage exceeds the allowable, the Contractor shall determine the cause and remedy it before the pipeline is accepted. For the purpose of this subarticle, a section of pipeline is defined as the length of pipe between successive manholes or special structures.
 - b. The Contractor shall correct any visible leaks in the pipeline or manholes.
 - c. The Contractor shall dispose of all water so as not to cause a public nuisance and as acceptable to the Engineer.
 - d. If any cleanup activities or fines ensue from a failed leakage test, any associated costs incurred by the City will be deducted from payment to the Contractor.
 - e. In no case shall the Contractor place the newly constructed sewer in operation without the approval of the Engineer.

3.03 TESTING OF MANHOLES

- A. Vacuum Testing: All new manholes shall be vacuum tested in accordance with Contract Documents. Vacuum test procedures and requirements shall be as follows:
 1. After completion of the manhole barrels but prior to backfilling and grade ring installation, all openings in the manholes shall be sealed with plugs and a rubber ring "donut" type plug inserted inside the opening of the cone.
 2. A small vacuum pump shall be attached to a hose connected to the plug and 10 inches Hg of vacuum applied.
 3. The vacuum is permitted to stabilize for 1 minute; then the test shall begin.
 4. The time shall be measured for the vacuum to drop to 9 inches Hg. The manhole must maintain vacuum such that no greater than 1 inch Hg of vacuum is lost during the specified test period.
 5. The specified test period is as follows:

Manhole Depth (Feet)	Test Period Based On Manhole Size (seconds)		
	48 inch Diameter	60 inch Diameter	72 inch diameter
Up to 8	20	26	33
10	25	33	41
12	30	39	49

6. The manhole is acceptable if the time for the vacuum reading to drop from 10 inches Hg to 9 inches Hg is greater than the test period. Manholes that fail the test shall be patched as required and retested.
7. A vacuum regulator shall be provided on the vacuum pump such that no greater than 10.5 inches Hg vacuum can be applied to the manhole during the test.

8. All manholes that do not meet the leakage test, or are unsatisfactory from visual inspection, shall be repaired to the satisfaction of the Engineer and retested at no additional cost to the Owner.

3.04 NOT USED

3.05 CLEANING

- A. After the sewers have satisfactorily passed the tests required in this Section, and before CCTV inspection required in the Contract Documents, the Contractor, in the presence of the Engineer, shall clean each section of the sewer in the following manner after placing a wire screen with a one-quarter of an inch (1/4") mesh or smaller in the downstream manhole to catch debris and to prevent any debris from being washed into the existing sewer system.
- B. Hydraulic Cleaning
 1. All hydraulic cleaning equipment shall be truck mounted. Water jet cleaning equipment shall include a water tank, auxiliary engine, pumps, and hydraulically driven hose reel.
 2. Cleaning shall remove all grit, sludge, rocks, debris, roots, grease accumulations, and obstructions from the sewer. Sewer cleaning method shall be water jetting.
- C. Debris Removal
 1. During cleaning operations, the Contractor shall provide a means of catching and removing the dislodged debris conveyed downstream with the sewer flow. The method chosen shall not allow the transport of debris to downstream sewer reaches.
 2. All debris removed from the sewer may be stored until the day's end, whereupon the Contractor shall be responsible for its proper disposal off site.
- D. Recleaning

If television inspection indicates that the sewer is not adequately cleaned, the Contractor shall remove all equipment or materials from the sewer and reclean the sewer at no additional expense to the City.

3.06 DISCHARGE OF CLEANING WATER

Water used for cleaning the lines may be discharged to the existing sewer system after screening and removal of solids, and as approved by the Engineer.

****END OF SECTION****

SECTION 33 01 30.81 MANHOLE REHABILITATION

PART 1 GENERAL

1.1 WORK INCLUDED

- A. This specification defines the method and material for the rehabilitation of sanitary sewer manholes. After installation, all new manholes shall be lined in conformance with this Section. This section includes materials, testing, and installation of corrosion barrier composite liners and coatings for concrete structures in compliance with manufacturer's installation requirements and compliance with applicable building codes and standards. Methods presented may utilize a spray or trowel applied calcium aluminate cementitious structural rehabilitation system, mortar barrier, or corrosion barrier geopolymer mortar. The purpose of this work is to obtain a dense and durable lining that is resistant to biosulfuric acid attack and meets the strength requirements described elsewhere in this specification. The work covered in this specification consists of furnishing all labor, equipment, materials, and supervision necessary to accomplish the rehabilitation as specified. When complete the rehabilitated structure shall:

1. Provide for a uniformly smooth surface of specified thickness.
2. Minimize, if not eliminate sources of inflow/infiltration (I/I).
3. Provide a service life that is supported by documented test analysis.

The Contractor's sequence of operation relative to structural rehabilitation shall include, but not be limited to the following:

1. Manhole rehabilitation shall take place after completion of pipeline installation but prior to disabling sewage diversion or bypass.
 2. Eliminate all sources of groundwater infiltration and voids in manhole walls and bases as appropriate for rehabilitation method used.
 3. Rehabilitate all interior surfaces including walls, and floors in accordance with the specification and the nature of the sub-surfaces to which the cementitious structural rehab system is to be applied.
 4. Provision to "cure" the installed lining material.
 5. Provision to "test" lining and structural rehabilitation materials.
- B. The Contractor and the manufacturer shall guarantee workmanship, materials, installation and completed product for a period of ten (10) years from the date of substantial completion of the manhole rehabilitation work.

1.2 RELATED WORK

- A. Section 03 30 00: Cast-in-Place Concrete
- B. Section 03 40 00: Precast Concrete Structures

1.3 SYSTEM DESCRIPTION

- A. This specification defines the material, method and installation for the rehabilitation of sanitary sewer manholes utilizing a spray or trowel applied Cementitious Liner with Cementitious with Calcium Aluminate and Geo-polymer restoration mortar. The work covered in this specification consists of furnishing all labor, equipment, materials, and supervision necessary to accomplish the rehabilitation as specified. Use Strong Coat or Approved Equal

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary trades and crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section. A minimum of three (3) years of active continuous experience in the commercial application of manhole rehabilitation under the Contractor's license is required.
- B. Engage experienced applicator to perform Work of this Section who has specialized training in installing materials required for this Project; who is approved, authorized, or licensed by coating system Manufacturer to install Manufacturer's product; and who is eligible to receive the standard Manufacturer's warranty. A minimum of three (3) years of active continuous experience in the commercial application of manhole rehabilitation under the Contractor's license is required.

1.5 REFERENCES

- A. ACI 305R - Hot Weather Concreting.
- B. ACI 503R - Use of Mortar Coating Compounds for Coating Concrete Manholes.
- C. ASTM C 78 - Flexural Strength of Concrete (Using Simple Beam With Third-Point Loading).
- D. ASTM C 109 - Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).
- E. ASTM C 157 - Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
- F. ASTM C 876 - Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete.
- G. ASTM D 4138 - Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means.
- H. International Concrete Repair Institute (ICRI) Technical Guideline No. 03730 – Surface Preparation Guidelines for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion.
- I. ASTM C597B – Standard Test Method for Pulse Velocity Through Concrete (Compressive Strength)
- J. ASTM C321 - Standard Test Method for Bond Strength of Chemical-Resistant Mortars.

1.6 SUBMITTALS

A. Furnish the following Qualifications submittal with bid.

1. Submit company history stating years in service.
2. Submit evidence of factory authorization or licensing by Manufacturer of lining system to install product
3. Submit documentation of employees' cognizance and ability to comply with all Federal and State OSHA regulations regarding confined space entry.

B. Furnish the following submittals.

1. Submit Manufacturer's product catalog data including physical properties.
2. Submit application instruction requirements.
3. Submit coating system and application certification per certificate of compliance requirements.
4. Submit material samples.
5. Submit qualifications of applicator(s).
6. Submit to the City a manufacturer's warranty for the liner or coating rehabilitation system to be in force and effective for a period of ten (10) years from the date of final acceptance by the City.
7. Submit to the City a warranty from the Contractor to be in force and effective for a period of ten (10) years from the date of final acceptance by the City. The warranty shall require the Contractor to repair or replace the manhole should leakage, other failure result from faulty materials or installation as determined by the Engineer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Manufacturer's instruction and warranty requirements for delivery, storage and handling of concrete restoration and coating systems shall be strictly followed.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials used shall be specifically designed for use in manhole rehabilitation. All materials used shall be, whenever possible, from the same manufacturer. Sanitary sewer manholes shall be rehabilitated using one of the following methods:

Cementitious Liner with Calcium Aluminate Mortar (minimum ½-inch thickness).

B. CEMENTITIOUS LINER WITH CALCIUM ALUMINATE MORTAR (MINIMUM ½-INCH THICKNESS):

Cementitious Lining material furnished under this specification shall be a prepackaged mortar mix, including all cement, aggregates, and any required additives. The mortar mix shall be pure Calcium Aluminate mortar designed for rehabilitation of deteriorated concrete and brick structures. Prior to application the Contractor shall provide to the Engineer the yield area per bag for the mortar mix. It is the intent of this specification that the Contractor only be required to add the proper amount of potable water so as to produce concrete suitable for spray application. Re-mixing or tempering shall not be permitted. Do not add Portland cement, other aggregates, or any admixtures whatsoever to lining material. Typical package weights shall not be less than 50 lbs and shall be identical for all material furnished on this project.

1. The chemical composition of the cement portion as well as the aggregates of the mortar mix shall meet or exceed the following:

Al ₂ O ₃	CaO	FeO + Fe ₂ O ₃	SiO ₂
39-44%	34-38%	9-15%	6-8%

Minimum physical and chemical resistant properties:

- a. Compressive Strength (ASTM C109):
 - a. 24 Hours: > 5,500 psi
 - b. 28 Days >7,000
 - b. Flexural Strength (ASTM C348):
 - a. 24 Hours: >900 psi
 - b. 28 Days: >1,300 psi
 - c. Splitting Tensile Strength (ASTM C496)
 - a. 24 Hours: >550 psi
 - b. 28 Days: >700 psi
 - d. Slant Shear test (ASTM C882)
 - a. 28 Days: >2,500 psi
 - e. Shrinkage at 28 days (ASTM C157)
 - a. 24 Hours: < 0.04%
 - b. 28 Days: < 0.07%
 - f. Freeze Thaw (ASTM C666):
 - a. After 300 cycles: 102
2. The mortar mix shall be Strong Seal High Performance Mix by “Strong Company, Inc.” or approved equal.
 3. Selected mortar mix must have at least seven (7) years of successful performance in similar applications and be supplied by an ISO 9001 certified manufacturer. Manufacturer’s ISO 9001 certificate shall be submitted to Engineer.

4. In addition, the mortar mix shall be designed to withstand long-term exposure to a bacterially corrosive hydrogen sulfide environment that may be expected to produce a pH of 1 on normal Portland cement based concrete or typical brick and mortar surfaces.
5. Water used in mixing shall be fresh, clean, potable water, free from injurious amounts of oil, acid, alkali, vegetable, sewage and/or organic matter. Water shall be considered as weighing 8.32 pounds per gallon.
6. Mortar mix shall be stored with adequate provisions for the prevention of absorption of moisture. It shall be stored in a manner that will permit easy access for inspection and identification of each shipment

PART 3 EXECUTION

3.1 PREPARATION

- A. Before using any product, investigate its compatibility with surfaces, fillers and joints sealants.
- B. Use only compatible materials.
- C. Clean cracked or soft areas with wire brush.
- D. Concrete preparation and installation of coating shall be performed under supervision of authorized Manufacturer's representative.
- E. Interior surface preparation of manholes shall proceed as follows:
 1. Remove manhole rungs prior to rehabilitating manhole, using such methods that will minimize damage to structure surface.
 2. Water blast manhole interior to remove deteriorated concrete, oil, grease, or existing coating. Water blast equipment shall use of a minimum pressure of 3,500 psi and shall not use detergent or other chemical cleaning solvents.
 3. Inspect cleaned surfaces to identify and mark corroded reinforcing steel, and to locate cracks, leaks and joints.
 4. Grind anchor bolts down to ½" below surface and patch flush. Promptly repair any damage to manhole structure caused by removal of steps, using methods acceptable to Owner.
 5. Remove all debris prior to coating. Do not allow debris to enter sewer system.
 6. Prepare surfaces to have a minimum profile of 1/16 inch profile, preferably with aggregate exposed.

7. Prior to installation, repair all irregularities, voids, and deteriorated surfaces to a uniform and sound surface using rapid setting repair mortar compatible with lining system.
8. Saturate all surfaces thoroughly with water.
9. Apply restoration mortar as soon as water sheen is no longer visible.
10. Return manhole channel and shelf areas to original dimensions using concrete repair mortar. Hand trowel shelves to provide smooth and uniform surface. Allow concrete to cure prior to coating.

3.2 OPERATIONS

- A. The Contractor shall provide all equipment necessary to individually gauge, control, and monitor the actual amounts of all component materials necessary to complete the lining installation. The type of equipment and methods used to gauge, control, and monitor component materials shall be subject to approval by the Engineer and Manufacturer.
- B. All lining materials shall be thoroughly mixed by mechanical means to ensure all agglomerated particles are reduced to original size or removed prior to placement into the application equipment (i.e. the hopper). Each batch of material should be entirely discharged before recharging with fresh material. Mixing equipment shall be cleaned at regular intervals to remove all adherent materials.
- C. The addition of water to the mix shall be in strict accordance with the Manufacturer's recommendations.
- D. Re-mixing or tempering shall not be permitted. Rebound materials shall not be reused.

3.3 EQUIPMENT

Equipment shall be of spray type and approved by the material manufacturer. Alternate equipment may be utilized provided it meets the performance requirements of the specification. All equipment must be kept in operating condition and good repair.

3.4 PROTECTION OF ADJACENT SURFACES

During progress of the work, adjacent areas or grounds which may be permanently discolored, stained or otherwise damaged by dust and rebound material, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing as the surroundings permit.

3.5 INFLOW AND INFILTRATION PREVENTION

- A. If inflow or infiltration is observed within the structure after surface preparation is complete, a rapid setting crystalline enhanced hydraulic cement product specifically formulated for infiltration control shall be used to stop minor infiltration flows in accordance with the manufacturer's recommendations. The material shall meet the following strength requirements:

Compressive Strength (ASTM C597B)	600 psi	(24 hours)
	1,000 psi	(7 days)
Bond Strength (ASTM C321)	30 psi	(1 hour)
	80 psi	(1 day)

- B. The material shall be Thoroc Plug, Octocrete, Burke Plug or Engineer approved equal. Where infiltration flows are more severe, pressure grouting may be required. The material for pressure grouting shall be Avanti A-220, DeNeef or Engineer approved equal installed in accordance with the manufacturer's written instructions.
- C. For manholes rehabilitated using the epoxy lining method, minor infiltration flows shall be stopped in accordance with the manufacturer's recommendations.
- D. All materials, labor, equipment, and incidentals required to correct inflow and infiltration conditions will be considered incidental to rehabilitation.

3.6 APPLICATION OF CEMENTITIOUS LINER WITH CALCIUM ALUMINATE RESTORATION MORTAR

- A. Application shall be according to the manufacturer's recommendation and these technical specifications.
- B. Lining material shall not be applied to a frozen surface or to a surface that may freeze within 24 hours of application. Frozen conditions shall be defined as ambient temperatures of 32 degrees Fahrenheit or below.
- C. Cementitious liner - Sequence of application may be from bottom to top or vice versa if rebound is properly removed.

Application shall be from an angle as nearly perpendicular to the surface as practicable, with the nozzle held at least 1 foot from the working sub-surface (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.

- D. Application shall be suspended if:
 - 1. Air velocity separates the cement from the aggregate at the nozzle.
 - 2. Ambient temperature approaches freezing and the newly placed SewperCoat, or approved equal, cannot be protected and insulated.
- E. The time interval between successive layers of material application must be sufficient to allow "tackiness" to develop but not final set. If final set does occur, this surface shall be prepared in accordance with Sections 3.01 of this document.

- F. Construction joints within a manhole shall be avoided. In the event a construction joint is necessary and approved by the Engineer, it shall be sloped off to a thin, clean, regular edge, at a 45-degree angle. Prior to placement of the adjoining materials, the sloped portion and adjacent applied material shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.
- G. Nozzleman shall bring the material to an even plane and to well-formed corners.
- H. After the body coat has been placed, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with additional material to insure a true, flat surface as specified herein.
- I. For manhole applications, the minimum thickness of SewperCoat, or approved equal, shall be a ½-inch cover over all surfaces. The thickness minimum is in addition to any material required to fill voids. For voids greater than one (1) square foot and less than ¾-inch in depth, the Contractor may request approval from the Engineer to use spray applied cementitious material to fill voids.
- J. Contractor shall provide all equipment necessary to individually gauge, control, and monitor the actual amounts of component materials necessary to complete the lining installation. The type of equipment and methods used to gauge, control, and monitor component materials shall be submitted to the Engineer for review and approval.
 - 1. Cementitious liner with Calcium Aluminate Mortar shall be allowed to cure in accordance with the manufacturer's recommendations.
 - 2. Cementitious liner with Calcium Aluminate Mortar shall be applied to all interior surfaces of the manhole structure including invert, benches, walls, cone, chimney, and grade rings.

K. CURING:

If the material has been applied and furnished in accordance to the specifications, and it has been determined that the environment is not moist enough for natural curing, the contractor will be required to apply a curing compound to all coated surfaces. Curing compound shall meet the requirements of ASTM C309 and have the approval of the lining material Manufacturer and the Engineer prior to use.

Moist curing may also be used in lieu of curing compound. If moist curing is selected, it should be implemented just after the notice of uniform heat generation of the installed lining. Moist curing can consist of the use of soaker hoses, water sprinklers, or vapor/misting machines. Regardless of delivery method, moist curing should continue for a minimum of 18 hours.

L. LINING/COATING OF INVERT:

The rehabilitation lining to be used shall extend to and include the invert of the existing, replaced, or new manhole. The invert of the manhole shall be raised to provide a smooth transition from the upstream to downstream end. Material used at the manhole

invert shall be suited to its intended purpose and shall be compatible with material it contacts.

M. REMOVAL AND DISPOSAL OF DEBRIS:

The Contractor shall be responsible for removal and disposal of all debris removed during the cleaning and rehabilitation process. The Contractor shall comply with all Federal, State, and local regulations regarding disposal of debris.

3.7 FIELD QUALITY CONTROL

A. Field testing shall include the following:

1. Inspection of Interior Surface Preparation – A visual inspection of the manhole surface following the interior surface preparation shall be performed by the Manufacturer before receiving the finish coat. Additionally, the City shall be notified two days in advance of the inspection.
2. Thickness Testing – During application, a dry film thickness test shall be used to ensure uniform thickness during application. Contractor shall perform the test and shall submit documented thickness readings to the City. Any area that does not meet the specified thickness shall receive additional coating at the Contractor's expense.
3. Installation, Leakage and Field Performance Test – A visual inspection by the City of the finished installation shall be performed to demonstrate compliance to these Contract Documents and Manufacturer's printed literature.
4. Holiday Testing – After the protective coating has set hard to the touch it shall be inspected with high voltage holiday detection equipment such as Tinker and Rasor APW or equivalent specified by coating Manufacturer. Perform spark testing upon completion of the visual inspection and in the presence of the City. Spark testing voltage will be set at 100 volts per mil of coating thickness specified. All detected holidays shall be marked and repaired following the manufacturer's recommendations and shall be performed at no cost to the City. Complete additional spark testing after all repairs have been completed, reinspected and approved.
5. Vacuum Testing - Manholes with flows low enough to halt the flow long enough for a vacuum test shall be vacuum tested. All pipes entering the manhole must be sound (not cracked) and should be plugged, taking care to securely place the plug from being drawn into the manhole. Lined mains must have pipe seal preventing leaks in annular space with original pipe. A vacuum pump apparatus shall be placed onto the manhole ring and sealed to the structure in accordance with the pump manufacturers' recommendations. A vacuum pump of ten (10) inches of mercury shall be drawn and the vacuum pump shut off. With the pressure relief valves closed, the time shall be measured for the vacuum to drop to (9) inches. Minimum allowable test times (seconds) for 48" diameter manhole acceptance at the specified vacuum drop shall be as follows:

Manhole Depth (feet)	Test Time (seconds)
4	10
8	20
12	30
16	40
20	50
24	60

6. Adhesion Testing – Affix one 3/4-inch dolly to lined surface at upper cone section, midsection and bottom. Adhesive used to attach dollies to liner shall be rapid setting with tensile strength in excess of liner material and permitted to cure in accordance with Manufacturer's specifications. Prior to pull test, tester shall use scoring device to cut through coating until substrate is reached. Failure due to improper dolly adhesive or scoring will require retesting at no additional cost to City. Pull tests in each area shall exceed 200 psi and include substrate adhered to back of dolly or leave no visual signs of coating material in test hole. Pull tests with results between 150 psi and 200 psi may be acceptable if more than 50% of substrate adhered to back of dolly. If any tests fail, test at least 3 additional locations in the section of the failure, as directed by City. If any of retests fail, remove entire liner and replace at the Contractor's expense. If host structure fails adhesion test, one additional host structure shall be tested as directed by City.

****END OF SECTION****

SECTION 33 01 30.83

MANHOLE FRAMES AND COVERS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies manhole frames and covers
- B. Related Sections
SECTION 03 40 00, PRECAST CONCRETE STRUCTURES

1.02 REFERENCES

- A. City of Morgan Hill
Standard Specifications and Details (latest edition)
- B. American Society for Testing and Materials (ASTM)
ASTM A48 - Standard Specification for Gray Iron Castings

1.03 SUBMITTALS

- A. Submit the following in accordance with the Contract Documents.
Manufacturer's catalog data showing specific items to be supplied for these specifications including:
 - 1. Manhole frames
 - 2. Manhole covers

PART 2 - PRODUCTS

2.01 ACCEPTABLE PRODUCTS

- A. Manhole frames and covers shall be South Bay Foundry SBF-1254 (24 inch opening) or approved equal and installed per the Contract Documents/City Standard Details.
- B. Water tight manhole frames and covers shall be D&L Foundry A-1024 (24 inch opening) or approved equal and installed per the Contract Documents.

2.02 MATERIALS

The materials for manhole frames and covers shall be cast iron in accordance with ASTM A48, Class 35B with solid covers embossed to match the City's standard manhole cover pattern.

2.03 FABRICATION

- A. Manhole frames and covers shall be the heavy-duty type designed for H-20 highway loading. Bearing and wedging surfaces shall be machined to ensure a tight fit and to prevent rocking.
- B. Manufacturer's name, initials, or logo type is to be cast in frame and cover. The bearing surfaces of the frame and cover shall be machined, and the cover shall seat firmly without rocking. Before leaving the foundry, all castings shall be protected with an asphalt coating as follows:

1. The surface to be protected shall be clean, uncoated cast iron free of oil, grease, scale, or rust.
2. The castings shall be cleaned and dipped twice in a preparation of asphalt or coal tar and oil applied at a temperature of not less than 290 degrees or more than 310 degrees Fahrenheit to form a firm and tenacious coating.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Existing and new manhole frames and covers shall not be set to final grade until the pavement has been completed, unless otherwise approved by the Engineer. The manhole frame and cover shall be permanently set when so authorized by the Engineer. The frame shall be centered on the manhole shaft and laid on mortar to final grade. The mortar shall be neatly struck.
- B. Set manhole frames and covers in paved or improved areas flush with the surrounding surfaces unless otherwise specified. Manhole frames and covers in unimproved areas/fields shall be set no less than 6 inches and no more than 12 inches above grade.

****END OF SECTION****

SECTION 33 01 30.86

ADJUST INCIDENTAL STRUCTURES TO GRADE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes raising or lowering the grade or changing the slope of the top of existing structures such as but not limited to manholes, catch basins, sumps, inlets, valve boxes, meter boxes, monument boxes, and similar structures shown or implied on the Drawings.
- B. This section is not applicable to raising or lowering covers on pressurized systems.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. SECTION 32 12 16, ASPHALT CONCRETE PAVEMENT
- B. SECTION 03 40 00, PRECAST CONCRETE STRUCTURES
- C. SECTION 33 01 30.83, MANHOLE FRAME AND COVERS

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 GENERAL

- A. Determine condition of existing incidental structure. Pre-existing damage must be brought to the City's attention prior to commencement of any work.
- B. Existing structures to be adjusted to grade shall be reconstructed to the required grade. The existing frames, grates, and covers shall be reused unless otherwise indicated.
- C. The existing structure shall be dismantled to a sufficient depth to allow reconstruction.
- D. Adjustment will take place just prior to placing of surface pavement for adjustments of the frame and cover. Adjustments which require dismantling and reconstruction of the structure shall be accomplished at the time of subgrade preparation. Pavement which is removed for this adjustment shall be cut square, tack coated, and capped with 2 inches of bituminous concrete.
- E. Each structure that is adjusted shall be cleaned of accumulated silt, debris, or foreign matter prior to final acceptance of the work.
- F. Any items damaged shall be replaced at the Contractor's expense.

3.02 ADJUST INCIDENTAL STRUCTURES TO GRADE

- A. Contractor is responsible for notifying the Engineer of any monuments not shown on the plans that will be disturbed during construction.

- B. Monuments and boxes shall be installed to the finished street grade. The Contractor shall bear the cost and responsibility for obtaining the services of a California registered Surveyor or Civil Engineer to tie out the existing monument, remark, and reset the monument. The Contractor shall be responsible for filing the appropriate Corner Records and shall provide a copy of all recorded documentation to the City prior to project acceptance.
- C. Whether at existing grade or buried, all existing junction structures, traffic signal boxes, monument boxes, water valve boxes, and other miscellaneous utility boxes and vaults within the work area shall be replaced and adjusted to grade. Any items damaged shall be replaced at the Contractor's expense.
- D. Frames, covers, and grates of existing manholes structures, water valves, monuments, or other facilities shall be adjusted to grade at locations where they are disturbed in accordance with the provisions in Section 15, "Existing Facilities," of the Caltrans Standard Specifications except that no metal riser adjustment rings will be permitted.
- E. The covers shall be raised by excavating the frame and cover in a neat line with a dimension not greater than necessary to loosen and adjust the frame with the cover and the concrete collar.
- F. Adjustments shall be accomplished by removing the existing concrete collar around the frame, installing concrete adjustment rings (or other as needed), raising the frame and cover, and construction of a new concrete collar. The concrete collar shall be constructed so that the top of the collar is no greater than two inches and no less than one inch below the existing pavement grade. The void between the top of the concrete collar and the finish grade of the pavement around the collar shall be paved to finish grade with asphalt concrete.
- G. All existing valve and monument boxes shall be removed and replaced at the time of construction. Water valves must be accessible immediately after paving and water valve covers must be raised within 48 hours of paving. All structures must be paved within 24 hours or the Contractor shall be required to furnish temporary paving.

****END OF SECTION****

SECTION 33 05 07.23

HORIZONTAL AUGER BORING

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work of this section includes all labor, machinery, material, construction equipment and appurtenances required to perform in a good workman-like manner all horizontal auger boring (HAB) of the pipeline casings at designated locations and the installation of the carrier pipe within the casing.
- B. Related Specifications:
 - 1. Section 01 10 01, Project Records and Submittals
 - 2. Section 03 34 00, Backfill Grout for Trenchless Carrier Pipe
 - 3. Section 31 73 13, Contact Grouting
 - 4. Section 31 75 00, Shaft Construction
 - 5. Section 33 01 30.01, Sewage Flow Control
 - 6. Section 33 05 07.24, Steel Casing Pipe
 - 7. Section 33 05 31.14, Fusible Polyvinyl Chloride Pipe
 - 8. Section 33 31 11, General Piping
- C. Definitions:
 - 1. Annular Space (Annulus): The theoretical volume created by the radial distance between the smallest outside radius allowed in the tolerance of the jacking pipe and the maximum radius of excavated ground along the length of the installation.
 - 2. Carrier Pipe: The permanent pipe which conveys the product intended to be transported. The carrier pipe may be cased for trenchless crossings.
 - 3. Casing: A jacking pipe which supports a bore. The casing is not a carrier pipe. The carrier pipe is constructed within the casing.
 - 4. Contact Grouting: Grouting outside of the jacking pipe to fill the annular space and voids and to assure that intimate contact for load transfer between the jacking pipe and the native host material has been achieved.

5. Dewatering: The act of removing groundwater for lowering the groundwater elevation using a system of wells and pumps.
6. Down Time: Time lost when the trenchless equipment is unable to operate; generally associated with equipment failure.
7. Drive: Designation of the jacking pipe installed from a jacking shaft to a reception shaft.
8. Entrance/Launch Seal: A mechanical seal, usually comprised of a rubber flange that is mounted to the wall of the jacking shaft. The flange seal is distended by the leading edge as it passes through, creating a seal to prevent lubrication inflow into the shaft during tunneling operations.
9. Exit Seal: Same as launch seal except for the retrieval of the equipment at the reception shaft. Used in high groundwater and unstable soil to prevent ground loss.
10. Exit Shaft: See Reception Shaft
11. Face: the location where excavation is taking place.
12. Face Pressure: Earth and groundwater pressures applied against the cross-sectional area of the face.
13. Factor of Safety: A ratio between the structural capacity of a system divided by expected loads or actual loads.
14. Grouting: The process of filling voids or modifying/improving ground conditions. Grouting materials may be cementitious, chemical, or other mixtures.
15. Heave: Measurable upward movement of the ground or structure as the result of the excavation process.
16. Jacking Force: The total force required to overcome the face pressure component and frictional resistance component along the pipe string to allow the forward movement of the pipe string.
17. Jacking Loads: See Jacking Force.
18. Jacking Pipe: Pipe designed to be installed using pipe jacking techniques.
19. Jacking/Launch Shaft: Excavation from which trenchless technology equipment is launched for the installation of a pipeline. The jacking/launch shaft may incorporate a thrust wall to spread reaction loads to the ground and an entry ring to control inflows of groundwater and ground at the portal.

20. Inadvertent Returns: The loss of lubrication from lubrication system. A special form of inadvertent return, where the fluid exceeds the strength and confining pressure of the ground and reaches the surface or waterway, is called a hydrofracture or “frac-out.”
21. Leading Edge: The first segment of the pipe string as the casing is advanced, usually either a pre-fabricated soil-cutting shoe or a special band welded around the jacking pipe.
22. Lubrication: The act of injecting a fluid, normally bentonite and/or polymers, used to reduce the skin friction and jacking forces on the jacking pipe during installation. The fluid fills the annular space.
23. Maximum Allowable Jacking Force: The largest jacking force that can be applied to the jacked pipe, allowing for an appropriate factor of safety.
24. Maximum Anticipated Jacking Force: The largest anticipated jacking force required to advance jacking pipe along a drive.
25. Obstruction: Any buried object that lies completely or partially within the cross-section of the face and prevents continued forward progress along the design path and allowable tolerances after diligent efforts by the CONTRACTOR.
26. Pipe Jacking: A system of directly installing jacking pipes behind a trenchless installation machine by hydraulic jacking from a jacking shaft such that the joined pipe segments form a continuous string in the ground.
27. Pipe Lubricant: See Lubrication.
28. Pipe String: The succession of joined individual jacking pipe segments being used to advance and support the excavation.
29. Pre-Treated Ground: Grouted or otherwise stabilized ground used to prevent ground deformation or inflows, groundwater inflows, or to stabilize existing features.
30. Product Pipe: See Carrier Pipe
31. Reception/Exit Shaft: Excavation into which the trenchless equipment is driven and recovered.
32. Settlement: Measurable downward movement of the ground, overlying utility, or other structure as the result of the excavation process or dewatering.
33. Spoil: Earth, rock, and other materials excavated during the trenchless process.

34. Surface Settlement Points: Survey control points established at the ground surface along the pipe alignment for monitoring surface movement resulting from subsurface excavation.
35. Trenchless: A technique for underground pipeline and utility construction, replacement, or renewal, without excavation from the ground surface.
36. Zone of Influence: Volume of ground that could possibly be impacted by settlement or heave from either the trenchless installation, shaft excavation, pile driving, or other construction activities.

Design Criteria:

1. CONTRACTOR may adjust the excavated diameter to fit their means and methods as long as the selected diameter enables the installation of the carrier pipe in accordance with this Section.

Performance Requirements:

1. A maximum tolerance of 0.15-foot per 100 linear feet of jacked casing is permitted.
2. Unless otherwise specified, the methods and equipment used in horizontal auger boring shall at option to the CONTRACTOR, provided that the proposed method is approved by DESIGNER and meets all railroad and highway facility owner requirements. Such approval, however, shall in no way relieve CONTRACTOR of the responsibility for meeting the requirements of the Contract Documents.
3. CONTRACTOR shall be fully responsible for the structural sufficiency of the casing and the placement thereof. The details shown on the Contract Drawings are to be considered minimum requirements only.
4. Surface settlement shall be limited as follows:
 - a. Threshold Value, 0.25 inches: Should the threshold value be met or exceed, provide written notice within 24 hours of occurrence and meet with the DESIGNER within 24 hours of providing notice to discuss means and method to determine what changes, if any, shall be made to better control ground movement.
 - b. Response Value, 0.40 inches: Provide written notice and meet with the DESIGNER within 24 hours to discuss means and methods to determine what changes shall be made to better control ground movement. Actively control ground movement in accordance with the accepted plan to prevent reaching the Shutdown Value.

- c. Shutdown Value, 0.50 inches: Stop all work immediately and provide immediate written notice. Meet with the DESIGNER to develop a plan of action before any Work resumes.

1.2 SUBMITTALS

A. General:

1. Submittals shall be made in accordance with Section 01 10 01 and as specified herein.
2. Submittals shall be coordinated with all relevant submittals required in Sections 03 34 00, 31 73 13, 31 75 00, 33 05 31.14, and 33 05 07.24 assembled and submitted as a single, comprehensive submittal.
3. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California.
4. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.

B. Product Data: (NOT USED)

C. Shop Drawings:

1. Submit Shop Drawings of each steel casing and carrier pipe installation prior to fabrication of piping, casing, and appurtenances.
2. Casing spacers with manufacturer recommended spacing.
3. HAB cutter design in CAD and photo format.

D. Working Drawings and Method Statements:

1. Before starting excavation, CONTRACTOR shall provide required submittals of the jacking and receiving shaft shoring design as required by Section 31 75 00, steel casing pipe as required by Section 33 05 07.24, and jacking head proposed to be used. CONTRACTOR shall also submit to DESIGNER for review and record purposes: Drawings, design details, and calculations for support blocks and bracing to prevent carrier pipe shifting and flotation.
2. Casing spacer arrangements as recommended by the manufacturer or CONTRACTOR's Engineer.
3. Casing spacer calculations which demonstrate that the casing spacer can: withstand dynamic installation loads, support the carrier pipe during backfill operations, and resist buoyant forces.

4. Jacking force calculations that clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information. The sources of information shall be from a widely accepted source and acceptable to DESIGNER.
5. Estimated spoils to be removed by HAB and method for measuring actual spoils removed during construction.
6. Sample Guidance Record Log.
7. Sample Daily Progress Report.

E. QUALITY CONTROL

1. Plan: Identify how the quality of materials and installation will be controlled (e.g. measurements, inspections, testing, etc.).
 - a. HAB operating plan for several possible operating scenarios based upon the following assumptions:
 - i. Ground is as anticipated;
 - ii. Ground behavior becomes running;
 - iii. Ground behavior becomes flowing;
 - iv. Ground behavior becomes squeezing;
 - v. Ground N-value becomes harder than anticipated; and
 - vi. Ground water is encountered.
 - b. Operating Plan to Include:
 - i. Auger design;
 - ii. Cutter design;
 - iii. Forward thrust;
 - iv. Advance rate;
 - v. Auger face in relation to casing leading edge; e.g. for sand the auger face will be inside the casing approximate 2D with slow auger rotation in RPM; and
 - vi. Method(s) to restrain cutting head from advancing further than anticipated.

c. Contingency Plans addressing the following:

- i. Line and/or grade tolerance is exceeded.
- ii. Launch and reception plan that addresses steps to be taken in case of ground and/or groundwater entering shaft during launch or reception.
- iii. Obstruction removal plan with observational and operational characteristics that indicate an obstruction is encountered.
- iv. Jacking pipe failure plan with inspection, repair, and removal plans. Repair methods shall be acceptable to the pipe manufacturer and the ENGINEER.
- v. Excessive ground movement plan including means and methods of expeditiously restoring any excessive ground settlement, with special respect to the UPRR right-of-way.
- vi. If lubrication is used, provide inadvertent returns plan with cleanup methods; emergency telephone numbers; sources of equipment and materials needed for containment and clean-up; and corrective actions for reducing operating pressures and modifying lubricant. Lubrication inadvertent return plan shall include operating parameters that are controlled with the intent of preventing an inadvertent return.
- vii. Not Used.
- viii. Excavated ground volume exceeds tolerances on theoretical volume, if applicable.
- ix. Noticeable hydrocarbon smell is detected in shaft.

d. Settlement Monitoring Plan

- i. CONTRACTOR shall submit for approval by DESIGNER a settlement monitoring plan for all HAB locations a minimum of 30 days prior to commencing any HAB work.
- ii. Settlement Monitoring Plan shall include, as a minimum, type and locations of survey points, installation schedule, survey schedule and format of daily readings submittals.

2. Workforce Qualifications:

- a. HAB contractor performing the Work;

- b. HAB Project Superintendent;
 - c. HAB Operator;
 - d. CONTRACTOR's Engineer; and
 - e. CONTRACTOR's Surveyor.
- 3. Certifications: (NOT USED)
- 4. Recordkeeping
 - a. Guidance Record Log for each shift by 9 am the following work day listing all alignment checks, surveys, and any adjustments, before and after, to line and grade control, person making changes, and time and date of change.
 - b. Provide daily progress reports with the following information for each shift by 9 AM the following work day:
 - i. Date.
 - ii. Project name.
 - iii. Start and finish times for each crew.
 - iv. Printed name of operator and signature.
 - v. Number of each pipe segment installed and length of pipe.
 - vi. Start and end time for each pipe segment.
 - vii. Location of pipe by station at the start and end of shift.
 - viii. Visual observations of settlement and heave.
 - ix. Volume of spoil material removal relative to the advancement of the casing.
 - c. Settlement monitoring surveying: Provide settlement monitoring survey readings to the DESIGNER within 24 hours of the readings being made. Submitted data sheets shall contain a cumulative history of readings; including weather conditions, temperature, and proximity of the excavation to the instrument location itself at the time of each reading.
 - d. Provide records of placed volume of material used to fill annular space between casing pipe and carrier pipe by lift and reach.
- 5. Notifications:

- a. All notifications are to be provided in writing and within one work day unless otherwise specified herein.
 - b. Within one work day of any proposed addition, deletion, or change to the scheduling of the HAB operation.
 - c. Immediately notify the DESIGNER upon encountering an object that impedes the forward movement of the casing.
 - d. Immediately notify the DESIGNER upon implementation of any contingency plan.
6. As-Builts
- a. Guidance Record Log.
 - b. Provide as-built survey of the casing pipe prior to installation of carrier pipe. Provide results in both tabular format and AutoCAD format acceptable to the DESIGNER. Scale to be acceptable to the DESIGNER. Survey shall confirm that carrier pipe can be installed within design tolerances.

1.3 QUALITY ASSURANCE

- A. Comply with the following industry standards effective at time of bid:
1. American Railway Engineering and Maintenance-of-Way Association (AREMA): Manual for Railway Engineering
 2. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
 3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 4. Tunnelman's Ground Classification, provided in Appendix C of Specifications and Contract Documents.
 5. Union Pacific Pipeline Installation Engineering Specifications
- B. Qualifications outlined below shall be met at the time of bid and remain in force through completion of the project:
1. Only workmen experienced in similar tunneling methods as proposed by CONTRACTOR shall be used in performing the Work.
 2. The CONTRACTOR performing the HAB work shall have at least ten (10) years of experience in performing HAB and shall have successfully completed:

- a. Three (3) HAB projects installing casing pipe between 36 inches and 54 inches OD.
 - b. Three (3) HAB projects using the same type of casing pipe material as specified for this project.
 - c. Three (3) HAB projects for gravity sanitary sewers.
 - d. Three (3) HAB projects in similar ground conditions as measured by soil type, N value and hydrostatic head, as anticipated on this project, with a drive length of at least 90 feet on each project.
3. HAB Project Superintendent shall have:
- a. A minimum of five (5) years of experience in the installation of pipes using HAB.
 - b. A minimum of five (5) projects, with each project consisting of at least 90 feet of pipe installed using HAB.
 - c. Successfully completed two (2) HAB projects installing casing pipe between 36 inches and 54 inches OD.
 - d. Successfully completed two (2) HAB projects using the same type of casing pipe material as specified for this project.
 - e. Successfully completed two (2) HAB projects in similar ground conditions as measured by soil type, N value, and hydrostatic head, as anticipated on this project.
4. Operator shall have:
- a. A minimum of five (5) years of experience in the installation of pipes using HAB.
 - b. A minimum of ten (10) projects, with each project consisting of at least 115 feet of pipe installed using HAB.
 - c. Successfully completed two (2) HAB projects installing casing pipe between 36 inches and 54 inches OD.
 - d. Successfully completed two (2) HAB projects installing the same type of casing pipe material as specified for this project.
 - e. Successfully completed two (2) HAB projects in similar ground conditions as measured by soil type, N-value, and hydrostatic head, as anticipated on this project.

- f. Operated HAB equipment similar to the one proposed on this project.
- 5. HAB engineer shall be a Professional Engineer registered in the State of California. Experience shall include HAB design calculations on five (5) projects within the last five (5) years.
- 6. Surveyor shall be a Professional Land Surveyor registered in the State of California with experience in underground surveying. Experience shall include:
 - a. Five (5) tunnel projects within the last five (5) years,
 - b. Transfer of points and line from the surface to below ground,
 - c. Closed loop tunnel survey for line and grade.
- 7. Experience records shall list the five (5) most recent HAB projects, including all HAB projects completed for the OWNER, and all projects demonstrating the specified experience. The experience record shall include name of project; owner of the project; names of contacts including all contact information; casing pipe material used; casing pipe outside diameter; ground conditions as measured by soil type, N value, and hydrostatic head; longest drive planned and completed; and total footage planned and completed.

1.4 JOB CONDITIONS

- A. See exploratory boring logs and laboratory testing results in in the Geotechnical Investigation Report, which can be made available for reference only.
- B. Groundwater conditions are known to change from time to time and following a rain event.
- C. Depth of disturbed soil varies as to the borehole locations and historic land use and local topography.

PART 2

PRODUCTS

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: All materials supplied shall conform to these technical specifications.
- B. Pipe Casing: Steel casing pipe shall be in accordance with Section 33 05 07.24.
- C. Lubrication shall be used at all times if the jacking force equation uses lubrication.
- D. Casing Pipe Joints: The joints of sections of casing pipe to be jacked shall be in accordance with Section 33 05 07.24. It shall be CONTRACTOR's responsibility to provide stress

transfer across the joints which is capable of resisting the jacking forces involved. Welds shall be ground smooth on the side of the casing to provide smooth bore and shall not extend more than 1/4-inches beyond pipe outside diameter. Field welds shall be complete penetration, single-level groove type joint. Welds shall be water-tight and continuous.

E. Steel Casing Spacers:

1. The carrier pipe, inside of steel casing pipe, shall be supported by casing spacers. The spacers shall be of adequate height to position the carrier pipe in the center of casing with a minimum clearance of 1-1/2-inches. All casing spacers shall be designed, taking into consideration the weight of the carrier pipe filled with water.
2. Casing spacers shall be designed to:
 - a. Install the carrier pipe to design line and grade allowing for installation tolerances.
 - b. Slide along surfaces so as to reduce friction and slide over weld beads.
 - c. Symmetrical design about the vertical axis with an even number of legs, load bearing supports, at or below the carrier pipe spring line, and arms, supports above the spring line that restrict buoyant forces.
 - d. Withstand dynamic installation loads
 - e. Assembled onto the carrier pipe before insertion into the casing pipe.
 - f. Manufactured of a durable material.
 - g. Designed to prevent dielectric charges flowing between the casing, casing spacer, and carrier pipe.

F. Casing Bulkheads: Casing end seals or 12-inch-thick masonry bulkheads shall be used to completely close both openings on either end of the casing.

G. Contact Grout: Shall conform to Section 31 73 13.

H. Carrier Pipe: Shall conform to Section 33 05 31.14.

I. Backfill Grout: Shall conform to Section 03 34 00.

PART 3 EXECUTION

3.1 GENERAL

A. Perform work in accordance with accepted submittals.

- B. Provide immediate notice of any change to work provided in accepted submittal. Provide written notice within one working day including revised work plan for review by DESIGNER.
- C. Provide OWNER and DESIGNER with access to the work.
- D. The installation of pipeline casings under railroads and highways shall be in accordance with all the requirements of encroachment permits issued by the governing agency.
- E. Once the jacking operation has commenced, it shall be performed in a timely manner minimizing work stoppages including weekend and holiday stoppages.

3.2 INSTALLATION:

A. Excavation:

1. Every effort shall be made to avoid any loss of earth outside the jacked casing by following:
 - a. Prevent the rear of the cutting head from advancing in front of the leading edge of the casing by more than 1/3 times the casing diameter when in firm cohesive ground conditions as defined by the Tunnelman's Ground Classification and not to exceed 8-inches.
 - b. In unstable conditions, in soil behaviors other than firm, slow raveling, and squeezing as defined by the Tunnelman's Ground Classification, the cutting head is retracted into the casing a distance that permits a balance between pushing pressure, pipe advancement and soil conditions.
 - c. Development of and maintaining a log of the volume of spoil material removal relative to the advancement of the casing.
 - d. Provide HAB guidance using survey, water level, or other guidance system to ensure casing is installed within design line and grade.
2. Excavated material shall be removed from the casing as excavation progresses, and no accumulation of such material within the conduit will be permitted.

B. Contact Grouting: Perform as indicated in Section 31 73 13.

C. Extreme care shall be exercised by CONTRACTOR to maintain line and grade during jacking operations, and CONTRACTOR may be required to modify the manner in which the jacking operation is being conducted to correct any deviation when deemed necessary by DESIGNER.

D. Unforeseen Conditions: Casing bores not completed and abandoned because of unforeseen subsurface conditions beyond the control of CONTRACTOR shall be left in a safe condition

including filling the casing or bore to restore the structural integrity of the area to a condition equal to that prior to construction. Casing or bore shall be filled completely with cement grout as previously specified.

E. Installation of Carrier Pipe

1. Carrier pipes installed inside of steel casing pipe shall be supported at a minimum of every 10-foot by casing spacers or two (2) spacers per pipe or as recommended by the casing spacer manufacturer or CONTRACTOR's Engineer in writing, whichever is less.
2. Adjust the pipe grade as required by changing the thickness of the supports to compensate for any grade variations of the casing, and to maintain carrier pipelines, grades, and dimensions, as shown on the Contract Drawings.
3. If the alignment of the casing is such that the carrier pipe grade cannot be met, the grade of the casing shall, if required by DESIGNER, be adjusted. If realignment is not deemed feasible by DESIGNER, another casing meeting the required grade shall be installed. The abandoned casing shall be filled with cementitious backfill, as specified in Section 03 34 00, and the ends plugged with 12-inch thick masonry plugs or other materials approved by DESIGNER. Realignment or replacement Work shall in no way result in extra cost to the OWNER.
4. All carrier pipe shall be installed in the casing shall conform to Sections 33 31 11 and 33 05 31.14.

3.3 WORK AREA PREPARATION AND MAINTENANCE

- A. Organize HAB equipment in such a manner as to enable proper operation at all times, to minimize impacts to property owners.
- B. Provide a suitable containment basins made of plastic lining and sand bags for any equipment operating with fuel, hydraulic, or lubrication oils.
- C. Maintain and keep all equipment in proper working order. All oil, hydraulic, or fuel leaks shall be repaired immediately upon discovery. Any leaking equipment shall not be used until repaired. Any fluid shall be contained and cleaned up upon discovery. Provide written notification within 4 hours of discovery.
- D. Contain all lubricant spills upon discovery and clean up and dispose of spills properly. Provide written notification within 4 hours of discovery.
- E. Provide temporary drainage facilities during construction.

3.4 FIELD QUALITY CONTROL

- A. Testing: (Not Used)

B. Inspection, Maintenance, and Repair: (NOT USED)

C. Surveying:

1. Survey casing during installation. Prepare and pull augers at the third point to ensure the casing is being installed within the design tolerances.
2. Perform as-built survey confirming the carrier pipe will be installed per the design and within design tolerances.

D. Instrumentation and Monitoring:

1. Settlement Monitoring: CONTRACTOR shall install settlement monitoring stations for each tunnel crossing a minimum of 30 days prior to commencement of shaft construction. Each settlement monitoring station shall consist of one surface settlement points (survey point) above the tunnel centerline and two survey points located perpendicularly six feet from the tunnel centerline on opposite sides. Settlement monitoring stations shall be installed half way between the shafts and the rails, at the rail edges and on the centerline of each rail for a minimum total of six settlement marker sections per HAB rail crossing. All survey points shall be monitored every 24 hours during construction of the HAB and shafts.
2. Provide settlement monitoring readings with an accuracy of at least ± 0.01 foot.
3. All measured deflection values are relative to the baseline value identified at the start of construction. Baselines shall not be reset after each bore and shall remain the same for the duration of this Contract

****END OF SECTION****

SECTION 33 05 07.24

STEEL CASING PIPE

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section provides specifications for a steel casing pipe to be installed by horizontal auger boring.
- B. Furnish all designs, tools, equipment, materials, and supplies and perform all labor required to complete the Work as indicated on the Contract Drawings and specified herein.
- C. Related Sections:
 - 1. Section 01 10 01, Project Records and Submittals
 - 2. Section 3 73 13 Contact Grouting
 - 3. Section 33 05 07.23, Horizontal Auger Boring
- D. Definitions: See Section 33 05 07.23.
- E. Design Criteria:
 - 1. The casing pipe shall meet or exceed the minimum nominal diameter indicated in the Contract Drawings.
 - 2. The Contractor shall select an excavated diameter and casing diameter to fit their means and methods, subject to acceptance by the DESIGNER.
 - 3. The selected thickness of steel casing pipe shall be of sufficient thickness and axial strength to withstand the forces to be encountered during the installation process while meeting the thickness requirements of the Contract Drawings, Union Pacific Pipeline Installation Engineering Specifications, and AREMA for railway undercrossings.
 - 4. Select casing thickness to withstand the anticipated stresses with a minimum factor of safety of 2.0.
 - 5. Steel casing pipe shall be installed to the minimum extent shown on the Contract Drawings.

1.2 SUBMITTALS

A. General

1. Submittals shall be made in accordance with Section 01 10 01 and as specified herein.
2. Submittals shall be coordinated with all relevant submittals required in Section 33 05 23.23, assembled and submitted as a single, comprehensive submittal.
3. Where calculations are required to be submitted, they shall be signed and sealed by a Professional Civil Engineer registered in the State of California.
4. Calculations shall clearly identify all parameters used, state all assumptions made in the calculation, and identify all sources of information.
5. All sources of information shall be from a widely accepted source and shall be acceptable to the Engineer.
6. All shop drawings shall be legible with dimensions accurately shown and clearly marked in English.

B. Product Data

1. Submit manufacturer's mill specification sheet listing diameter, thickness, and class of steel used in making the casing, and the mill certification.
2. Submit manufacturer's pipe handling instructions.
3. Submit the pipe manufacturer's recommendations for joint connections, repairs for joint failures, and repairs for sidewall failure.

C. Shop Drawings

1. Submit shop drawing of casing showing prefabricated grout ports in accordance with the CONTRACTOR's means and methods.
2. Submit shop drawing showing lay length and joint detail.

D. Working Drawings and Method Statements

1. Provide the maximum anticipated earth loads, live loads, including AREMA E80 loads, highway loadings in accordance with Caltrans Bridge Design Specifications, installation loads, contact grouting, and handling loads that might be imposed on the casing pipe, and ensure that anticipated loads are incorporated into the manufacturer's design of the casing pipe subject to the DESIGNER's review.

2. Calculations demonstrating that the casing pipe has been designed to support the maximum anticipated construction and operational loads, with special respect to the maximum anticipated installation loads.
3. Working drawing of casing showing grout ports if and when CONTRACTOR elects to install grout ports before casing installation.

E. QUALITY CONTROL

1. Qualifications

- a. Contractor Engineer's experience record. Experience record shall include project name, project owner's name, project owner's contact information, project description including casing size, length, purpose of undercrossing, carrier pipe material, carrier pipe service type, and soil type by UCS system including N-value and ground water level.
- b. Shall include five (5) projects in the last five (5) years and all projects demonstrating the specified experience.

2. Certifications

- a. Welder qualifications and third-party certification of a welding test standard for pipe acceptable to DESIGNER.
- b. Submit a certificate of compliance that verifies the pipe complies with the project specifications, including pipe design data and tolerances.

1.3 QUALITY ASSURANCE

A. Comply with the following industry standards effective at time of bid:

1. American Railway Engineering and Maintenance-of-Way Association (AREMA): Manual for Railway Engineering
2. ASTM A36 - Standard Specification for Carbon Structural Steel
3. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
4. ANSI/AWS D1.1 – Structural Welding Code – Steel
5. Caltrans Bridge Design Specifications
6. Union Pacific Pipeline Installation Engineering Specifications

B. Qualifications

1. All welding procedures used to fabricate steel casings shall be prequalified under the provisions of ANSI/AWA D1.1. All welding shall be performed by skilled welders, welding operators and tackers, experienced in the type of materials to be used. Welders shall be qualified under the provisions of ANSI/AWA D1.1 by an independent local, approved testing agency not more than six (6) months prior to commencing work on the casing.
2. Contractor's Engineer shall demonstrate qualified experience performing similar calculations for a similar installation method.

PART 2 PRODUCTS

2.1 MATERIALS

A. Casing Pipe

1. Provide casing as required by the Contract Drawings.
2. The wall thickness of casing passing under railroad or highway facility right-of-way shall not be less than that allowed by the governing agency of the facility. Steel casing shall conform to the requirements of the UPRR Agreement provided in Appendix A.
3. Provide casing that is specifically manufactured for the CONTRACTOR's trenchless pipeline installation method with a smooth outer wall and is manufactured to the following dimensional criteria:
 - a. Circumference $< 0.5\%$
 - b. Exterior Roundness $< 0.5\%$
 - c. End Squareness $\pm 1/16$ in
 - d. Straightness $< 1/8$ in
 - e. Pipe Length $\pm 1/4$ in
4. Comply with ASTM A36, minimum.

B. All casing segments shall be joined by continuous, full circumference, full penetration butt welds or Permalok™ joint.

C. Contact Grout and Lubrication Ports:

1. Grout ports are to be standard 2-inch ports.
2. Provide at least one (1) port per 10 linear feet of casing pipe.
3. Grout ports are to be preinstalled and of a design that does not impact HAB.

4. Ports to be staggered along circumference of pipe with at least 120 degrees separation from previous port and with the approval of the ENGINEER.

PART 3 EXECUTION (NOT USED)

****END OF SECTION****

SECTION 33 05 31.11

SDR 26/PS 115 POLYVINYL CHLORIDE SEWER PIPE

PART 1 – GENERAL

1.01 DESCRIPTION

The Contractor shall furnish and install all 4-inch to 27-inch underground polyvinyl chloride (PVC), non-pressure pipe and all appurtenant work, complete and in place, all in accordance with the Contract Documents.

1.02 REFERENCES

- A. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued or replaced.
- B. American Society of Testing and Materials (ASTM)
 - 1. ASTM D1784 - Standard Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds
 - 2. ASTM D2241 - Standard Specification for Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)
 - 3. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
 - 4. ASTM D3034 - Standard Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings
 - 5. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
 - 6. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - 7. ASTM F679 – Standard Specifications for Poly Vinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings

1.03 SUBMITTALS

In accordance with the Contract Documents, Shop Drawings, Product Data and Samples, the Contractor shall prepare and submit to the Engineer the following:

A. Shop Drawings:

The Contractor shall submit shop drawings and laying diagrams of all pipe, joints, bends, special fittings, and piping.

B. Certificates:

The Contractor shall provide manufacturers' certificates for all materials indicating conformance to the Contract Documents.

1.04 QUALITY ASSURANCE

A. Testing: All materials testing will be based upon applicable ASTM Test Methods and AWWA Standards referenced herein for the materials specified.

B. All costs of such inspection and tests shall be borne by the Contractor.

C. Certificates: Manufacturer's notarized certificates of compliance shall be furnished by the Contractor. Certification by the manufacturer that pipe and fittings furnished under this specification were manufactured, sampled, tested, and inspected in accordance with ASTM D3034/ASTM F679. Certification shall be signed by an authorized agent of the manufacturer. A report of test results shall be furnished if requested by the Engineer. The date the pipe was manufactured shall be included in the Certification.

D. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

PART 2 – PRODUCTS

2.01 GENERAL

A. All PVC pipe shall be continuously and permanently marked with the manufacturer's name, pipe size, dimension ratio and pressure rating in psi.

B. The Contractor shall require the manufacturer to mark the date of extrusion on the pipe. This dating shall be done in conjunction with records to be held by the manufacturer for two (2) years, covering quality control tests, raw material batch number, and other information deemed necessary by the manufacturer.

2.02 PIPE

A. Polyvinyl chloride sewer pipe, fittings and joint materials shall be SDR 26 PVC/PS 115 PVC except as otherwise specified herein and shown on the drawings.

B. All materials incidental to flexible pipe installations such as gaskets, joint lubricants, cements, etc., shall be supplied by the pipe manufacturer. All flexible pipe required in odd lengths shall be cut using a proper cutting tool and guide that insures true-line cut on planes perpendicular to the pipe axis. No bevel cuts for pipeline alignment adjustments will be permitted.

C. Unless otherwise specified, SDR 26 PVC/PS 115 PVC pipe shall be in accordance with the requirements for SDR 26/PS 115 sewer pipe as stated in ASTM D3034/ASTM

F679. Pipe joints and fittings shall be factory assembled, integral wall bell and spigot configuration, compatible with the pipe and shall meet the requirements of ASTM D3212. The furnished pipe shall be sewer pipe green in color.

- D. PVC pipe shall have a solid cross section rubber ring gasket. The gasket shall be securely attached to the pipe to prevent displacement of the gasket when installed in the field. All rubber-ring gaskets shall be in accordance with ASTM F477. Lubricant used for field assembly of gasketed PVC pipe shall have no detrimental effect on the gasket, joint, fitting, or pipe and shall be as recommended by the manufacturer. Provide rubber waterstop gaskets on the pipe exterior perimeter at the entry of all PVC pipe into manhole bases, type and manufacturer to be approved by the Engineer.

- E. All PVC pipe shall be joined by compression joints unless otherwise indicated in the Contract Documents and shall conform to the following requirements:

Polyvinyl-chloride pipe (PVC) shall conform to the requirements of ASTM D 3034/ASTM F679, SDR 26/PS 115. Material for PVC pipe shall conform to the requirements of ASTM D 1784, Cells Class 12454, as defined therein.

2.03 FITTINGS

- A. All fittings for PVC pipe shall conform to the requirements of ASTM D3034/ASTM F679. The ring groove and gasket ring shall be compatible with PVC pipe ends. Flanged fittings shall be compatible with cast-iron or ductile-iron pipe fittings.
- B. The strength class of the fittings shall be not less than the strength class of any adjoining pipe.

2.04 BEDDING MATERIAL

Pipe bedding material shall conform to the requirements of Section 31 23 00, Earthwork.

2.05 FLEXIBLE COUPLINGS

Flexible couplings shall be Mission Rubber Flex-Seal adjustable repair couplings or approved equal. Couplings shall have T-Bolt clamps to secure the coupling tightly to entering and exiting pipes. All screw-clamp hardware shall be Type 316 stainless steel with stainless steel support sleeve. Rubber material shall be suitable for sewage service.

PART 3 – EXECUTION

3.01 GENERAL

- A. All laying, jointing, and testing for defects and for leakage shall be performed in the presence of the Engineer and shall be subject to inspection before acceptance. All material found during the progress of the work to have defects will be rejected, and the Contractor shall promptly remove such defective materials from the site of the work.
- B. Installation shall conform to the requirements of ASTM D 2321 and to the supplementary requirements or modifications specified herein. Wherever the provisions of this Section and the requirements of ASTM D 2321 are in conflict, the more stringent provision shall apply.

3.02 TRENCHING AND BACKFILL

- A. Trench excavation and backfill shall conform to the requirements of Section 31 23 00, Earthwork.
- B. The minimum depth of cover over the top of the pipe shall be as indicated in the Contract Documents.

3.03 LAYING PIPE

- A. The pipe shall be installed in accordance with the requirements of ASTM D 2321 and as indicated in the Contract Documents. The Sections shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for jointings, the bedding for the pipe shall be checked for firmness and uniformity of surface.
- B. Proper implements, tools, and facilities, as recommended by the pipe manufacturer's standard printed installation instructions, shall be provided and used by the Contractor for safe and efficient execution of the work. All pipe, fittings, and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
- C. Cutting and machining of the pipe shall be accomplished in accordance with the pipe manufacturer's standard procedures for this operation. Pipe shall not be cut with a cold-chisel, standard-iron pipe cutter, nor any other method that may fracture the pipe or produce ragged, uneven edges.
- D. The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged, or unsound pipe shall be repaired or replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean during and after laying. All openings in the pipeline shall be closed with watertight, expandable-type sewer plugs or PVC test plugs at the end of each day's operation or whenever the pipe openings are left unattended. The use of burlap, wood, or other similar temporary plugs will not be permitted.
- E. Adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the Contractor, at its own expense, under the direction of the Engineer.
- F. Where the grade or alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor in cooperation with owners of such utility structures. Unless otherwise indicated, this work shall be performed at the Contractor's expense.

3.04 HANDLING

- A. Handling of the PVC pipe shall be done with care to ensure that the pipe is not damaged in any manner during storage, transit, loading, unloading, and installation.
- B. Pipe shall be inspected both prior to and after installation in the ditch, and all defective lengths shall be rejected and immediately removed from the working area.

3.05 FIELD JOINTING

- A. Each pipe-compression-type joint shall be joined with a lock-in rubber ring and a ring groove that is designed to resist displacement during pipe insertion.
 - B. The ring and the ring seat inside the bell shall be wiped clean before the gasket is inserted. At this time, a thin film of lubricant shall be applied to the exposed surface of the ring and to the outside of the clean pipe end. Lubricant other than that furnished with the pipe shall not be used. The end of the pipe shall then be forced into the ring to complete the joint.
 - C. The pipe shall not be deflected either vertically or horizontally in excess of the printed recommendations of the manufacturer of the coupling.
 - D. When pipe laying is not in progress, the open ends of the pipe shall be closed to prevent trench water from entering pipe. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and re-laid in an acceptable manner. No pipe shall be laid when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for such work.
 - E. All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made. The Contractor shall not over-insert PVC pipe beyond the home mark on each length of pipe.
- The socket and spigot configurations for the fittings and couplings shall be compatible to those used for the pipe.

3.06 INSTALLATION OF BENDS, TEES, AND REDUCERS

- A. Cast-iron and PVC fittings shall be installed utilizing standard installation procedures. Fittings shall be lowered into trench by means of rope, cable, chain, or other acceptable means without damage to the fittings. Cable, rope, or other devices used for lowering fittings into trenches shall be attached around exterior of fittings for handling. Under no circumstances shall the cable, rope, or other device be attached through the fitting's interior for handling. Fittings shall be carefully connected to pipe or other facility, and joint shall be checked to ensure a sound and proper joint.

3.07 TESTING AND CLEANING

- A. Field testing of PVC gravity sewer pipe shall conform to the requirements of Section 33 01 30.41, Sanitary Sewer System Testing and Cleaning.

3.08 CCTV

- A. The completed pipeline shall have CCTV inspection as specified in Section 33 01 30.11 Closed Circuit Television (CCTV) Inspection of Sanitary Sewer System.

****END OF SECTION****

SECTION 33 05 31.14 FUSIBLE POLYVINYL CHLORIDE SEWER PIPE

PART 1 - GENERAL

1.1 REQUIREMENTS

- A. The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the Work as indicated in the Contract Documents.
- B. The Contractor shall furnish, install, and test fusible polyvinylchloride (FPVCP) pipe, fittings, and appurtenances of the dimensions and to the lines and grades shown on the Contract Documents.
- C. This section covers the furnishing and installation of FPVCP and fittings for sewers and drains, as specified and shown in the Contract Documents.
- D. Excavation and backfill, including the pipe bedding, shall conform to the provisions of Section 31 23 00, Earthwork, of these Specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.
- B. Related Sections
 - 1. SECTION 01 55 26, Traffic Control
 - 2. SECTION 03 34 00, Backfill Grout
 - 3. SECTION 03 40 00, Precast Concrete Structures
 - 4. SECTION 31 23 00, Earthwork
 - 5. SECTION 33 01 30.41, Sanitary Sewer System Testing And Cleaning
 - 6. SECTION 33 05 07.23 – Horizontal Auger Boring

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. All Work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following publications to the extent that the provisions thereof are not in conflict with other provisions of these Specifications.
- B. Comply with the current provisions of the following codes and standards.
 - AWWA C605 Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVOC)

	Pressure Pipe and Fittings.
AWWA C905	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 in. through 48 in.
AWWA M23	AWWA Manual of Supply Practices PVC Pipe - Design and Installation, Second Edition.
ASTM C923	Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals.
ASTM D1784	Specifications for Rigid Polyvinylchloride (PVC) Compounds.
ASTM D2152	Test Method for Degree of Fusion of Extruded Polyvinylchloride (PVC) Pipe and Molded Fittings by Acetone Immersion.

- C. Comply with the applicable reference specifications as directed in the General Conditions.

1.4 SUBMITTALS

- A. Submittals shall be made in accordance with the Standard Specifications, General Conditions and Special Conditions and as specified herein.
- B. The following product data is required from the pipe supplier and/or fusion provider:
1. Pipe Size.
 2. Dimensionality.
 3. Pressure Class per applicable standard.
 4. Color.
 5. Recommended Minimum Bending Radius.
 6. Recommended Maximum Safe Pull Force.
 7. Fusion technician qualification indicating conformance with this Specification.
 8. Recommendations for shipping, handling, lifting and fusing.
 9. Manufacturer's technical data showing complete information on material composition, physical properties, pressure rating and dimensions of the FPVCP. Manufacturer's recommendations for transport, handling, storage, and repair of the FPVCP shall be included.
 10. Specifications of fusing machine and fusing procedures and restrictions, including machine cut sheet.

11. Fusion machine data logger with time and pressure recording elements.
12. Not used
13. Pipe manufacturers' joint assembly procedure including cool down time and data logger equipment.
14. FPVCP fusion technician's experience and qualifications demonstrating conformance with Quality Assurance requirements.
15. Written certification from the FPVCP pipe supplier that the fusion technician has received training in the proper use of the fusion equipment.
16. Fusion Data (heater plate temperature, pressures, time/duration, etc.) shall be submitted to the Engineer within two days following the completion of any joint.
17. Shop drawings and cut sheets providing information on fittings, including dimensions, compliance with standards and pressure rating.
18. Information on pipe accessories, including but not limited to special adaptors for connections to ductile iron fittings.
19. FPVCP manufacturer shall furnish an affidavit of compliance that all delivered materials comply with the requirements of these specifications.
20. Contractor preconstruction submittals for auger bore installation.

Certifications: The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this section, as specified in the referenced standards.

1.5 CARE AND HANDLING

- A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Engineer.
- B. Pipe shall be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed.
- C. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the Engineer.

- D. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.
- E. The Contractor shall not store pipe upon the roadway or parkway of residential streets for more than 5 days or upon commercial streets for more than 3 days.
- F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

1.6 QUALITY ASSURANCE

- A. General:
 - 1. All piping shall be made from PVC compound conforming to cell classification 12454 per ASTM D1784.
 - 2. Fusion Technician shall be qualified by the pipe supplier to fuse FPVCP pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.
 - 3. FPVCP shall be used as manufactured under the trade Fusible C-905® for Underground Solutions, Inc., Poway, CA, (858) 679-9551 or Engineer approved equal. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051.
 - 4. The pipe shall be warranted for one year per the pipe supplier's standard terms.
 - 5. In addition to the pipe warranty, the fusion services shall be warranted for one year per the fusion service provider's standard terms.

PART 2 - PRODUCTS

2.1 FUSIBLE POLYVINYLCHLORIDE PIPE (FPVCP)

- A. FPVCP for wastewater carrier pipe shall conform to, AWWA C905-10, for standard dimensions as applicable. Testing shall be in accordance with AWWA C905-10.
- B. FPVCP shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.
- C. FPVCP shall be manufactured in custom lengths as required to accommodate

the launching shaft dimensions.

- D. Fusible polyvinylchloride (FPVC) pipe shall be green in color.
- E. Pipe generally shall be marked per AWWA C905 and shall include as a minimum:
 - 1. Nominal pipe size.
 - 2. PVC.
 - 3. Dimension Ratio, Standard Dimension Ratio or Schedule.
 - 4. AWWA pressure class.
 - 5. AWWA standard designation number.
 - 6. Extrusion production-record code.
 - 7. Trademark or trade name.
 - 8. Cell Classification 12454 and/or PVC material code shall be included.
- F. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.
- G. Fusible polyvinyl chloride (FPVC) pipe shall be C-905, Dimension Ratio (DR) 21.

2.2 FUSION JOINTS

- A. Unless otherwise specified, fusible polyvinylchloride pipe lengths shall be assembled in the field with butt-fused joints. The fusion technician shall follow the pipe supplier's guidelines for this procedure. All fusion joints shall be completed as described in this Specification.
- B. Joints shall be watertight under pressure and foreseeable conditions of expansion, contraction and settlement.

2.3 CONNECTION TO SANITARY SEWER MANHOLES AND STRUCTURES

- A. Fusible polyvinylchloride (FPVC) pipe shall be connected to manholes and other structures to provide a leak-free, properly graded flow into or out of the manhole or structure.
- B. Connections to a manhole or structure shall be as indicated in the construction documents.

1. A flexible, rubber watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures in accordance with the Contract Documents.
2. Grout internal joint space with non-shrink grout.

2.4 BEDDING AND ENCASEMENT MATERIALS

- A. Where installed in open cut and backfill trenching, all bedding and encasement materials shall be as shown per the Contract Documents and per Section 31 23 00, Earthwork, of these Specifications.
- B. Where installed, casing and pipe support shall be shown per the Contract Documents and backfill grout shall conform to Section 03 34 00, Backfill Grout. Casing spacers shall conform as required per the Contract Documents.

PART 3 - EXECUTION

3.1 GENERAL

- A. Pipe shall be off loaded, loaded, installed, handled, stored and stacked per the pipe supplier's guidelines. These guidelines include compliance with the minimum recommended bend radius and maximum safe pull force for the specific pipe being used.
- B. The general best practices of the industry per AWWA M23 shall also be observed.
- C. For open cut and backfill installations, trench excavation, bracing methods, foundation preparation, pipe bedding, trench backfill, and related operations shall be in accordance with the requirements of Section 02200, Earthwork.
- D. The sewer shall be constructed to the alignment and grade shown. The grade line shown on the profile is the invert or interior bottom of the pipe. The excavation shall be made a sufficient distance below the grade line to allow for the placing of the sewer pipe and the supporting bedding if such bedding is shown. Should the trench be excavated to a depth greater than required, the Contractor shall refill such excess excavation with the same fill material as specified for the overlying fill or bedding and compacted as required for such overlying fill or bedding.
- E. Sewer pipelines shall never be used as drains for removing water that has infiltrated into the trenches.
- F. For installation with casing, the installation shall conform to Section 02715, Carrier Pipe Installation into Casing.

3.2 FACTORY TESTING

- A. All pipes shall be tested in the factory per AWWA C905-10 prior to delivery to project site.

3.3 FUSION PROCESS

- A. FPVCP will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.
- B. FPVCP will be fused by qualified fusion technicians holding current qualification credentials for the pipe size being fused, as documented by the pipe supplier.
- C. Pipe supplier's procedures shall be followed at all times during fusion operations.
- D. Each fusion joint shall be recorded and logged by an approved electronic monitoring device (data logger) connected to the fusion machine, which utilizes a current version of the pipe supplier's recommended and compatible software.
- E. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. This includes requirements for safety, maintenance, and operation with modifications made for PVC.
- F. The FPVCP shall not be placed in tension or compression for installation until the pipe has cooled to within 5°F of the ambient pipe temperature.

3.4 GENERAL INSTALLATION

- A. Installation guidelines from the pipe supplier shall be followed for all installations.
- B. The FPVCP will be installed in a manner so as not to exceed the recommended bending radius guidelines.
- C. Where FPVCP is installed by pulling in tension, the recommended maximum safe pulling force, established by the pipe supplier, shall not be exceeded.
- D. Internal and external rolled up beads formed at joints during fusion process shall be removed from the inside of the pipe. Removal shall take place immediately after the fusion joint is complete, including cool down. The Contractor shall exercise caution to avoid damage to the joint and pipe while removing the bead and shall be responsible for repairs and/or

replacement of any damaged joint or pipe.

3.5 FIELD WELDING QUALITY CONTROL

- A. General: The Contractor shall be responsible for employing a rigorous quality control procedure for field welding quality control and documentation. All field-welding shall be accomplished with Engineer-Approved Equipment. Documentation of each field weld shall be submitted to the Engineer for record within two days of weld completion.
- B. Data Collector and Recording Device: The Contractor shall utilize data collection and recording equipment to verify proper fusion procedures have been followed prior to installation. The Data collector shall consist of a rugged computer to record and report key weld parameters including the heater temperature and fusion pressure profile over time. Data Collector and Recording Devices shall be Datalogger TM as manufactured by McElroy, or Engineer-Approved Equal.
- C. Weld Quality Control Documentation: The Contractor shall produce and submit field weld reports within two days of welding activity. Report shall provide the following information, at a minimum:
 - 1. Date, time, and ambient temperature.
 - 2. Joint Number that correlates to Project pipeline stationing.
 - 3. Employee Identification that is unique to Project approved FPVC Fusion Technician.
 - 4. Equipment Identification and specifications including piston area.
 - 5. Pipe Data including material, size, Dimension Ratio.
 - 6. Interfacial Pressure in pounds per square inch (psi) including Heat, Soak, Fuse, and Cool.
 - 7. Recommended Gauge Pressures in pounds per square inch (psi) including Heat, Soak, Fuse, and Cool.
 - 8. Recorded Data including Drag pressure, weld temperature.
 - 9. Graphs of pressure and temperature over time. Provide one graph for the first five minutes of weld procedure and a summary plot of the entire weld and cool down process.

3.6 DAMAGED PIPE

- A. Pipe sections with gouges or cuts deeper than ten percent (10%) of the wall thickness shall be cut out, removed and replaced by the Contractor at

no additional cost to the City. Undamaged pipe portions may be rejoined using butt-fusion joining methods.

3.7 TESTING, CLEANING, AND ACCEPTANCE

- A. Pipeline testing shall be performed once fusion process is completed on the pipeline reach after the completion of the installation.
- B. General: It is the intent of the Contract Documents that the completed sewer pipe of all types, along with manholes and other appurtenances shall be watertight.
- C. Testing of FPVCP pipelines shall be performed as specified in Section 33 01 30.41 Sanitary Sewer System Testing and Cleaning.
- D. The completed pipeline shall have CCTV inspection as specified in Section 33 01 30.11 Closed Circuit Television (CCTV) Inspection of Sanitary Sewer System.
- E. Deflection tests should be conducted using a go/no-go mandrel. The mandrel's outside dimension shall be sized to permit no more than 7.5 percent deflection. The percent deflection shall be established from the base of the inside diameter of the pipe. The mandrel shall be approved by the Engineer prior to use.
- F. Even though a section of sewer may have previously passed the leakage or infiltration test, each section of pipe shall be tested subsequent to the last backfill compacting operation thereon. The Contractor shall furnish all materials required for the tests and bear all associated costs in connection therewith. Tests shall be made in the presence of the Engineer.
- G. If the leakage and/or infiltration rate is greater than the amount specified in Section 33 31 11, General Piping, the sewer shall be repaired, or, if necessary, the pipe shall be removed and re-laid at the Contractor's expense. The sewer will not be considered acceptable until the leakage and/or infiltration rate, as determined by the appropriate test, meets the allowable limit. Even when infiltration is less than the specified amount, the Contractor shall stop any observed individual leaks when ordered to do so by the Engineer. The Contractor shall furnish all labor and materials for making the tests required at his own expense. All tests shall be completed before the street or trench is resurfaced, unless otherwise directed by the Engineer.
- H. Tests for Alignment and Grade, and Damaged or Defective Pipe in Place: After the pipe has been installed, tested for leakage, backfilled to existing grade, manholes raised to grade and the street resurfaced, the pipe shall be "balled" from manhole to manhole with a sewer scrubbing ball of type and size to be accepted by the Engineer. All "balling" shall be done in the presence of the Engineer and shall constitute tests for alignment, grade,

damaged or defective pipe in place, or any other type of faulty installation. Should "balling" indicate any faulty installation of the pipe, repairs or replacements shall be made at the Contractor's expense as directed by the Engineer.

****END OF SECTION****

SECTION 33 31 11

GENERAL PIPING

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish, install, test, and complete the piping in accordance with the Contract Documents.
- B. Related Sections:
 - 1. SECTION 31 23 00, EARTHWORK
 - 2. SECTION 03 40 00, PRECAST CONCRETE STRUCTURES
 - 3. SECTION 33 01 30.41, SANITARY SEWER SYSTEM TESTING AND CLEANING
 - 4. SECTION 01 55 26, TRAFFIC CONTROL
 - 5. SECTION 33 05 31.11, POLYVINYL CHLORIDE SEWER PIPE
 - 6. SECTION 33 05 31.14 FUSIBLE POLYVINYL CHLORIDE PIPE

1.02 QUALITY ASSURANCE

- A. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance and manufacturer's service.
- B. To assure uniformity and compatibility of piping components in grooved-end piping systems, fittings and couplings shall be furnished by the same manufacturer.

1.03 REFERENCES

- A. City of Morgan Hill:
Standard Specifications and Details (latest edition).
- B. American Society of Testing and Materials (ASTM):
Refer to individual piping sections for relevant ASTM standards.
- C. Uni-Bell PVC Pipe Association:
Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe, current Uni-B-6 pamphlet.

1.04 GENERAL

- A. All sewer construction materials proposed to be used shall be new materials.
- B. Where material specification numbers are used herein, they shall refer to the latest revision thereof.

1.05 SUBMITTALS

- A. Submit, in accordance with the Contract Documents, installation instructions and details of all pipe, joints, fittings, metallic pipeline marking tape, and appurtenances to be used in the work including the following.
 - 1. Catalog cuts showing all piping, manholes, and fittings.

2. Dimensioned layout drawings, including piping, building sewers, and manholes.
 3. Installation procedures and sequencing.
 4. Staging and lay-down areas.
 5. Security plans and fencing.
 6. Sewer Bypassing Plan in accordance with the Contract Documents.
 7. Traffic Control Plan in accordance with the Contract Documents.
 8. Connection details for all building sewers and existing systems.
- B. The review of procedures and equipment by the Engineer shall not relieve the Contractor of his responsibility nor modify any of the provisions of the contract.
- Furnish shop drawings for pipe in accordance with the requirements of the Contract Documents as follows:
1. Details of the pipe to be used. Submit shop drawings indicating the details of all thickness, joints, materials, and procedures, as applicable. Indicate the required fabrication tolerances for the pipe.
 2. Information indicating that pipe manufacturer meets the experience requirements specified.

PART 2 - PRODUCTS

2.01 GENERAL

Provide all required piping and fittings in accordance with the individual piping sections.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Trenching and trench dewatering requirements shall comply with the requirements of the Contract Documents.
- B. Sewer bypassing and dewatering requirements shall comply with the requirements of the Contract Documents.
- C. Layout of Controls:
 1. Establish line and grade control and staking in accordance with the Contract Documents.

2. The grades and alignment of the sewer so staked must be approved by the Engineer prior to start of sewer construction.
3. Construction staking:
 - a. A registered land surveyor engaged by the Contractor shall be responsible for setting stakes and preparing cut sheets. Submit the name, license number and expiration date of the surveyor in charge of the survey work prior to construction.
 - b. At least five (5) working days before the start of any sewer construction requiring staking, submit three copies of cut sheets to the Engineer. Cut Sheets will be reviewed and one approved copy will be furnished to the Contractor for use in construction. Stakes must not be marked with cuts prior to Engineer's approval of cut sheets.
 - c. The Contractor shall be responsible for preserving all required benchmarks, reference points and construction stakes in the area and will be responsible for any cost incurred in replacing any such benchmarks, reference points or construction stakes which are destroyed as a result of his activities.
 - d. The Contractor shall be responsible for maintaining the legibility and refreshing of paint marks as long as needed, including maintenance during idle time and/or inclement weather.
 - e. Unless otherwise required by the Engineer, locate sewer construction stakes at 50-foot maximum intervals except that on horizontal curves and on sewers with a slope flatter than 0.003 foot per foot the maximum spacing will be 25 feet. The maximum spacing of construction stakes on vertical curves shall be 10 feet. Additional sewer construction stakes shall be located at angle points, grade breaks, and structures.
 - f. Offset stakes from the centerline of the sewer at a safe distance from the excavation but in no case greater than 10 feet unless authorized by the Engineer. The stakes will be marked with offset distance and station only.
- D. Surveying Instruments or Lasers: When laying main sewers 6 inches and larger in diameter, unless otherwise approved by the Engineer, a commercial Laser grade setting system shall be used. The following requirements and conditions must be met:
 1. The Contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the Laser, and

said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Section 1514, and Sections 1800 through 1801 of said orders for applicable requirements.

2. When using a Laser, the Laser shall be an in-line Laser or be connected firmly to a tripod, set firmly on compacted soil. The Laser height of instrument shall be taken from one offset hub and checked with at least two more hubs. This shall be done every time the Laser is set up, or disturbed.
3. The Laser shall be properly calibrated at all times. If any Laser is found to be out of calibration, the Laser shall be removed from the job site until it has been properly calibrated.

E. Line and Grade:

1. The horizontal controls for this project are the control points and base lines as shown on the plan. The vertical controls for this project are the benchmarks as shown on the plan.
2. It is the responsibility of the Contractor to check these benchmarks at the beginning of the contract period and report any errors or discrepancies to the Engineer.
3. When satisfied that all benchmarks are correct, the Contractor shall use these benchmarks to furnish and maintain all reference lines and grades for sewer construction. Contractor shall not disturb benchmarks with construction equipment, materials or by dewatering operations.
4. Submit to the Engineer copies of field notes used to establish all lines and grades. The Contractor remains fully responsible for the accuracy of his work and the correction of it, if required.

F. Verification of Existing Sewer Connection at New Manhole:

1. Where connection is to be made to an existing sewer with a new manhole, said existing sewer shall be uncovered and checked for location and elevation prior to submitting cut sheets. Any discrepancy between the Plans and field information shall be reported immediately to the Engineer.
2. Where construction requires removal of any existing sewer or structure from service, the work shall be conducted in accordance with the Contract Documents.

G. Sewer Pipe Plugs: Sewer pipe stubs, or other open ends, which are not to be connected for service under this contract, shall be plugged or capped with standard watertight plugs or caps, as submitted by the Contractor and approved by the Engineer for use in the particular installation.

H. Handling of Pipe:

1. All pipe and accessories shall be carefully lowered into the trench in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the excavation.

2. Pipe shall be protected against impact shocks during handling. Prior to making pipe joints, all surfaces of the portion of the pipe to be joined shall be cleaned, dried and otherwise repaired in accordance with the manufacturer's installation instructions. The interior of all pipe shall be kept free from all dirt and foreign matter as the work progresses.
3. At the close of each day's work, and at such other times when pipe is not being installed or utilized for service, the ends of all open pipes shall be closed with a watertight plug or cap.

I. Field Cutting Pipe:

1. Use whole lengths of pipe wherever possible. Short lengths or cut pieces shall be allowed only to complete connections to manholes and structures, wye branches, and other required fittings.
2. Unless otherwise permitted by the Engineer, pipes that must be cut in the field shall be cut as recommended by the pipe manufacturer.

3.02 EXCAVATION AND TRENCHING

Perform all excavations for pipelines and appurtenances, of whatever substances encountered, to the depths indicated in the Contract Documents and in accordance with the Contract Documents.

3.03 INSTALLATION

A. General:

1. Each pipe and fitting shall be carefully inspected before the pipe or fitting is installed. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
2. Clean out fittings and pipe sections before installing. Clean joint contact surfaces immediately prior to joining. Use joint lubricants and joining methods as recommended by the pipe manufacturer.
3. Furnish and assemble pipe and fittings to provide accurate alignment for joints.
4. Make all joints watertight.

B. Every precaution shall be taken to prevent foreign material from entering the pipe during installation. No debris, tools, clothing, or other materials shall be placed in the pipe. Whenever pipe laying is stopped, the open end of the pipe shall be closed with an end board closely fitting the end of the pipe to keep sand and earth out of the pipe. The end board shall have several small holes near the bottom to permit water to enter the pipe and prevent flotation in the event of flooding of the trench.

C. Use proper implements, tools, and facilities for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.

D. Buried Pipe:

1. Commencement of New Sewer Pipeline:
Unless otherwise specified or authorized by the Engineer, the laying of the pipe by open-cut methods in finished trenches shall be commenced at the lowest point of the project and continued in an upstream manner until completion. Spigot ends shall point in the direction of the flow except as noted or otherwise specified. The joints shall be carefully centered so that when laid to proper grade and alignment as designated on the Contract Documents, they will form a sewer with a uniform invert.
2. Pipe Installation:
 - a. The sewer trench shall be dewatered to enable pipe installation under dry conditions per the Contract Documents.
 - b. Backfill material shall not be dropped directly on the pipe, and chutes or deflectors shall be utilized to protect the pipe.
 - c. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and reinstalled in an acceptable manner. No pipe shall be installed when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for such work.
3. Control of Line and Grade:
 - a. Total horizontal deviation of the sewer from the line shown on the Contract Documents shall be not more than 1 inch. The sewer grade shall not deviate from the profile shown on the Plans by more than 1/4 inch, measured at the pipe invert, and the grade shall be maintained during and after backfilling operations. Sewer grades exceeding this amount shall be removed and replaced at Contractor's expense.
 - b. If deviations less than 1/4 inch from the design grade occurs, pipe joints shall be deflected to bring the invert back to grade. Grade corrections shall be made gradually to prevent ponding in the pipe invert at low spots. Pipe shall be installed to be free draining (no sags) between any two points. No reverse (adverse) grade will be allowed.
4. Joint Deflections: The deflection in the joint between any two successive pipe sections shall not exceed 50 percent of the maximum deflection as recommended by the pipe manufacturer. The minimum allowable radius shall be 300 feet unless otherwise shown. Minimum 2-foot pipe lengths may be supplied or pipe may be cut, if approved joint material is available, to install short radius curves and conform with the joint deflection limitations. When short lengths are to be used, it shall be as shown on the Plans.
5. General:
 - a. When the pipe laying is not in progress, including break hours, the open ends of pipe shall be closed by approved means, and no trench water, animals, or foreign material shall be permitted to enter the pipe.

- b. All buried pipe shall be prepared as herein before specified and shall be laid on the prepared pipe embedment material in accordance with the Contract Documents to ensure uniform bearing. No pipe shall be laid in water or when, in the opinion of the Engineer, trench conditions are unsuitable.
- c. All sewer mains and building sewers installed by open cut methods shall be installed with green metallic marking tape indicating the presence of the buried sewer. The tape shall be located at the lower of the two following depths:
 - 1) 18 inches above the sewer pipe.
 - 2) 6 inches below the finished subgrade.
- d. Pavement restoration and trench backfill shall be per City Standard details.

3.04 FITTINGS

Fittings shall be sized to receive the type of pipe specified. Installation of fittings will be in accordance with manufacturer's recommendations. Fittings and wyes shall be of the same material as that of the pipe it is connecting to.

3.05 DELIVERY, STORAGE, AND HANDLING

- A. Materials delivered to site shall be inspected for damage and accepted by the Contractor.
- B. Pipe materials shall be stored in strict accordance with the manufacturer's requirements. Typical requirements for pipe storage include:
 - 1. Pipe shall be stored, if possible, at the job site. Caution shall be exercised to avoid compression, damage, or deformation to the pipe joints and barrel. Pipe supports and straps installed by the manufacturer shall be maintained in place during storage.
 - 2. When pipelines are stacked, insure that weight or upper units do not cause damage to pipe in lower units.
 - 3. Pipes shall be supported by struts, racks or dunnage to prevent damage to the bottom during storage.
 - 4. When long-term storage with exposure to direct sunlight is unavoidable, pipe shall be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excessive heat accumulation.
 - 5. Pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam lines, engine exhaust, etc.
 - 6. Pipe shall not be stored directly on the ground, and shall be kept free of dirt and debris.
 - 7. Protect gaskets from excessive exposure to heat and sunlight.

3.06 PIPE COUPLINGS

Flexible couplings shall be Mission Rubber Flex-Seal adjustable repair couplings with stainless steel shear band (i.e. MR02 series) or approved equal. Couplings shall have T-Bolt clamps to secure the coupling tightly to entering and exiting pipes. All screw-clamp hardware shall be Type 316 stainless steel with stainless steel support sleeve. Rubber material shall be suitable for sewage service.

3.07 TESTING

Testing shall be completed in accordance with the Contract Documents.

3.08 CLEANING

Care shall be exercised during fabrication to prevent the accumulation of pipe cuttings, and filings, gravel, cleaning rags, etc., within piping sections. All piping shall be examined to assure removal of these and other foreign objects prior to assembly. Shop cleaning may employ any conventional commercial cleaning method if it does not damage, deform, swell, or otherwise alter the physical properties of the material being cleaned.

3.09 FIELD QUALITY CONTROL

- A. Field tests and inspections including air pressure tests and cleaning shall be in accordance with the Contract Documents and the following specifications herein.
- B. The following construction deficiencies shall be considered as in need of correction prior to acceptance of the work:
 - 1. Damaged pipes including cracks, gouges and chipped ends of pipe sections.
 - 2. Slope less than the specified.
 - 3. Changes in slope greater than ± 0.05 percent of the design slope.
 - 4. Low spots, sags or bellies that hold water
 - 5. Dropped, offset or separated joints.
 - 6. Excessive gap between pipe ends within a coupling or fitting (greater than 0.5 inch unless approved by the Engineer).
 - 7. Infiltration/leaking joints.
 - 8. Other noted deficiencies.