CITY OF FLORENCE

FLORENCE, CO

BIDDING REQUIREMENTS AND CONTRACT DOCUMENTS

for the construction of the

NORTH PIKES PEAK WATERLINE

CH2M HILL Engineers, Inc. (Engineer), a wholly owned subsidiary of Jacobs Engineering Group Inc. (Jacobs)

Englewood, CO

October 2024

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Project No. D3330100

CITY OF FLORENCE, CO

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

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Digitally Signed on

October 8, 2024

Aaron Edward Smith

END OF SECTION

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PART 1

PROCUREMENT REQUIREMENTS

INVITATION TO BID

Sealed Bids for construction of North Pikes Peak Avenue (SH67) Water Line Replacement addressed to Mr. Sam Elstun, Director of Public Works, City Hall, 600 West Third Street, Florence, CO 81226 will be received at the office of the City of Florence, State of Colorado, (Owner), until 11:00 a.m. local time, on the 21st day of November, 2024. Any bids received after the specified time will not be considered.

Bids will then be publicly opened and read.

The Project contemplated consists of new treated waterline between 5th Street and north of 7th Street along North Pikes Peak Avenue (State Highway 67) and includes, but is not limited to: replacement of existing water lines with approximately 950 linear feet of new 12-inch ductile iron pipe waterline, new isolation valves, waterline laterals, water service lines, connection of proposed waterlines to existing waterlines, corrosion protection, asphalt replacement and overlay, construction sequencing constraints, traffic control, testing, and disinfection.

The Work will be completed in all respects within the number of calendar days from the date the Contract commences to run, as set forth below:

Schedule C 120 calendar days

Bidding Documents may be examined in Owner's office, City Hall, 600 West Third Street, Florence CO 81226. Bidding Documents may be obtained from the Owner's office upon payment (check or money order only) of \$250 for each set of documents, unless otherwise noted. Return of the documents is not required, and amount paid for the documents is nonrefundable.

To obtain Bidding Documents via mail, send requests to the attention of Cortlyne Huppe, telephone: (719) 784-4848, e-mail: cortlyne.huppe@florencecolorado.org at the office of the Owner. Include check or money order in the amount noted above, plus \$50 for shipping.

The following plan room services have received sets of Bidding Documents for the Work contemplated herein:

Bidnet Direct - Rocky Mountain Purchasing

Each bid must be submitted on the prescribed Bid Form and accompanied by Bid Security as prescribed in the Instructions to Bidders.

The Successful Bidder will be required to furnish the additional bond(s) and insurance prescribed in the Bidding Documents.

PW/DEN003/D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS INVITATION TO BID 00 11 13 - 1 In order to perform public work, the Bidder and Subcontractors prior to award of contract shall hold or obtain such licenses as required by State Statutes, and federal and local Laws and Regulations, including the City of Florence.

For information concerning the proposed Work, contact Cortlyne Huppe by email at cortlyne.huppe@florencecolorado.org.

Attendance at a prebid conference is required. The prebid meeting is scheduled for 10:00 a.m. on October 21st, 2024. Refer to Instructions to Bidders for additional information.

Bidding Documents are anticipated to be available by October 11, 2024.

Owner's right is reserved to reject all bids or any bid not conforming to the intent and purpose of the Bidding Documents.

Dated this 7th day October, 2024.

City of Florence

By _____

Cortlyne Huppe Finance Officer, City of Florence

END OF SECTION

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

1.1. Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

1.1.1. *Issuing Office*—The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered: City Hall, 600 West Third Street, Florence, CO 81226.

2. COPIES OF BIDDING DOCUMENTS

2.1. Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Invitation to Bid may be obtained from the Issuing Office.

2.2. Complete sets of Bidding Documents shall be used in preparing Bids. Neither Owner nor Engineer assumes responsibility for errors or misinterpretations resulting from use of incomplete sets of Bidding Documents.

2.3. Drawings bound in the Bidding Documents are photographic reductions of original tracings. Amount of reduction is indicated by a note or scale bar on Drawing. Full-size Drawings may be obtained from Engineer at cost of reproduction and handling, plus postage for mailing (if mailing is requested). Drawings will only be made available to firms listed as having complete sets of Bidding Documents. No return of full-size Drawings is required, and no refund will be made.

2.4. Owner and Engineer, in making copies of Bidding Documents made available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

3.1. In order to perform public work, Bidder and its Subcontractors, prior to award of Contract or as otherwise required by the jurisdiction, shall hold or obtain such licenses as required by State Statutes, and federal and local Laws and Regulations.

3.2. To demonstrate Bidder's qualifications to perform the Work, within 5 days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below:

3.2.1. Number of years Bidder's organization has been in business as a general contractor, and number of those years under its current name.

3.2.2. Percentage of work normally performed with own forces, by trade, and percentage by trade planned for this project.

3.2.3. Statement addressing whether Bidder has ever failed to compete any awarded work; if so, provide details and Owner contact information.

3.2.4. Statement addressing whether Bidder has ever paid, or had deducted from the contract amount, Liquidated Damages; if so provide details and Owner contact information.

3.2.5. Bonding capacity.

3.2.6. Experience of Bidder's superintendent, firm and subcontractor (if any) with similar work, including references for a minimum of three of the similar projects.

3.2.7. Bidder's statement of equipment and personnel availability to meet the Project schedule.

3.2.8. Bidder's list of manufacturers Bidder intends to use for the project for any material quantities that are required beyond those included in the Owner-Furnished Products list to include, at a minimum:

3.2.8.1. Ductile iron pipe.3.2.8.2. Valves.3.2.8.3. Hydrants.

3.2.8.4. Fittings.

3.3. Bidder is advised to carefully review those portions of the Bid Form requiring representations and certifications.

4. EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.1. Subsurface and Physical Conditions:

4.1.1. The Supplementary Conditions identify:

4.1.1.1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site (None).

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4.1.1.2. Those drawings known to Owner of physical conditions relating to existing surface and subsurface structures at the Site (None, except Underground Facilities).

4.1.2. Copies of reports and drawings referenced will be made available by Owner to any Bidder on request. The "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 5.03 of the General Conditions has been identified and established in Paragraph 5.03 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings. Costs associated with making available copies of reports and drawings shall be borne by Owner.

4.2. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner or others.

4.3. Hazardous Environmental Condition:

4.3.1. The Supplementary Conditions identify reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site, if any.

4.3.2. Copies of reports and drawings referenced will be made available by Owner to any bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 5.06 of the General Conditions has been identified and established in Paragraph 5.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings. Costs associated with making available copies of reports and drawings shall be borne by Owner.

4.4. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraph 5.03 through Paragraph 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents as a result of any Hazardous Environmental Condition uncovered

or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.5. On request, Owner will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.6. Related Work at Site: Reference is made to the General Requirements for identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request Owner will provide to each Bidder for examination, access to or copies of contract documents (other than portions thereof related to price) for such other work.

4.7. Safety: Paragraph 7.12.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.8. It is responsibility of each Bidder before submitting a Bid to:

4.8.1. Examine and carefully study the Bidding Documents, other related data identified in the Bidding Documents, and any Addenda.

4.8.2. Visit the Site to become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

4.8.3. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

4.8.4. Carefully study all:

4.8.4.1. Reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable "technical data".

4.8.4.2. Reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in

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Paragraph 5.06 of the Supplementary Conditions as containing reliable "technical data".

4.8.5. Consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on:

4.8.5.1. Cost, progress, and performance of the Work.

4.8.5.2. Means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents.

4.8.5.3. Bidder's safety precautions and programs.

4.8.6. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) Bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

4.8.7. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

4.8.8. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in Bidding Documents and confirm that written resolution thereof by Engineer is acceptable to Bidder.

4.8.9. Determine Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of the Work.

4.9. Submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this article; that without exception the Bid is premised upon performing and furnishing the Work required by Bidding Documents and applying specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by Bidding Documents; that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder;

and that Bidding Documents are generally sufficient to indicate and convey understanding of terms and conditions for performing and furnishing the Work.

5. PREBID CONFERENCE

5.1. A prebid conference will be held at 10:00 a.m. local time on Monday, October 21, 2024, at City Hall, 600 West Third Street, Florence, Colorado. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the mandatory pre-bid conference. Engineer will transmit to prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

6. SITE AND OTHER AREAS

6.1. The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner, unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

6.2. Refer to the Drawings for the location of the designated lay-down area.

7. INTERPRETATIONS AND ADDENDA

7.1. All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the office issuing documents as having received the Bidding Documents. Questions received after 12:00 p.m. (noon) on Monday, November 11, 2024, may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.2. Addenda may also be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

8. BID SECURITY

8.1. Bid shall be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a penal Bid Bond (on the attached form), issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions.

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8.2. The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within the time period specified in Article Signing of Agreement, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the 7th day after the Effective Date of the Agreement or the number of days specified for all Bids to remain subject to acceptance in Article Bids to Remain Subject to Acceptance, whereupon Bid security furnished by such Bidders will be returned.

8.3. Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within 7 days after Bid opening.

9. CONTRACT TIMES

9.1. The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

10. LIQUIDATED DAMAGES

10.1. Provisions for liquidated damages, if any, are set forth in the Agreement.

11. SUBSTITUTE AND "OR-EQUAL" ITEMS

11.1. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

12. SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.1. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, apparent Successful Bidder, and any other Bidder so requested, shall within 5 days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be

INSTRUCTIONS TO BIDDERS 00 21 13 - 7 accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner.

12.2. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute without an increase in Bid.

12.3. If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in General Conditions Paragraph 7.06.E.

12.4. Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

13. EMPLOYMENT REQUIREMENTS

13.1. Pursuant to Colorado Revised Statute 8-17-101, 80 percent of skilled and common labor employed on the Project shall be Colorado residents.

14. PREPARATION OF BID

14.1. With each copy of the Bidding Documents, Bidder will be furnished one separate unbound copy of the Bid Form, and, if applicable, the Bid Bond Form. No substitution of the Bid Form will be allowed.

14.2. All blanks on the Bid Form shall be completed by typing or printing with ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein or the words "No Bid," "No Change," or "Not Applicable" entered.

14.3. A Bid by a corporation shall be executed in the corporate name by the president or a vice president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

14.4. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.

14.5. A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

14.6. A Bid by an individual shall show the Bidder's name and official address.

14.7. A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

14.8. All names shall be typed or printed in ink below the signatures.

14.9. The Bid shall contain an acknowledgement of receipt of all Addenda; the numbers of which shall be filled in on the Bid Form.

14.10. Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

14.11. The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number and class, if applicable, shall also be shown on the Bid Form.

15. BASIS OF BID; COMPARISON OF BIDS

15.1. Lump Sum:

15.1.1. For Bid items defined as Lump Sum, Bidders shall submit a Bid on a lump sum basis for those items in the Bid Form.

15.2. Unit Price:

15.2.1. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

15.2.2. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

15.2.3. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the

indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

15.3. Bid Schedules:

15.3.1. Bid Schedule C: The amount entered into the Bid Form, Schedule C shall represent the total cost of Schedule C.

16. SUBMISSION OF BID

16.1. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data.

16.2. A Bid shall be submitted no later than the date and time prescribed, and at the place indicated in the Invitation to Bid. Enclose Bid in a plainly marked package with the Project title, name and address of Bidder, and accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED."

17. MODIFICATION AND WITHDRAWAL OF BID

17.1. A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

17.2. If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

18. OPENING OF BIDS

18.1. Bids will be opened at the time and place indicated in the Invitation to Bid and unless obviously nonresponsive, read aloud publicly. An abstract of the amounts of the base Bids and Bid Schedules will be made available to Bidders after the opening of Bids.

19. BIDS TO REMAIN SUBJECT TO ACCEPTANCE

19.1. All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

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20. EVALUATION OF BIDS AND AWARD OF CONTRACT

20.1. Pursuant to Colorado Revised Statute 8-19-101, Colorado resident Bidder shall be allowed preference over nonresident Bidder equal to preference given or required by state or foreign country in which nonresident Bidder is resident.

20.1.1. Local Preference. When contracts for goods or services are awarded by the City of Florence, whether through the bidding process or otherwise, the City Council in its sole discretion may, but need not, award to locally established business firms a preference of 5 percent in determining which bid or contract shall be determined to be the lowest responsible bid or contract. This preferential allowance to locally established business firms may not exceed two thousand five hundred dollars (\$2,500.00) or any one contract or bid.

20.2. Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

20.3. More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

20.4. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

20.5. In evaluating Bidders, Owner may consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted either with the Bid, or otherwise prior to issuance of the Notice of Award.

20.6. Owner may conduct such investigations as Owner deems necessary to establish responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

20.7. If the Contract is to be awarded, Owner will award the Contract to Bidder whose Bid is in the best interests of the Project.

21. CONTRACT SECURITY AND INSURANCE

21.1. Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to bonds and insurance. When Successful Bidder delivers executed Agreement to Owner, it shall be accompanied by such bonds.

22. SIGNING OF AGREEMENT

22.1. When Owner issues a Notice of Award to Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents that are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within 10 days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

23. SALES AND USE TAXES

23.1. Owner is exempt from Colorado state sales and use taxes on materials and equipment to be incorporated in the Work; Exemption No. will be provided to the successful Bidder by the Owner at the issuance of Notice of Award. Said taxes shall not be included in the Bid. Refer to Paragraph 7.09 of the Supplementary Conditions for additional information.

24. RETAINAGE

24.1. Provisions concerning retainage and Contractor's rights to deposit securities in lieu of retainage, if applicable, are set forth in the Agreement.

25. CONTRACTS TO BE ASSIGNED

25.1. None.

26. OTHER

26.1. Refer to Paragraph 7.06A of the Supplementary Conditions for requirements on the amount of onsite labor that Contractor shall perform with its own employees.

26.2. Notice that many of the materials required for this project have been purchased by the Owner. Refer to Section 01 64 00, Owner-Furnished Products.

INSTRUCTIONS TO BIDDERS 00 21 13 - 12

26.3. Contractor is responsible for securing the Colorado Department of Transportation (CDOT) utility permit and approved traffic control plan. The City requires single lane traffic to be maintained north of the south side of the 7th Street intersection. Coordinate with CDOT for additional traffic control requirements.

26.4. The City will provide the Point-man survey required by CDOT.

END OF SECTION

NOTE TO BIDDER: Use typewriter or ink for completing this Bid Form.

BID FORM (STIPULATED PRICE BASIS)

1. BID RECIPIENT

1.1. This Bid is submitted to:

| Owner: | City of Florence |
|-------------------------|-------------------------------------------------------------|
| Address: | 600 West 3rd Street, Florence, Colorado 81226 |
| Project Identification: | North Pikes Peak Avenue/Highway 67 Waterline Replacement |
| Contract No | |

Contract No.:

1.2. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2. BIDDER'S ACKNOWLEDGEMENTS

2.1. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3. BIDDER'S REPRESENTATIONS

3.1. In submitting this Bid, Bidder represents that:

3.1.1. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| Addendum No. | Addendum Date |
|--------------|---------------|
| | |
| | |
| | |

(Bidder shall insert number of each Addendum received.)

3.1.2. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3.1.3. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

3.1.4. Bidder has carefully studied: i) reports of explorations and tests of subsurface conditions at or contiguous to the Site and drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) which have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable "technical data,"; and ii) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 5.06 of the Supplementary Conditions as containing reliable "technical data."

3.1.5. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

3.1.6. Based on information and observations referred to in paragraph above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) Bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents. 3.1.7. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

3.1.8. Bidder has given Engineer written notice of conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

3.1.9. The Bidding Documents are generally sufficient to indicate and convey understanding of terms and conditions for the performance of the Work for which this Bid is submitted.

4. BIDDER'S CERTIFICATION

4.1. Bidder certifies:

4.1.1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization or corporation;

4.1.2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

4.1.3. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

4.1.4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this paragraph:

4.1.4.1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

4.1.4.2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish Bid prices at artificial noncompetitive levels, or (c) to deprive Owner of the benefits of free and open competition;

4.1.4.3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, noncompetitive levels; and 4.1.4.4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

4.1.5. Required sales and use taxes are included in the stated Bid prices for the Work unless provision is made herein for the Bidder to separately itemize the estimated amount of sales tax or if Instructions to Bidders state Owner is tax exempt.

5. BASIS OF BIDS

5.1. Bidder shall complete the Work in accordance with the Contract Documents for the following price(s):

5.2. Unit Price Bid Schedule:

5.2.1. Unit prices have been computed in accordance with Paragraph 13.03.C of the General Conditions.

5.2.2. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

| | Schedule C UNIT PRICE BID SCHEDULE | | | | |
|-------------|---------------------------------------|-----------------------|------|-------------------|----------------------------|
| Item No. | Description | Estimated Quantity | Unit | Bid Unit Price | Extended Bid Unit Price |
| 1. | Mobilization | 1 | LS | \$ | \$ |
| 2. | Demobilization | 1 | LS | \$ | \$ |
| 3. | Erosion and Sediment Control | 1 | LS | \$ | \$ |
| 4. | Dewatering | 1 | LS | \$ | \$ |
| 5. | Traffic and Pedestrian Control | 1 | LS | \$ | \$ |
| 6. | Asphalt Removal and Restoration | 3,500 | SF | \$ | \$ |
| 7. | Asphalt Mill and Overlay | 10,000 | SF | \$ | \$ |

BID FORM 00 41 13 - 4

| | Schedule C UNIT PRICE BID SCHEDULE | | | | |
|-------------|-------------------------------------------------------|-----------------------|----------|-------------------|----------------------------|
| Item No. | Description | Estimated Quantity | Unit | Bid Unit Price | Extended Bid Unit Price |
| 8. | Concrete Curb and Gutter Removal and Restoration | 30 | LF | \$ | \$ |
| 9. | Concrete Sidewalk Removal and Restoration | 72 | LF | \$ | \$ |
| 10. | South End Connection | 1 | LS | \$ | \$ |
| 11. | W. 6th Street Connection A | 1 | LS | \$ | \$ |
| 12. | W. 6th Street Connection B | 1 | LS | \$ | \$ |
| 13. | E. 6th Street Connection A | 1 | LS | \$ | \$ |
| 14. | E. 6th Street Connection B | 1 | LS | \$ | \$ |
| 15. | 7th Street Connection A | 1 | LS | \$ | \$ |
| 16. | North End Connection | 1 | LS | \$ | \$ |
| 17. | 4-Inch Stub | 1 | LS | \$ | \$ |
| 18. | Fire Hydrant | 2 | EA | \$ | \$ |
| 19. | Waterline Testing | 1 | LS | \$ | \$ |
| 20. | 12-inch Water Line | 950 | LF | \$ | \$ |
| 21. | 2-Inch and Smaller Service Line Connection – Short | 13 | EA | \$ | \$ |
| 22. | 2-Inch and Smaller Service Line Connection – Long | 5 | EA | \$ | \$ |
| 23. | Trench Stabilization | 200 | CY | \$ | \$ |
| | Schedule C 7 | Fotal of Exten | nded Bio | d Unit Prices | \$ |

5.3. Bid Summary:

| Item | Description | Bid Total |
|------|-------------|-----------|
| 1. | Schedule C | |

6. TIME OF COMPLETION

6.1. Bidder agrees the Work will be substantially complete within 120 calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 135 calendar days after the date when the Contract Times commence to run. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work, and any specified Milestones, within the Contract Times.

7. ATTACHMENTS TO THIS BID

7.1. The following documents are submitted with and made a condition of this Bid:

7.1.1. Required Bid security in the form of Bid bond.

7.1.2. Evidence of authority to do business in Colorado; or a written covenant to obtain such license within the time for acceptance of Bids.

7.1.3. Bidder acknowledges the requirement to provide additional information within 5 days of the Bid opening as listed in the Instructions To Bidders.

8. DEFINED TERMS

8.1. The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

9. BID SUBMITTAL

9.1. This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed):

By (signature):

Doing business as:

| A Partnership | |
|--------------------------------------------------------------|-------------|
| Partnership Name: | (SEAL) |
| By: | ty to sign) |
| Name (typed or printed): | |
| <u>A Corporation</u> | |
| Corporation Name: | (SEAL) |
| State of Incorporation: | |
| Type (General Business, Professional, Service, Limited Liabi | lity): |
| By:(Signature – attach evidence of authority to sign |) |
| Name (typed or printed): | |
| Title: (CORPORAT | TE SEAL) |
| Attest: | |
| (Signature of Corporate Secretary) | |
| Date of Qualification to do business in Colorado is: | |
| <u>A Joint Venture</u> | |
| Joint Venturer Name: | (SEAL) |
| By: | ty to sign) |
| Name (typed or printed): | |
| Title: | |
| | |

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| Bidder's Business Address: | | | | |
|-------------------------------------------|--------|----------|---|--|
| Phone No.: | | FAX No.: | | |
| E-mail: | | | | |
| SUBMITTED on | , 20 | | | |
| Colorado Contractor's License No.: | | | - | |
| Contractor's License Class (where applica | able): | | - | |

END OF SECTION

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

BID

Bid Due Date: Project (Brief Description Including Location):

BOND

Bond Number: Date (Not later than Bid due date):

Penal sum

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CITY OF FLORENCE, CO

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| BIDDER | SURETY |
|----------------------------|----------------------------------------------------------|
| (Se | eal) (Seal) Surety's Name and Corporate Seal |
| By: Signature and Title | By: Signature and Title (Attach Power of Attorney) |
| Attest: | Attest: Signature and Title |

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent. 6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

END OF SECTION

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PART 2

CONTRACTING REQUIREMENTS

AGREEMENT

| THIS AGREEMENT is by and between | City of Florence, Colorado | (Owner) and |
|----------------------------------|----------------------------|-------------|
| | | |

(Contractor).

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

1. WORK

1.1. Contractor shall complete the Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

1.1.1. The Project contemplated consists of new treated waterline between 5th Street and north of 7th Street along North Pikes Peak Avenue (State Highway 67) and includes, but is not limited to: replacement of existing water lines with approximately 950 linear feet of new 12-inch ductile iron pipe waterline, new isolation valves, waterline laterals, water service lines, connection of proposed waterlines to existing waterlines, corrosion protection, asphalt replacement and overlay, construction sequencing constraints, traffic control, testing, and disinfection.

2. THE PROJECT

2.1. The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

2.1.1. The Project contemplated consists of new treated waterline between 5th Street and north of 7th Street along North Pikes Peak Avenue (State Highway 67) and includes, but is not limited to: replacement of existing water lines with approximately 950 linear feet of new 12-inch ductile iron pipe waterline, new isolation valves, waterline laterals, water service lines, connection of proposed waterlines to existing waterlines, corrosion protection, asphalt replacement and overlay, construction sequencing constraints, traffic control, testing, and disinfection.

3. ENGINEER

3.1. The Project has been designed by Jacobs (Engineer), who is to act as Owner's representative, assume duties and responsibilities, and have the rights and authority

assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

4. CONTRACT TIMES

4.1. Time of the Essence: Time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.2. Days to Achieve Substantial Completion and Final Payment:

4.2.1. The Work shall be substantially completed within 120 days from the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 135 days after the date when the Contract Times commence to run.

4.3. Liquidated Damages:

4.3.1. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph Contract Times above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner \$2,500 for each day that expires after the time specified herein for Substantial Completion until the Work is substantially complete.

4.3.2. After Substantial Completion, if Contractor neglects, refuses, or fails to complete remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$1,500 for each day that expires after the time specified herein for completion and readiness for final payment until the Work is completed and ready for final payment.

5. CONTRACT PRICE

5.1. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

6. FUNDING

6.1. As required by Colorado Revised Statutes 24-91-103.6, Owner hereby provides assurance that funds adequate to cover Contract Price have been appropriated.

7. PAYMENT PROCEDURES

7.1. Submittal and Processing of Payments: Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

7.2. Progress Payments and Retainage: Owner will make progress payments on account of the Contract Price on the basis of Contractor's Application for Payment on the date of each month as established in the preconstruction conference during performance of the Work as provided herein. All such payments will be measured by the Schedule of Values established as provided in Paragraph 2.05 of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided in the General Requirements.

7.2.1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 15.01 of the General Conditions:

7.2.1.1. Ninety percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

7.2.1.2. Ninety percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

7.2.2. In lieu of retainage, provisions may be made as provided in Colorado Revised Statutes 24-91-105, for depositing securities with Owner.

7.2.3. Upon Substantial Completion, Owner will pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts as Engineer will determine in accordance with Paragraph 15.01.C.6 of the General Conditions and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as

shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

7.3. Final Payment:

7.3.1. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner will pay the remainder of the Contract Price as recommended by Engineer as provided in Paragraph 15.06.

8. INTEREST

8.1. Monies not paid when due as provided in Article 15 of the General Conditions shall bear interest at the rate of 3 percent per annum.

9. CONTRACTOR'S REPRESENTATIONS

9.1. In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

9.1.1. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

9.1.2. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

9.1.3. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

9.1.4. Contractor has carefully studied: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) if any, which have been identified in Paragraph 5.03 of the Supplementary Conditions as containing reliable "technical data", and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site which have been identified in Paragraph 5.06 of the Supplementary Conditions as containing reliable "technical data."

9.1.5. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information,

AGREEMENT 00 52 13 - 4 observations, and documents on 1) the cost, progress, and performance of the Work; 2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and 3) Contractor's safety precautions and programs.

9.1.6. Based on the information and observations referred to above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

9.1.7. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

9.1.8. Contractor has given Engineer written notice of conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

9.1.9. The Contract Documents are generally sufficient to indicate and convey understanding of terms and conditions for performance and furnishing of the Work.

10. CONTRACT DOCUMENTS

10.1. Contents:

10.1.1. The Contract Documents that are attached to this Agreement (except as expressly noted otherwise) consist of the following:

- 10.1.1.1. This Agreement (pages 1 to _____, inclusive).
- 10.1.1.2. Performance bond (pages _____ to ____, inclusive).
- 10.1.1.3. Payment bond (pages _____ to ____, inclusive).
- 10.1.1.4. General Conditions (pages _____ to ____, inclusive).
- 10.1.1.5. Supplementary Conditions (pages _____ to ____, inclusive).
- 10.1.1.6. Specifications as listed in the table of contents of the Project Manual.

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS 10.1.1.7. Drawings consisting of ---- sheets with each sheet bearing the following general title: "North Pikes Peak Waterline Replacement".

10.1.1.8. Addenda (numbers ______ to _____, inclusive).

10.1.2. Exhibits to this Agreement (enumerated as follows):

10.1.2.1. Contractor's Bid (pages to , inclusive).

10.1.2.2. Documentation submitted by Contractor prior to Notice of Award (pages _____ to ____, inclusive).

10.1.3. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

10.1.3.1. Notice to Proceed (pages _____ to ____, inclusive).

10.1.3.2. Work Change Directives.

10.1.3.3. Change Order(s).

10.2. There are no Contract Documents other than those listed above in this Article.

10.3. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 11.01 of the General Conditions.

11. MISCELLANEOUS

11.1. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

11.2. Successors and Assigns: Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

11.3. Severability: Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

11.4. Assignment of Contract:

11.4.1. No assignment by a party hereto of any rights under or interests in the Contract shall be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment shall release or discharge the assignor from any duty or responsibility under the Contract Documents.

11.5. Contractor's Certifications:

11.5.1. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this paragraph:

11.5.1.1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in Contract execution;

11.5.1.2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract Price at artificial noncompetitive levels, or (c) to deprive Owner of the benefits of free and open competition;

11.5.1.3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, noncompetitive levels; and

11.5.1.4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in triplicate. One counterpart each has been delivered to Owner, Contractor, and Engineer. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____, 20__ (which is the Effective Date of the Agreement).

CITY OF FLORENCE, CO

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| OWNER: | CONTRACTOR: |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| | |
| By: | By: |
| Title: | Title: |
| [CORPORATE SEAL] | [CORPORATE SEAL] |
| | Attest: |
| Attest: | Title: |
| Title: | Address for giving notices: |
| Address for giving notices: | |
| | |
| | License No. |
| (If Owner is a corporation, attach evidence of authority to sign. If Owner is a public | (Where applicable) |
| body, attach evidence of authority to sign and resolution or other documents | Agent for service or process: |
| authorizing execution of this Agreement.) | |
| | (If Contractor is a corporation, a partnership, or a joint venture, attach |
| | evidence of authority to sign.) |

END OF SECTION

PERFORMANCE BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT

Date: Amount: Description (Name and Location):

BOND

Bond Number: Date (Not earlier than Contract Date): Amount: Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

| CONTRACTOR AS PRINCIPAL | SURETY | |
|------------------------------------------------------------------------------|----------------------------------|--------|
| Company: | | |
| Signature:(Seal) Name and Title | Surety's Name and Corporate Seal | (Seal) |
| | By: Signature and Title | |
| | (Attach Power of Attorney) | |
| (Space is provided below for signatures of additional parties, if required.) | | |
| | Attest: Signature and Title | |
| CONTRACTOR AS PRINCIPAL | SURETY | |
| Company: | | |
| Signature:(Seal) | | (Seal) |
| | | |

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS PERFORMANCE BOND FORM 00 61 13.13 - 1

Name and Title

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

Attest: _____ Signature and Title

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance

of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable. 10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1. Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone Surety Agency or Broker Owner's Representative (engineer or other party)

END OF SECTION

PAYMENT BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT

Date: Amount: Description (Name and Location):

BOND

Bond Number: Date (Not earlier than Contract Date): Amount: Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

| CONTRACTOR AS PRINCIPAL | SURETY |
|-----------------------------------------------------|----------------------------------|
| Company: | |
| Signature:(S | (Seal)(Seal |
| Name and Title | Surety's Name and Corporate Seal |
| | By: Signature and Title |
| | (Attach Power of Attorney) |
| (Space is provided below for signatures of addition | onal |

parties, if required.)

Attest: Signature and Title

CITY OF FLORENCE, CO

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| CONTRACTOR AS PRINCIPAL | SURETY |
|------------------------------------|-----------------------------------------|
| Company: | |
| Signature:(Seal) Name and Title | (Seal) Surety's Name and Corporate Seal |
| | By: Signature and Title |
| | (Attach Power of Attorney) |
| | Attest: Signature and Title |

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or CITY OF FLORENCE, CO

supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS PAYMENT BOND FORM 00 61 13.16 - 3 related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond. 14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions:

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone Surety Agency or Broker: Owner's Representative (engineer or other party):

END OF SECTION

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



American Council of Engineering Companies





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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
 - 1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 - 2. Agreement—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 - 3. Application for Payment—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 - 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 - 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 - 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 - 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 - 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued

on or after the Effective Date of the Contract.

- 9. *Change Proposal*—A written request by duly submitted Contractor, in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a setoff against payments due; or seeking other relief with respect to the terms of the Contract.
- 10. Claim—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.
- 11. Constituent of Concern-Asbestos, petroleum, radioactive materials. polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C.

§§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

- 12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
- 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
- 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
- 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
- 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
- 17. *Cost of the Work*—See Paragraph 13.01 for definition.
- 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
- 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
- 20. *Engineer*—The individual or entity named as such in the Agreement.
- 21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
- 22. *Hazardous Environmental Condition* The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and

contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

- 23. Laws and Regulations; Laws or Regulations—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
- 24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
- 25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
- 26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
- 27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
- 28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
- 29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
- 30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
- 31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing

the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

- 32. Resident Project Representative—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.
- 33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
- 34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.
- 35. Schedule of Values—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- 36. Shop Drawings—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
- 37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
- 38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems,

standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

- 39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
- 40. Substantial Completion-The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" "substantially and completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- 41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
- 42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
- 43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
- 44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made

available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

- 45. Underground Facilities—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, steam, gases, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
- 46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
- 47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
- 48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.
- 1.02 Terminology
 - A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
 - B. Intent of Certain Terms or Adjectives:
 - 1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect

or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

- C. Day:
 - 1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.
- D. Defective:
 - 1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. Furnish, Install, Perform, Provide:
 - 1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

- 2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
- 3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
- 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a wellknown technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. Evidence of Owner's Insurance: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of

insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 Before Starting Construction

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
- 2.04 Preconstruction Conference; Designation of Authorized Representatives
 - A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph

2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 Initial Acceptance of Schedules

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

- 3.01 Intent
 - A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
 - B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
 - C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
 - D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
 - E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- 3.02 Reference Standards
 - A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference

standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

- No provision of any such standard 2. specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.
- 3.03 *Reporting and Resolving Discrepancies*
 - A. Reporting Discrepancies:
 - Contractor's Verification of Figures and 1. Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to field measurements. applicable Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
 - 2. Contractor's Review of Contract Documents: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract

Documents and (a) any applicable Law Regulation, (b) actual field or conditions. standard (c) any specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation bv Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

- 3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.
- B. Resolving Discrepancies:
 - 1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - the provisions of any Laws or b. Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).
- 3.04 *Requirements of the Contract Documents*
 - A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under

the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.
- 3.05 *Reuse of Documents*
 - A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
 - B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude

Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

- 4.01 Commencement of Contract Times; Notice to Proceed
 - A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.
- 4.02 *Starting the Work*
 - A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.
- 4.03 Reference Points
 - A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.
- 4.04 *Progress Schedule*
 - A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

- 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 Delays in Contractor's Progress

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. abnormal weather conditions;

- 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
- 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

- 5.01 Availability of Lands
 - A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
 - B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- 5.02 Use of Site and Other Areas
 - A. Limitation on Use of Site and Other Areas:
 - Contractor shall confine construction 1. equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 - If a damage or injury claim is made by 2. the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for Contractor is responsible, which Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and officers. directors. the members. partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.
- 5.03 Subsurface and Physical Conditions
 - A. *Reports and Drawings*: The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 - 3. Technical Data contained in such reports and drawings.
 - B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions

with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 Differing Subsurface or Physical Conditions

- A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
 - 1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Drawings or Specifications; or
 - 3. differs materially from that shown or indicated in the Contract Documents; or
 - 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- Β. Engineer's Review: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. **Owner's Statement to Contractor Regarding** Site Condition: After receipt of Engineer's written findings, conclusions. and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. Possible Price and Times Adjustments:
 - 1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will

be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - the existence of such condition b. reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required bv the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
- 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
- 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 Underground Facilities

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing

Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

- 1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
- 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. Notice by Contractor: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.
- C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to

which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. Owner's Statement to Contractor Regarding Underground Facility: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. Possible Price and Times Adjustments:
 - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.

- 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
- 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
- 5.06 Hazardous Environmental Conditions at Site
 - A. *Reports and Drawings*: The Supplementary Conditions identify:
 - 1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 - 2. Technical Data contained in such reports and drawings.
 - Reliance by Contractor on Technical Data R Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data. Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

- 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates Hazardous Environmental а Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered

written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members. partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and

hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- Contractor shall furnish a performance bond A. and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one vear after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- All bonds shall be in the form prescribed by B. the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by

an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-infact signed the accompanying bond.

- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and

endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements. and documentation of and applicable self-insured retentions deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- Owner shall deliver to Contractor, with copies D. to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of and endorsements. policies and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other

party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
 - 4. Foreign voluntary worker compensation (if applicable).
- B. Commercial General Liability—Claims Covered: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
 - 1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 - 2. claims for damages insured by reasonably available personal injury liability coverage.
 - claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. Commercial General Liability—Form and Content: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO

commercial general liability form (occurrence form) and include the following coverages and endorsements:

- 1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
- 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
- 3. Broad form property damage coverage.
- 4. Severability of interest.
- 5. Underground, explosion, and collapse coverage.
- 6. Personal injury coverage.
- 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
- For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. Automobile liability: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage

afforded shall follow form as to each and every one of the underlying policies.

- F. Contractor's pollution liability insurance: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. Additional insureds: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions: include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- Contractor's professional liability insurance: H. If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
 - 1. include at least the specific coverages provided in this Article.

- 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
- 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
- 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
- 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 Owner's Liability Insurance

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability

policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 Property Insurance

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 - include the Owner and Contractor as 1 named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07. and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work. temporary buildings. falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and mischief; malicious mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

- cover, as insured property, at least the 3. following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work construction. including under scaffolding, form work, fences, shoring, falsework, and temporary structures.
- 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
- 5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
- 6. extend to cover damage or loss to insured property while in transit.
- 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
- 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
- 10. not include a co-insurance clause.
- 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
- 12. include performance/hot testing and start-up.
- 13. be maintained in effect, subject to the provisions herein regarding Substantial

Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

- B. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- Partial Occupancy or Use by Owner: If D. Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 Waiver of Rights

- All policies purchased in accordance with A. Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents. consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- Contractor shall be responsible for assuring D. agreement under which a that the Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees. agents. consultants. and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.
- 6.07 Receipt and Application of Property Insurance Proceeds
 - A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
 - B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 Supervision and Superintendence

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.
- 7.02 Labor; Working Hours
 - A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
 - B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.
- 7.03 Services, Materials, and Equipment
 - A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or

not such items are specifically called for in the Contract Documents.

- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.
- 7.04 *"Or Equals"*
 - Whenever an item of material or equipment is A. specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance,

strength, and design characteristics;

- it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
- it has a proven record of performance and availability of responsive service; and
- it is not objectionable to Owner.
- b. Contractor certifies that, if approved and incorporated into the Work:
 - there will be no increase in cost to the Owner or increase in Contract Times; and
 - it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. Engineer's Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "orequal", which will be evidenced by an approved Shop Drawing or other written advise communication. Engineer will Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may

request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

- 7.05 *Substitutes*
 - A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

- 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
- whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
- c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and
 - available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- Engineer's Evaluation and Determination: B. Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- E. Effect of Engineer's Determination: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 Concerning Subcontractors, Suppliers, and Others

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed

acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- Owner may require the replacement of any E. Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor. Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of

Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- 7.07 Patent Fees and Royalties
 - A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual

knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the directors, members, officers. partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.
- 7.08 Permits
 - Unless otherwise provided in the Contract A. Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of

utility owners for connections for providing permanent service to the Work.

- 7.09 Taxes
 - A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- 7.10 Laws and Regulations
 - A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
 - If Contractor performs any Work or takes any R other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the partners. officers. directors. members, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
 - C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of

such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and

replacement of their property or work in progress.

- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
- 7.13 Safety Representative
 - A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 Hazard Communication Programs

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 Emergencies

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.
- 7.16 Shop Drawings, Samples, and Other Submittals
 - A. Shop Drawing and Sample Submittal Requirements:
 - 1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques,

sequences, and procedures of construction, and safety precautions and programs incident thereto.

- 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
- 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.
- B. Submittal Procedures for Shop Drawings and Samples: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
 - 1. Shop Drawings:
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.
 - 2. Samples:
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which

intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

- 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. Engineer's Review:
 - 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 - 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
 - 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 - 4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the

requirements of the Contract Documents in a Field Order.

- 5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
- 6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
- 7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
- 8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.
- E. Resubmittal Procedures:
 - 1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
 - shall furnish required 2. Contractor submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
 - 3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to

Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

- 7.17 Contractor's General Warranty and Guarantee
 - A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
 - B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
 - C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal;
 - 6. the issuance of a notice of acceptability by Engineer;
 - 7. any inspection, test, or approval by others; or
 - 8. any correction of defective Work by Owner.
 - D. If the Contract requires the Contractor to accept the assignment of a contract entered

into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

- 7.18 Indemnification
 - To the fullest extent permitted by Laws and A. Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
 - B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by anv employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
 - C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees,

agents, consultants and subcontractors arising out of:

- 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
- 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.
- 7.19 Delegation of Professional Design Services
 - A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
 - B. professional design If services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
 - C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
 - D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract

Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

- 8.01 Other Work
 - A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
 - B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
 - C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
 - D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other

work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 Coordination

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.
- 8.03 Legal Relationships
 - A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such

equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.
- If Contractor damages, delays, disrupts, or D. interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors,

members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

- 9.01 Communications to Contractor
 - A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.
- 9.02 Replacement of Engineer
 - A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.
- 9.03 Furnish Data
 - A. Owner shall promptly furnish the data required of Owner under the Contract Documents.
- 9.04 Pay When Due
 - A. Owner shall make payments to Contractor when they are due as provided in the Agreement.
- 9.05 Lands and Easements; Reports, Tests, and Drawings
 - A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
 - B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
 - C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 Insurance
 - A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

- 9.07 Change Orders
 - A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.
- 9.08 Inspections, Tests, and Approvals
 - A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 Limitations on Owner's Responsibilities
 - A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 9.10 Undisclosed Hazardous Environmental Condition
 - A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 Evidence of Financial Arrangements
 - A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).
- 9.12 Safety Programs
 - A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

- 10.01 *Owner's Representative*
 - A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 Visits to Site

- Engineer will make visits to the Site at A. intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.
- 10.03 Project Representative
 - A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

- 10.04 *Rejecting Defective Work*
 - A. Engineer has the authority to reject Work in accordance with Article 14.
- 10.05 Shop Drawings, Change Orders and Payments
 - A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
 - B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
 - C. Engineer's authority as to Change Orders is set forth in Article 11.
 - D. Engineer's authority as to Applications for Payment is set forth in Article 15.
- 10.06 Determinations for Unit Price Work
 - A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.
- 10.07 Decisions on Requirements of Contract Documents and Acceptability of Work
 - A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.
- 10.08 Limitations on Engineer's Authority and Responsibilities
 - A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- Engineer's review of the final Application for D. Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.
- 10.09 Compliance with Safety Program
 - A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 Amending and Supplementing Contract Documents

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. Change Orders:
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order

also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

- b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
- Work Change Directives: A Work 2. Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.
- 3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor

believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 Owner-Authorized Changes in the Work

Without invalidating the Contract and without A. notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 Unauthorized Changes in the Work

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.
- 11.04 Change of Contract Price
 - A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
 - B. An adjustment in the Contract Price will be determined as follows:

- 1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
- 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
- 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
 - 1. a mutually acceptable fixed fee; or
 - 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
 - where one or more tiers of c. subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee

plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

- d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 Change Proposals

Contractor shall submit a Change Proposal to Α. Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

- 1. Procedures: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
- 2. Engineer's Action: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
- 3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

- 11.07 Execution of Change Orders
 - A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 - 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.
 - B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.
- 11.08 Notification to Surety
 - A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

- 12.01 Claims
 - A. *Claims Process*: The following disputes between Owner and Contractor shall be

submitted to the Claims process set forth in this Article:

- 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
- 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
- 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- Submittal of Claim: The party submitting a Β. Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. Mediation:
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such

agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

- 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. Denial of Claim: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

- 13.01 Cost of the Work
 - A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

- 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
- 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
 - Payroll costs for employees in the direct 1. employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include. without limitation. superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 - 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case

the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

- Payments made by Contractor to 3. Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
- 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
- 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of

transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property established insurance in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that

Contractor is required by the Contract Documents to purchase and maintain.

- C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:
 - Pavroll costs and other compensation of 1. Contractor's officers, executives. principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the schedule agreed upon of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of

Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

- E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.
- 13.02 Allowances
 - A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
 - B. *Cash Allowances*: Contractor agrees that:
 - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
 - C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
 - D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.
- 13.03 Unit Price Work
 - A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

- 14.01 Access to Work
 - A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable

times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 Tests, Inspections, and Approvals

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval

prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.
- 14.03 Defective Work
 - A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.
 - B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.
 - C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
 - D. Correction, or Removal and Replacement: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
 - E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
 - F. Costs and Damages: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to

defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

- If, instead of requiring correction or removal A. and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.
- 14.05 Uncovering Work
 - A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
 - B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
 - C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose,

or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

- 1. If it is found that the uncovered Work is defective. Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, and testing, and inspection, of replacement satisfactory or reconstruction (including but not limited to all costs of repair or replacement of of others); and work pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
- 2. If the uncovered Work is not found to be defective. Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof. then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.
- 14.06 Owner May Stop the Work
 - A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.
- 14.07 Owner May Correct Defective Work
 - A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other

provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

- 15.01 Progress Payments
 - A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

- B. Applications for Payments:
 - At least 20 days before the date 1. established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
 - 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
 - 3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- C. Review of Applications:
 - Engineer will, within 10 days after 1. receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to indicating in Contractor writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation

by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
- c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
- 3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
- d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
- 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
- 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.
- D. Payment Becomes Due:
 - 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-

offs) will become due, and when due will be paid by Owner to Contractor.

- E. Reductions in Payment by Owner:
 - 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - claims have been made against a. Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or account damages on of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;

- i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
- j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
- Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
- 1. there are other items entitling Owner to a set off against the amount recommended.
- If Owner imposes any set-off against 2. payment, whether based on its own knowledge the or on written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
- 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a

permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its purpose intended without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
 - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that

part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 Final Payment

- A. Application for Payment:
 - 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered. in accordance with the Contract all maintenance Documents. and instructions. operating schedules. guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents. Contractor may make application for final payment.
 - 2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;

- c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
- d. a list of all disputes that Contractor believes are unsettled; and
- e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- In lieu of the releases or waivers of Liens 3. specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. Engineer's Review of Application and Acceptance:
 - If, on the basis of Engineer's observation 1. of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are

necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

- C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. Payment Becomes Due: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.
- 15.07 Waiver of Claims
 - A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
 - B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.
- 15.08 Correction Period
 - A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the

Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

- 1. correct the defective repairs to the Site or such other adjacent areas;
- 2. correct such defective Work;
- 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
- 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- If Contractor does not promptly comply with B. the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and

warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

- 16.01 Owner May Suspend Work
 - At any time and without cause, Owner may A. suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Change Proposal seeking Anv such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.
- 16.02 Owner May Terminate for Cause
 - A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
 - B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

- 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

- 16.03 Owner May Terminate For Convenience
 - A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
 - B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.
- 16.04 Contractor May Stop Work or Terminate
 - A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
 - B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such

amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 Methods and Procedures

- A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

- 18.01 Giving Notice
 - A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 Computation of Times

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- The duties and obligations imposed by these Α. General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.
- 18.04 *Limitation of Damages*
 - A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.
- 18.05 No Waiver
 - A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.
- 18.06 Survival of Obligations
 - A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or

termination or completion of the Contract or termination of the services of Contractor.

18.07 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 Headings

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof. The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-1.01. Renumber Paragraph 1.01.A.38 to 1.01.A.38.a, and add the following new paragraphs:

1.01.A.38.b. *Specialist*—The term Specialist refers to a person, partnership, firm, or corporation of established reputation (or if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the Contract Documents, or otherwise performing Work required by the Contract Documents. Where the Specifications require the installation by a Specialist, that term shall also be deemed to mean either the manufacturer of the item, a person, partnership, firm, or corporation licensed by the manufacturer, or a person, partnership, firm, or corporation who will perform the Work under the manufacturer's direct supervision.

1.01.A.38.c. *Standard Specifications*—Wherever in these Contract Documents reference is made to the Standard Specifications, said reference shall be understood as referring to the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, current edition, with modifications specified in the Contract Documents, if any, which applicable parts are incorporated herein and made a part of these Documents by specific reference thereto. If requirements contained in the Standard Specifications are modified by or are in conflict with supplemental information in these Contract Documents, the requirements of these Contract Documents shall prevail.

SC-1.01. Add the following language at the end of Paragraph 1.01.A.40:

Substantial Completion is further defined as (i) that degree of completion of the Project's operating facilities or systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and (ii) required functional, performance and acceptance, or startup testing has been successfully

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SC-2.01 Delete Paragraph 2.01.B. and Paragraph 2.01.C. in their entirety and insert the following in their place:

2.01.B. Evidence of Contractor's Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies of insurance (including all endorsements, and identification of applicable self-insured retentions and deductibles) required to be provided by Contractor in Article 6. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.01.C. Evidence of Owner's Insurance: After receipt from Contractor of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner under Article 6 (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

SC-2.02. Amend first sentence in Paragraph 2.02.A to read as follows:

Owner will furnish to Contractor four hard copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

SC-3.01. Add the following new paragraph immediately after Paragraph 3.01.E:

3.01.F. Sections of Division 01, General Requirements, govern the execution of the Work of all sections of the Specifications.

SC-5.02. Add the following language to the end of Paragraph 5.02.A.1:

Contractor shall not enter upon nor use property not under Owner control until appropriate easements have been executed and a copy is on file at the Site.

SC-5.03. Delete Paragraphs 5.03.A and 5.03.B in their entirety and insert the following in their place:

5.03.A. No reports of explorations or tests of subsurface conditions at or contiguous to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site are known to Owner.

SC-5.06. Delete Paragraph 5.06.A and Paragraph 5.06.B in their entirety and insert the following in their place:

5.06.A. No reports or drawings related to Hazardous Environmental Conditions are known to Owner.

SC-6.01. Delete the first sentence of Paragraph 6.01.A and insert the following in its place:

Contractor shall furnish performance and payment bonds, each in an amount at least equal to 100 percent of the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents.

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.A.4:

6.03.A.5. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

6.03.A.5.a. Workers' Compensation and related coverages under Paragraph 6.03.A.1 and Paragraph 6.03.A.3 of the General Conditions:

6.03.A.5.a.1. State: Statutory.

6.03.A.5.a.2. Applicable Federal (e.g., Longshoreman's): Statutory.

6.03.A.5.a.5. Employer's Liability:

Bodily Injury, Each Accident: \$1,000,000.

Bodily Injury by Disease, Each Employee: \$1,000,000.

Bodily Injury/Disease Aggregate: \$1,000,000.

Foreign Voluntary Worker Compensation: Statutory

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.C.8:

6.03.C.9. Contractor's General Liability under Paragraph 6.03.B. and Paragraph 6.03.C of the General Conditions which shall eliminate the exclusion with respect to property under the care, custody and control of Contractor:

| 6.03.C.9.a. General Aggregate | \$2,000,000. |
|----------------------------------------------------------|--------------|
| 6.03.C.9.b. Products - Completed Operations Aggregate | \$2,000,000. |

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| | 6.03.C.9.c. Personal and Advertising Injury (per person/Organization) | \$1,000,000. |
|----------------------|-----------------------------------------------------------------------------------------------------|-----------------|
| | | \$1,000,000 |
| | 60.3.C.9.d. Each Occurrence (Bodily Injury and Property Damage) | \$1,000,000. |
| | 6.03.C.9.e. Property Damage liability insurance wi Explosion, Collapse, and Underground coverages v | 1 |
| SC-6.03. Add the fol | lowing new paragraph immediately following Parag | raph 6.03.D: |
| 6.03.I | D.1. Contractor's Automobile Liability | |
| | 6.03.D.1.a. Bodily Injury: | |
| | Each Person | \$2,000,000. |
| | Each Accident | \$2,000,000. |
| | 6.03.D.1.b. Property Damage: | |
| | Each Accident | \$2,000,000. |
| | 6.03.D.1.a. Combined Single Limit of | \$4,000,000. |
| SC-6.03. Add the fol | lowing new paragraph immediately following Parag | raph 6.03.E: |
| | 6.03.E.1. Excess or Umbrella Liability: | |
| | a) General Aggregate | \$2,000,000. |
| | b) Each Occurrence | \$2,000,000. |
| SC-6.03. Add the fol | lowing new paragraph immediately following Parag | raph 6.03.F: |
| | 6.03.F.1. Pollution Liability: | |
| | a) Each Occurrence | N.A. |
| | b) General Aggregate | N.A. |
| | If box is checked, Contractor is not requ | ired to provide |

If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract.

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SC-6.03. Add the following language after Paragraph 6.03.G:

6.03.G.1. Include the following parties or entities as additional insured:

6.03.G.1.a. The Owner, its officers, agents, and employees shall be named as additional insureds on the selected Proposers general liability and comprehensive automobile liability insurance policies to ensure coverage on any claims arising out of services performed under an Agreement. The required professional liability and workers' compensation policies or coverages shall not contain endorsements including the Owner, its officers, or employees as additional insureds.

6.03.G.1.b. Jacobs Engineering Company.

6.03.G.1.c. Materials testing firm TBD.

6.03.G.1.d. Contractor's subcontractors.

SC-6.03. Add the following new paragraph immediately following Paragraph 6.03.H:

6.03.H.1 Contractor's Professional Liability:

| a) Each Claim | \$1,000,000. |
|---------------------|--------------|
| b) Annual Aggregate | \$2,000,000. |

SC-6.05. Insert the following paragraph after 6.05.A.1:

6.05.A.1.a. In addition to the individuals and entities specified in Paragraph 6.05.A.1, include as insureds, the following:

6.05.A.1.a.1) Jacobs Engineering Company

SC-6.05. Add the following language as Paragraph 6.05.A.15:

6.05.A.15. Property insurance furnished under this Contract shall have deductibles no greater than \$5,000 for direct physical loss in any one occurrence for sublimits except for earthquake, which shall have a maximum deductible of \$50,000.

SC-7.02. Add the following language to the end of Paragraph 7.02.B:

7.02.B.1. Contractor and Subcontractor regular working hours consist of 8 working hours up to 10 working hours within an 11-hour period between 7:00 a.m. and 6:00 p.m., on a regularly scheduled basis, excluding Saturdays, Sundays and holidays. Overtime work is work in excess of 40 hours per week. Requests by Contractor to

Owner for overtime and Saturday work shall be made a minimum of 72 hours in advance, and shall be subject to Owner approval. In such event, work on weekends and holidays may be limited to reduced hours and times of day.

7.02.B.2. Owner's legal holidays are Federally recognized holidays.

SC-7.02. Add the following new paragraph immediately after Paragraph 7.02.B:

7.02.C. Owner shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.06. Add the following language at the end of Paragraph 7.06.A:

Contractor shall perform a minimum of 50 percent of the onsite labor with its own employees.

SC-7.06. Add the following new paragraphs immediately after Paragraph 7.06.D:

7.06.D.1. The identity and acceptance of Subcontractors and Suppliers for the following portions of the Work is required in accordance with the requirements of the Instructions to Bidders:

7.06.D.1.a. Subcontractors and Suppliers whose contract is 10 percent or more of Contract Price.

7.06.D.1.b. Suppliers and manufacturer brands of pipe and valves pertinent to the main scope of the Work.

SC-7.09. Delete Paragraph 7.09.A in its entirety and insert the following in its place:

7.09.A. In accordance with Colorado Revised Statutes, 39-26-114, public works contracts that are to be used in a governmental capacity are exempt from payment of Colorado State sales tax. Upon application by Contractor, Subcontractor, or Supplier, the Colorado Department of Revenue will issue a certificate or certificates of exemption from payment of Colorado State sales tax as provided by Colorado Revised Statutes.

SC-7.09. Add the following new paragraphs immediately after Paragraph 7.09.A:

7.09.B.1. All sales to Owner in its governmental capacity only shall be exempt from sales and use tax pursuant to Section 39-26-704, C.R.S. Contractor shall apply with the Department of Revenue, Sales Tax for an exemption certificate pursuant to and purchase the materials for incorporation in this Project taxfree pursuant to Section 39-26-708, C.R.S. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.09.B.2. Owner is exempt from payment of sales and compensating use taxes of the State of Colorado and of cities and counties thereof on all materials to be incorporated into the Work.

- a. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
- b. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-7.10. Add the following new paragraph(s) immediately after Paragraph 7.10.C:

7.10.D. While not intended to be inclusive of all Laws or Regulations for which Contractor may be responsible under Paragraph 7.10, the following Laws or Regulations are included as mandated by statute or for the convenience of Contractor:

7.10.D.1. Pursuant to Colorado Revised Statute 8-17-101, 80 percent of skilled and common labor employed on the Project shall be Colorado residents.

SC-7.12. Add the following new paragraph immediately after 7.12.C:

7.12.C.1. The following Owner safety program(s) are applicable to the Work: N.A.

SC-9.13. Add the following new paragraph(s) immediately following Paragraph 9.12:

9.13. Owner As Resident Project Representative

9.13.A. In addition to the Resident Project Representative furnished by Engineer, Owner will furnish an Owner's Site representative to assist

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS Engineer. The responsibilities, authorities, and limitations of authority of Owner's Site representative will be as specified for Engineer's Resident Project Representative.

SC-10.03. Add the following new paragraphs immediately after Paragraph 10.03.A:

10.03.B. Resident Project Representative (RPR) will be furnished by Engineer. The responsibilities, authority, and limitations of the RPR are limited to those of Engineer in accordance with Paragraph 10.08 and as set forth elsewhere in the Contract Documents and are further limited and described below.

10.03.C. Responsibilities and Authority:

10.03.C.1. Schedules: Review and monitor Progress Schedule, Schedule of Submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

10.03.C.2. Conferences and Meetings: Conduct or attend meetings with Contractor, such as preconstruction conferences, progress meetings, Work conferences and other Project related meetings.

10.03.C.3. Liaison: (i) Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, and assist in understanding the intent of the Contract Documents; (ii) assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's onsite operations; (iii) assist in obtaining from Owner additional details or information when required for proper execution of the Work.

10.03.C.4. Interpretation of Contract Documents: Inform Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

10.03.C.5. Submittals: Receive submittals that are furnished at the Site by Contractor, and notify Engineer of availability for examination. Advise Engineer and Contractor of the commencement of any Work or arrival of materials and equipment at Site, when recognized, requiring a Shop Drawing or Sample if the submittal has not been approved by Engineer.

10.03.C.6. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and provide recommendations to Engineer; transmit to Contractor, in writing decisions as issued by Engineer.

10.03.C.7. Review of Work and Rejection of Defective Work: (i) Conduct onsite observations of the Work in progress to assist Engineer in determining

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if the Work is, in general, proceeding in accordance with the Contract Documents; (ii) inform Engineer and Contractor whenever RPR believes that any Work is defective; (iii) advise Engineer whenever RPR believes that any Work will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged or does not meet the requirements of any inspection test, or approval required to be made; and advise Engineer of that part of the Work in progress that RPR believes should be corrected or rejected or uncovered for observation, or requires special testing, inspection, or approval.

10.03.C.8. Inspections, Tests, and System Startups: (i) Verify tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records thereof; (ii) observe, record, and report to Engineer appropriate details relative to the test procedures and system startups; and (iii) accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to Engineer.

10.03.C.9. Records: (i) Maintain records for use in preparing Project documentation; (ii) keep a diary or log book recording pertinent Site conditions, activities, decisions and events; (iii) record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of Contractors, Subcontractors, and major Suppliers of materials and equipment.

10.03.C.10. Reports: (i) Furnish Engineer periodic reports of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Submittals; (ii) immediately notify Engineer of the occurrence of Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition; and (iii) assist Engineer in drafting proposed Change Orders, Work Change Directives, and Field Orders; obtain backup material from Contractor as appropriate.

10.03.C.11. Payment Requests: Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS 10.03.C.12. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify materials and equipment certificates and operation and maintenance manuals and other data required by Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents been delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

10.03.C.13. Completion: (i) Participate in a Substantial Completion inspection; assist in determination of Substantial Completion and the preparation of lists of items to be completed or corrected; (ii) Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied; and (iii) observe whether items on final list have been completed or corrected, and make recommendations to Engineer concerning acceptance.

10.03.D. Limitations of Authority: Resident Project Representative will not:

10.03.D.1. have authority to authorize a deviation from Contract Documents or substitution of materials or equipment, unless authorized by Engineer; or

10.03.D.2. exceed the limitations of Engineer's authority as set forth in Contract Documents; or

10.03.D.3. undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's authorized representative; or

10.03.D.4. advise on, issue directions relative to, or assume control over an aspect of the means, methods, techniques, sequences, or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents; or

10.03.D.5. advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor; or

10.03.D.6. participate in specialized field or laboratory tests or inspections conducted offsite by others, except as specifically authorized by Engineer; or

10.03.D.7. accept Shop Drawings or Samples from anyone other than Contractor; or

10.03.D.8. authorize Owner to occupy the Project in whole or in part.

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SC-10.08. Add the following new paragraph immediately after Paragraph 10.08.E:

10.08.F. Contractors, Subcontractors, Suppliers, and others on the Project, or their sureties, shall maintain no direct action against Engineer, its officers, employees, affiliated corporations, and subcontractors, for any Claim arising out of, in connection with, or resulting from the engineering services performed. Only the Owner will be the beneficiary of any undertaking by Engineer.

SC-11.01. Add the following new paragraph immediately after Paragraph 11.01.A:

11.01.A.1. In accordance with Colorado Revised Statute 24-91-103.6, no change order will be issued which causes the aggregate amount payable under the Contract to exceed amount appropriated for the original Contract without written notice to Contractor that appropriations have been made to cover the costs of the additional work.

SC-11.04. Add the following new paragraph immediately after Paragraph 11.04.C:

11.04.D. In the event Contractor submits request for additional compensation as a result of a change or differing Site conditions, or as a result of delays, acceleration, or loss of productivity, Owner reserves right, upon written request, to audit and inspect Contractor's books and records relating to the Project. Upon written request for an audit, Contractor shall make its books and records available within 14 days of request. Owner shall specifically designate identity of auditor. As part of audit, Contractor shall make available its books and records relating to the Project, including but not limited to Bidding Documents, cost reports, payroll records, material invoices, subcontracts, purchase orders, daily timesheets, and daily diaries. Audit shall be limited to those cost items which are sought by Contractor in a change order or claim submission to Owner.

SC-13.03. Add the following language after Paragraph 13.03.E.3:

13.03.E.4. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

13.03.E.4.a. if the Bid price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 15 percent from the estimated quantity of such item indicated in the Agreement; and

13.03.E.4.b. if there is no corresponding adjustment with respect to any other item of Work; and

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS 13.03.E.4.c. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variation in the quantity of Unit Price Work performed.

SC-14.02. Add the following language at the end of Paragraph 14.02.D:

Tests required by Contract Documents to be performed by Contractor that require test certificates be submitted to Owner or Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes. In the event state license or certification is not required, testing laboratories or agencies shall meet the following applicable requirements:

14.02.D.6. Basic requirements of ASTM E329, "Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection" as applicable.

14.02.D.7. Calibrate testing equipment at reasonable intervals by devices of accuracy, traceable to the National Institute of Standards and Technology or accepted values of natural physical constants.

SC-15.01. Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

15.01.D.1. Thirty days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 15.01.E.) become due and when due will be paid by Owner to Contractor.

SC 15.03.B. Add the following new subparagraph to Paragraph 15.03.B:

SC 15.03.B.1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

END OF SECTION

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PART 3

SPECIFICATIONS

SECTION 01 11 00 SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project contemplated consists of new treated waterline between 5th Street and north of 7th Street along North Pikes Peak Avenue (State Highway 67) and includes, but is not limited to: replacement of existing water lines with approximately 950 linear feet of new 12-inch ductile iron pipe waterline, new isolation valves, waterline laterals, water service lines, connection of proposed waterlines to existing waterlines, corrosion protection, asphalt replacement and overlay, construction sequencing constraints, traffic control, testing, and disinfection. Many of the required materials for this Project have been secured by the City and will be made available as "Owner-Furnished Products." Bidder shall be responsible for furnishing all materials required for the Work that are not listed as being Owner-Furnished Products, including any additional material quantities that may be required.

1.02 WORK NOT COVERED BY CONTRACT DOCUMENTS

- A. None.
- 1.03 PROVISIONS FOR FUTURE WORK
 - A. None.

1.04 OWNER-FURNISHED PRODUCTS

- A. Refer to Section 01 64 00, Owner-Furnished Products.
- PART 2 PRODUCTS (NOT USED)
- PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00 PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational Submittals:
 - 1. Schedule of Values: Submit on Owner's form.
 - 2. Application for Payment.
 - 3. Final Application for Payment.

1.02 SCHEDULE OF VALUES

- A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.
- B. Upon request of Engineer, provide documentation to support the accuracy of the Schedule of Values.
- C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- D. Lump Sum Work:
 - 1. Reflect specified cash allowances and alternates, as applicable.
 - 2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.
- E. An unbalanced or front-end loaded schedule will not be acceptable.
- F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.

1.03 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to Engineer and Owner.

- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.
- F. Preparation:
 - 1. Round values to nearest dollar.
 - 2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.04 MEASUREMENT—GENERAL

- A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.
- B. Whenever pay quantities of material are determined by weight, weigh material on scales furnished by Contractor and certified accurate by state agency responsible. Obtain weight or load slip from weigher and deliver to Owner's representative at point of delivery of material.
- C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.
- D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by Engineer. Each vehicle shall bear a plainly legible identification mark.
- E. Haul materials that are specified for measurement by the cubic yard measured in the vehicle in transport vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Load vehicles to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of

a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

- F. Quantities will be based on ground profiles shown. Field surveys will not be made to confirm accuracy of elevations shown.
- G. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.

| Item | Method of Measurement | |
|-------|-------------------------------------------------------------------------------|--|
| AC | Acre—Field Measure by Engineer | |
| СҮ | Cubic Yard—Field Measure by Engineer within limits specified or shown | |
| CY-VM | Cubic Yard—Measured in Vehicle by Volume | |
| EA | Each—Field Count by Engineer | |
| GAL | Gallon—Field Measure by Engineer | |
| HR | Hour | |
| LB | Pound(s)—Weight Measure by Scale | |
| LF | Linear Foot—Field Measure by Engineer | |
| MFBM | Thousand Foot Board Measure—[Delivery Invoice] [Field Measure by Engineer] | |
| SF | Square Foot | |
| SY | Square Yard | |
| TON | Ton—Weight Measure by Scale (2,000 pounds) | |

H. Units of measure shown on Bid Form shall be as follows, unless specified otherwise.

I. Work Item Descriptions: Work item descriptions are provided below for the work items listed in Payment Schedule. The price bid for each work item shall cover costs in connection with the Work, including furnishing labor, materials, equipment, and supplies; providing construction plant equipment and tools; performing necessary labor and supervision to fully complete the Work as described and specified in the Contract Documents; and overhead and profit. Related work not specifically identified in the work item

descriptions is considered incidental and a subsidiary obligation of the Contractor and costs in connection therewith shall be included in the price bid for work items. Typical incidental items may include, but are not limited to, construction administration, communications, and coordination with Owner, the Engineer, land owners, regulatory agencies, and other stakeholders, and quality control.

| | SCHEDULE C | | | |
|-----|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| 1. | Mobilization (LS) | Lump sum bid includes mobilization of all contractor and subcontractor personnel, equipment, and temporary construction facilities to the Project site; Health and Safety, providing temporary utilities; preparing and updating detailed construction schedule; construction surveying and staking; providing all insurance and bonds required to complete the Work; and all project specific and field and office overhead. | Payment will be made upon completion of portions of the Work as requested by the Contractor and as approved by the Owner/Engineer. Lump sum of this project cannot exceed 5% of the total Project cost. | |
| | | The cost of all work specified in Division 1, General Requirements, unless specifically covered in other bid items, will not be paid separately, but shall be included in the lump sum price bid for General Conditions. | | |
| | | The first progress payment for General Conditions will be subject to receipt and/or completion of the following: | | |
| | | Includes the mobilization of Contractor personnel, equipment and temporary construction facilities to the Project site; providing temporary utilities; maintaining access roads, parking areas and haul roads, detailed CPM baseline construction schedule submittal; schedule of values submittal. | | |

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| | SCHEDULE C | | | |
|-----|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| | | Required insurance certificates and bonds, unless specifically included in other bid items. | | |
| | | Required preconstruction meeting, submittals, and permits. | | |
| | | Providing a designated full-time superintendent, project engineer, Health and Safety officer, and foremen onsite. | | |
| 2. | Demobilization (LS) | Demobilization includes demobilization of all contractor and subcontractor personnel, equipment, and temporary construction facilities to the Project site; closing out all required paperwork and all project specific and field and office overhead. | Payment will be made upon completion of portions of the Work as requested by the Contractor and as approved by the Owner/Engineer. | |
| | | | Lump sum of this project cannot exceed 2% of the total Project cost. | |
| 3. | Erosion and Sediment Control (LS) | Lump sum bid includes costs for storm water, sediment, and erosion control measures, complete; including installing, maintaining, and removing storm water, sediment, and soil erosion stabilization and sedimentation control, temporary seeding, implementing and monitoring the Storm Water Management Plan, and conformance to applicable permit and Specification requirements. | Payment will be distributed in equal monthly installments over the Contract Times stated in the Contract Agreement. | |

| | SCHEDULE C | | | |
|-----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| 4. | Dewatering (LS) | Lump sum bid includes control and disposal of groundwater or groundwater mixed with Stormwater from excavated areas within trench requiring dewatering in accordance with the Contract Documents, applicable regulations, and permit requirements. | Payment will be based on percent of pipeline installed. | |
| 5. | Traffic and Pedestrian Control (LS) | Lump sum bid includes costs for traffic and pedestrian control, complete; including developing traffic control plan, furnishing materials for implementing and monitoring the traffic and pedestrian control plan, and conformance to applicable permit and Specification requirements. | Payment will be distributed in equal monthly installments over the Contract Times as stated in the Contract Agreement for Schedule C. | |
| 6. | Asphalt Removal and Restoration (SF) | Square Foot bid includes restoration of disturbed areas identified as asphalt, complete; including furnishing and installing materials and equipment and any additional restoration required in areas of ongoing development to preconstruction conditions unless specified otherwise or as shown on the Drawings. Pavement markings and striping shall be incidental to this pay item. | Payment will be based on a quantity of completed Asphalt Removal and Restoration except that any quantity required beyond the 5-foot trench patch width shall be incidental. | |
| 7. | Asphalt Mill and Overlay (SF) | Square foot bid includes all material, equipment, and labor required for milling asphalt pavement as shown on the Drawings for surface limits and details for depth, including saw cutting; removal, planning, hauling, and disposal of removed asphalt material along all public streets disturbed during construction, including stockpile of planed | Payment will be based on area of asphalt that has been milled and overlayed and as approved by the Owner/Engineer. | |

| | SCHEDULE C | | | |
|-----|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| | | materials and cuttings. Also included is cleanup of the disturbed site. | | |
| 8. | Concrete Curb and Gutter Removal and Restoration (LF) | Lineal foot bid includes restoration of disturbed areas identified as concrete, complete; including furnishing and installing materials and equipment and any additional restoration required in areas of ongoing development to pre-construction conditions unless specified otherwise or as shown on the Drawings. | Payment will be based on length of Concrete Curb and Gutter installed. | |
| 9. | Concrete Sidewalk Removal and Restoration (LF) | Lineal foot bid includes restoration of disturbed areas identified as concrete, complete; including furnishing and installing materials and equipment and any additional restoration required in areas of ongoing development to pre-construction conditions unless specified otherwise or as shown on the Drawings. | Payment will be based on Sidewalk installed. | |
| 10 | South End Connection | Lump sum bid includes all Work and Contractor furnished materials south of Sta 16+50 as shown on the Drawings. | Payment will be based on the connection complete. | |
| 11. | W. 6th Street Connection A (LS) | Lump Sum bid includes furnishing and installing all materials and labor necessary for the procurement, transportation and installation of 8-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, other fittings, thrust blocks, subsurface utility locating (pothole), and all other work incidental to the installation of the water line complete in place as shown on the Drawings and labeled as W. 6th Street Connection A. | Payment will be based on the completion of all piping identified as W. 6th Street Connection A complete. | |

| | SCHEDULE C | | |
|-----|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| No. | Item | Description | Payment |
| 12. | W 6th Street B Connection (LS) | Lump sum bid includes furnishing and installing all materials and labor necessary for the procurement, transportation and installation of 8-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, other fittings, valves, thrust blocks, and all other work incidental to the installation of the water line complete in place as shown on the Drawings and labeled as W. 6th Street Connection B, including but not limited to: | Payment will be based on the completion of the W. 6th Street Connection B to the existing waterline complete. |
| | | Demolition of the existing water line of sufficient length to facilitate the connection of the new water line to the existing or as shown on Drawings. | |
| | | Furnishing all equipment, labor, and materials necessary for procurement, transportation, and installing, 12-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, installation of valves, other fittings, thrust blocks, subsurface utility locating (potholes), and all other work incidental to the connection of the proposed water line to the existing water line. | |
| 13. | E. 6th Street Connection A (LS) | Lump sum bid includes furnishing and installing all materials and labor necessary for the procurement, transportation and installation of 8-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, other fittings, thrust blocks, subsurface utility locating | Payment will be based on the completion of all piping identified as E. 6th Street Connection A complete. |

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| | SCHEDULE C | | | |
|-----|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| | | (pothole), and all other workincidental to the installation of thewater line complete in place as shownon the Drawings and labeled as E. 6thStreet Connection A. | | |
| 14. | E. 6th Street Connection B (LS) | Lump sum bid includes furnishing and installing all materials and labor necessary for the procurement, transportation and installation of 8-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, other fittings, valves, thrust blocks, subsurface utility locating (pothole) and all other work incidental to the installation of the water line complete in place as shown on the Drawings and labeled as E. 6th Street Connection B, including but not limited to: | Payment will be based on the completion of the E. 6th Street Connection B to the existing waterline complete. | |
| | | Demolition of the existing water line of sufficient length to facilitate the connection of the new water line to the existing or as shown on Drawings. Connection of the proposed water line to the existing water line. | | |
| 15 | W 7th Street Connection A (LS) | Lump sum bid includes furnishing and installing all materials and labor necessary for the procurement, transportation and installation of 8-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, other fittings, thrust blocks, subsurface utility locating (potholes) and all other work incidental to the installation of the water line complete in place as shown | Payment will be based on the completion of all piping identified as W. 7th Street Connection A complete. | |

| | SCHEDULE C | | |
|-----|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| No. | Item | Description | Payment |
| | | on the Drawings and labeled as W. 7th Street Connection A. | |
| 16. | North End Connection | Lump sum bid includes all Work and Contractor furnished materials west of the gate valve at Sta 25+60 as shown on the Drawings. | Payment will be based on the connection complete. |
| 17. | 4-Inch Stub | Lump sum bid includes all Work and Contractor furnished materials for the 4-inch stub east of Sta 25+40 as shown on the Drawings. | |
| 18. | Fire Hydrant (EA) | All materials, equipment, and labor required to furnish and install fire hydrant assembly where required on the Construction Drawings including, installation of assembly, associated valve and valve box, application of wax tape coating of all metallic surfaces with poly-wrap encasement, connection, thrust blocks, bedding, backfill, compaction, testing, restoration of surface material to match adjacent material type and depth, and cleanup. Costs of all fittings, pipe, valves, thrust blocks, restraint, and, appurtenances necessary to complete the fire hydrant installation to be included in the cost of the fire hydrant assembly. | Payment to be based on the number of fire hydrants installed within the limits of Schedule C. |
| 19. | Waterline Testing (LS) | Lump sum bid includes furnishing all equipment, labor and materials necessary for the hydrostatic testing, chlorine disinfection, and flushing, including test caps, temporary fire hydrant connections and all other work incidental to the testing of the waterline, complete. | Payment will be based on the completion all testing necessary to activate the proposed waterline. |

| | SCHEDULE C | | | |
|-----|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--|
| No. | Item | Description | Payment | |
| 20. | 12-inch Water Line (LF) | Lineal foot bid includes furnishing all equipment, labor, and materials necessary for procurement, transportation, and installing, 12-inch, DIP, PC350 restrained joint water pipe including excavation, bedding, backfill, installation of valves, other fittings, thrust blocks, subsurface utility locating (potholes), and all other work incidental to the installation of the water line complete in place as shown on the Drawings. | Payment will be based on 12-inch pipeline stationing installed within the limits of Schedule C. | |
| 21. | 2" and Smaller Service Line Connection - Short (EA) | Unit price bid includes all costs for furnishing and installing service lines, meters, relocation of meter boxes, restoration of surfaces disturbed including private fences and all other work incidental to the installation of the water line complete in place as shown on the Drawings. | Payment will be based on number of short service lines installed within the limits of Schedule C. | |
| 22. | 2" and Smaller Service Line Connection - Long (EA) | Unit price bid includes all costs for furnishing and installing service lines, meters, relocation of meter boxes, restoration of surfaces disturbed including private fences and all other work incidental to the installation of the water line complete in place as shown on the Drawings. | Payment will be based on number of long service lines installed within the limits of Schedule C. | |
| 23. | Trench Stabilization (CY) | Cubic yard bid includes excavation and trench stabilization installation required for the project in accordance with the Contract Documents. | Payment will be based on cubic yards of Work as requested by the Contractor and as approved by the Owner/Engineer. | |

1.05 PAYMENT

A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage

complete basis for each line item of the accepted Schedule of Values or as stated.

B. Payment for unit price items covers all the labor, materials, and services necessary to furnish and install the following items.

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
 - 1. Loading, hauling, and disposing of rejected material.
 - 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 - 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
 - 4. Material not unloaded from transporting vehicle.
 - 5. Defective Work not accepted by Owner.
 - 6. Material remaining on hand after completion of Work.

1.07 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Engineer.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 13 PROJECT COORDINATION

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational:
 - 1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
 - 2. Photographs:
 - a. Digital Images: Submit one copy of DVD disc containing images within 5 days of being taken. Each image is to have a minimum file size of 1.4 Mb (1,400 Kb) so viewed resolution is high quality. The production of larger file sizes with higher resolution is encouraged.
 - 3. Video Recordings: Submit one copy taken within 5 days prior to Notice to Proceed.

1.02 OWNER-FURNISHED PRODUCTS

A. Refer to Section 01 64 00, Owner-Furnished Products.

1.03 WORK SEQUENCING/CONSTRAINTS

A. See Drawings for specific work sequencing/constraints.

1.04 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's

written request. No existing valves shall be operated by Contractor unless directed by Owner.

- E. Install and maintain bypass facilities and temporary connections required to keep Owner's water utility distribution operations on line. Sequences other than those specified will be considered upon written request to Owner and Engineer, provided they afford equivalent continuity of operations.
- F. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Engineer's advance approval of the need for and duration of such Work.
- G. Relocation of Existing Facilities:
 - 1. During construction, it is expected that minor relocations of Work will be necessary.
 - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
 - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
 - 4. Perform relocations to minimize downtime of existing facilities.
 - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

1.05 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
 - 1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
 - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.
- B. Documentation:
 - 1. Record and submit documentation of observations made on examination inspections in accordance with Article Construction Photographs.
 - 2. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of

PROJECT COORDINATION 01 31 13 - 2

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C. Owner to provide Contractor with copies of easements for installing new meters and making service line transfers.

1.06 CONSTRUCTION PHOTOGRAPHS

- A. General:
 - 1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.
 - 2. Engineer shall have right to select subject matter and vantage point from which photographs are to be taken.
 - 3. Digital Images: No post-session electronic editing of images is allowed. Stored image shall be actual image as captured without cropping or other edits.
- B. Preconstruction and Post-Construction:
 - 1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of four photographs per 100 lineal feet of Work and property adjacent to perimeter of Site.
 - 2. Particular emphasis shall be directed to structures both inside and outside the Site.
 - 3. Format: Digital, minimum resolution of 1832 by 3264.
- C. Construction Progress Photos:
 - 1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
 - 2. Weekly: Take photographs using digital, minimum resolution of 1832 by 3264 showing locations where existing utilities are crossed and wherever new valves, fittings, hydrants, and meters are installed, and at all connections to existing water system.
- D. Documentation:
 - 1. Digital Images:
 - a. Electronic image shall have date taken embedded into image.
 - b. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.

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

1.07 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning the Work on Site or of a particular area of the Work, and again within 10 days following date of Substantial Completion, videograph Site and property adjacent to Site.
- B. In the case of preconstruction recording, no work shall begin in the area prior to Engineer's review and approval of content and quality of video for that area.
- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within pipeline alignment and areas adjacent to and within the right-of-way or easement, and on Contractor storage and staging areas.
- D. Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Video Format and Quality:
 - 1. DVD format, with sound.
 - 2. Video:
 - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
 - b. Electronically, and accurately display the month, day, year, and time of day of the recording.
 - 3. Audio:
 - a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
 - b. Indicate date, project name, and a brief description of the location of recording, including:
 - 1) Facility name.
 - 2) Street names or easements.
 - 3) Addresses of private property.
 - 4) Direction of coverage, including engineering stationing, if applicable.

1.08 REFERENCE POINTS AND SURVEYS

A. Location and elevation of bench marks are shown on Drawings.

- B. Contractor's Responsibilities:
 - 1. Provide additional survey and layout required to layout the Work.
 - 2. Notify Engineer at least 3 working days in advance of time when grade and line to be provided by Owner will be needed.
 - 3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
 - 4. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
 - 5. Retain professional land surveyor or civil engineer registered in state of Project who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
 - 6. Maintain complete accurate log of survey work as it progresses as a Record Document.
 - 7. On request of Engineer, submit documentation.
 - 8. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
 - a. Establish control points, lines, and easement boundaries.
 - b. Check layout, survey, and measurement work performed by others.
 - c. Measure quantities for payment purposes.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Owner before commencing Work to cut or otherwise alter:
 - 1. Asphalt, sidewalks, services, or existing waterlines.
- C. Refinish surfaces to provide an even finish.
 - 1. Refinish continuous surfaces to nearest intersection.
 - 2. Refinish entire assemblies.
 - 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.

- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on Drawings.
- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

END OF SECTION

SECTION 01 32 00 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational Submittals:
 - 1. Preliminary Progress Schedule: Submit within time specified in Paragraph 2.03 of the General Conditions.
 - 2. Detailed Progress Schedule:
 - a. Submit initial Detailed Progress Schedule within 30 days after Effective Date of the Agreement.
 - b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.
 - 3. Submit with Each Progress Schedule Submission:
 - a. Contractor's certification that Progress Schedule submission is actual schedule being used for execution of the Work.
 - b. Electronic file compatible with latest version of Adobe PDF.
 - c. Narrative Progress Report: Same format as specified for Progress Schedule.
 - 4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

- A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 60 days, and a summary of balance of Project through Final Completion.
- B. Show activities including, but not limited to the following:
 - 1. Notice to Proceed.
 - 2. Permits.
 - 3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittal Procedures.
 - 4. Early procurement activities for long lead equipment and materials.
 - 5. Mobilization.
 - 6. Specified Work sequences and construction constraints.
 - 7. Dates for testing, disinfection and bacteriological testing.
 - 8. Dates for making connections to existing waterlines.
 - 9. Dates for service line transfers from existing to new meters.
 - 10. Days allocated for anticipated "normal weather impacts."
 - 11. Contract Substantial and Final Completion Dates.

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- 12. Owner-furnished products delivery dates or ranges of dates.
- 13. System startup summary.
- 14. Project close-out summary.
- 15. Demobilization summary.
- C. Update Preliminary Progress Schedule monthly as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- D. Format: In accordance with Article Progress Schedule—Bar Chart.

1.03 DETAILED PROGRESS SCHEDULE

- A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.
- B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.
- D. Format: In accordance with Article Progress Schedule—Bar Chart.
- E. Update Bi-weekly to reflect actual progress and occurrences to date, including any weather delays.

1.04 PROGRESS SCHEDULE—BAR CHART

- A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) 580, "Construction Project Planning and Scheduling Guidelines." If a conflict occurs between the AGC publication and this specification, this specification shall govern.
- B. Format:
 - 1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
 - 2. Title Block: Show name of Project and Owner, date submitted, revision or update number, and name of scheduler.
 - 3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.

- 4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
- 5. Legend: Describe standard and special symbols used.
- 6. Contents: Identify, in chronological order, those activities reasonably required to complete the Work.

1.05 PROGRESS OF THE WORK

- A. Updated Progress Schedule shall reflect:
 - 1. Progress of Work to within 5 working days prior to submission.
 - 2. Approved changes in Work scope and activities modified since submission.
 - 3. Delays in Submittals or resubmittals, deliveries, or Work.
 - 4. Adjusted or modified sequences of Work.
 - 5. Other identifiable changes.
 - 6. Revised projections of progress and completion.
 - 7. Report of changed logic.
- B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as testing. Disinfection and system connections..
- C. If an activity is not completed by its latest scheduled completion date and this failure is anticipated to extend Contract Times, submit, within 7 days of such failure, a written statement as to how nonperformance will be corrected to return Project to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times will not be justification for adjustment to Contract Price or Contract Times.
- D. Owner may order Contractor to increase plant, equipment, labor force, or working hours if Contractor fails to:
 - 1. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.06 NARRATIVE PROGRESS REPORT

- A. Format:
 - 1. Organize same as Progress Schedule.
 - 2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

- 1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
- 2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
- 3. Contractor's plan for management of Site (for example, lay down and staging areas, construction traffic), use of construction equipment, buildup of trade labor, and identification of potential Contract changes.
- 4. Identification of new activities and sequences as a result of executed Contract changes.
- 5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
- 6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
- 7. Changes to activity logic.
- 8. Changes to the critical path.
- 9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
- 10. Steps taken to recover the schedule from Contractor-caused delays.

1.07 SCHEDULE ACCEPTANCE

- A. Engineer's acceptance will demonstrate agreement that:
 - 1. Proposed schedule is accepted with respect to:
 - a. Contract Times, including Final Completion and all intermediate Milestones, are within the specified times.
 - b. Specified Work sequences and constraints are shown as specified.
 - c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
 - d. Access restrictions are accurately reflected.
 - e. Startup and testing times are as specified.
 - f. Submittal review times are as specified.
 - g. Startup testing duration is as specified and timing is acceptable.
 - 2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the

nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

- B. Unacceptable Preliminary Progress Schedule:
 - 1. Make requested corrections; resubmit within 10 days.
 - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, including updating schedule on a monthly basis to reflect actual progress and occurrences to date.
- C. Unacceptable Detailed Progress Schedule:
 - 1. Make requested corrections; resubmit within 10 days.
 - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.
- D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.08 ADJUSTMENT OF CONTRACT TIMES

- A. Reference General Conditions.
- B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.
- C. Schedule Contingency:
 - 1. Contingency, when used in the context of the Progress Schedule, is time between Contractor's proposed Completion Time and Contract Completion Time.
 - 2. Contingency included in Progress Schedule is a Project resource available to both Contractor and Owner to meet Contract Times. Use of Schedule contingency shall be shared to the proportionate benefit of both parties.
 - 3. Use of schedule contingency suppression techniques such as preferential sequencing and extended activity times is prohibited.
 - 4. Pursuant to Contingency sharing provisions of this specification, no time extensions will be granted, nor will delay damages be paid until a

delay occurs which (i) consumes all available contingency time, and (ii) extends Work beyond the Contract Completion date.

- D. Claims Based on Contract Times:
 - 1. Where Engineer has not yet rendered formal decision on Contractor's Claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in Progress Schedule, reflect an interim adjustment in the Progress Schedule as acceptable to Engineer.
 - 2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
 - 3. Revise Progress Schedule prepared thereafter in accordance with Engineer's formal decision.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Engineer's approval.
- B. Informational Submittal: Information submitted by Contractor that requires Engineer's review and determination that submitted information is in accordance with the Conditions of the Contract.

1.02 PROCEDURES

- A. Direct submittals to Engineer, unless specified otherwise. Engineer and Owner contact information will be provided at preconstruction conference.
- B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format.
 - 1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
 - 2. Electronic files that contain more than 10 pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
 - 3. PDF files shall be set to open "Bookmarks and Page" view.
 - 4. Add general information to each PDF file, including title, subject, author, and keywords.
 - 5. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
 - 6. Submit new electronic files for each resubmittal.
 - 7. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
 - 8. Engineer will reject submittal that is not electronically submitted, unless specifically accepted.
 - 9. Provide Engineer with authorization to reproduce and distribute each file as many times as necessary for Project documentation.
 - 10. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.

- C. Transmittal of Submittal:
 - 1. Contractor shall:
 - a. Review each submittal and check for compliance with Contract Documents.
 - b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
 - Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
 - 2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
 - 2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section or in a format approved by Engineer.
 - 3. Identify each submittal with the following:
 - a. Numbering and Tracking System:
 - 1) Sequentially number each submittal.
 - 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
 - b. Specification section and paragraph to which submittal applies.
 - c. Project title and Engineer's project number.
 - d. Date of transmittal.
 - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
 - 4. Identify and describe each deviation or variation from Contract Documents.
- D. Format:
 - 1. Do not base Shop Drawings on reproductions of Contract Documents.
 - 2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
 - 3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
 - 4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals and requirements of individual specification sections.

SUBMITTAL PROCEDURES 01 33 00 - 2

- F. Processing Time:
 - 1. Time for review shall commence on Engineer's receipt of submittal.
 - 2. Engineer will act upon Contractor's submittal and transmit response to Contractor not later than 15 calendar days after receipt, unless otherwise specified.
 - 3. Resubmittals will be subject to same review time.
 - 4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.
- G. Resubmittals: Clearly identify each correction or change made.
- H. Incomplete Submittals:
 - 1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
 - 2. When any of the following are missing, submittal will be deemed incomplete:
 - a. Contractor's review stamp; completed and signed.
 - b. Transmittal of Contractor's Submittal; completed and signed.
 - c. Insufficient number of copies.
- I. Submittals not required by Contract Documents:
 - 1. Will not be reviewed and will be returned stamped "Not Subject to Review."
 - 2. Engineer will keep one copy and return submittal to Contractor.

1.03 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual specification sections.
- B. Shop Drawings:
 - 1. Identify and Indicate:
 - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
 - b. Equipment and Component Title: Identical to title shown on Drawings.

- c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
- d. Project-specific information drawn accurately to scale.
- 2. Manufacturer's standard schematic drawings and diagrams as follows:
 - a. Modify to delete information that is not applicable to the Work.
 - b. Supplement standard information to provide information specifically applicable to the Work.
- 3. Product Data: Provide as specified in individual specifications.
- 4. Deferred Submittal: See Drawings for list of deferred submittals.
 - a. Contractor-design drawings and product data related to permanent construction.
 - 1) Written and graphic information.
 - 2) Drawings.
 - 3) Cut sheets.
 - 4) Data sheets.
 - 5) Action item submittals requested in individual specification section.
 - b. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit required supporting data and drawings for review and acceptance by Engineer and Owner. Documentation of review and approval provided on Engineer's comment form, along with completed submittal, will be filed with permitting agency by Owner and approved by permitting agency prior to installation.
- 5. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.
- C. Samples:
 - 1. Copies: Two unless otherwise specified in individual specifications.
 - 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
 - a. Manufacturer name.
 - b. Model number.
 - c. Material.
 - d. Sample source.
 - 3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
 - 4. Full-size Samples:
 - a. Size as indicated in individual specification section.
 - b. Prepared from same materials to be used for the Work.

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- c. Cured and finished in manner specified.
- d. Physically identical with product proposed for use.
- D. Action Submittal Dispositions: Engineer will review, comment, stamp, and distribute as noted:
 - 1. Approved:
 - a. Contractor may incorporate product(s) or implement Work covered by submittal.
 - b. Distribution: Electronic.
 - 2. Approved as Noted:
 - a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
 - b. Distribution: Electronic.
 - 3. Partial Approval, Resubmit as Noted:
 - a. Make corrections or obtain missing portions, and resubmit.
 - b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
 - c. Distribution: Electronic.
 - 4. Revise and Resubmit:
 - a. Contractor may not incorporate product(s) or implement Work covered by submittal.
 - b. Distribution: Electronic.

1.04 INFORMATIONAL SUBMITTALS

- A. General:
 - 1. Refer to individual specification sections for specific submittal requirements.
 - 2. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copy to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one copy and return remaining copy with review comments to Contractor, and require that submittal be corrected and resubmitted.
- B. Certificates:
 - 1. General:
 - a. Provide notarized statement that includes signature of entity responsible for preparing certification.
 - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.

- 2. Welding: In accordance with individual specification sections.
- 3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual specification section.
- 4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- 5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
- 6. Manufacturer's Certificate of Compliance: In accordance with Section 01 61 00, Common Product Requirements.
- 7. Manufacturer's Certificate of Proper Installation.
- C. Construction Photographs and Video: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.
- D. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- E. Contractor-design Data (related to temporary construction):
 - 1. Written and graphic information.
 - 2. List of assumptions.
 - 3. List of performance and design criteria.
 - 4. Summary of loads or load diagram, if applicable.
 - 5. Calculations.
 - 6. List of applicable codes and regulations.
 - 7. Name and version of software.
 - 8. Information requested in individual specification section.
- F. Deferred Submittals: See Drawings for list of deferred submittals.
 - 1. Contractor-design data related to permanent construction:
 - a. List of assumptions.
 - b. List of performance and design criteria.
 - c. Summary of loads or load diagram, if applicable.
 - d. Calculations.
 - e. List of applicable codes and regulations.
 - f. Name and version of design software.
 - g. Factory test results.
 - h. Informational submittals requested in individual specification section.

SUBMITTAL PROCEDURES 01 33 00 - 6

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

- 2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Engineer. Documentation of review and indication of compliance with general design intent and project criteria provided on Engineer's comment form as meets conditions of the Contract, along with completed submittal, will be filed with permitting agency by Owner and approved by permitting agency prior to installation.
- G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual specification section.
- H. Payment:
 - 1. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.
 - 2. Schedule of Values: In accordance with the Bid Form Unit Prices and Quantities.
- I. Quality Control Documentation: As required in Section 01 45 16.13, Contractor Quality Control.
- J. Schedules:
 - 1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
 - a. Show for each, at a minimum, the following:
 - 1) Specification section number.
 - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
 - 3) Estimated date of submission to Engineer, including reviewing and processing time.
 - b. On a monthly basis, submit updated Schedule of Submittals to Engineer if changes have occurred or resubmittals are required.
 - 2. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.
- K. Special Guarantee: Supplier's written guarantee as required in individual specification sections.
- L. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty

Subcontractor, trade, Specialist, consultant, installer, and other professionals. Reference Paragraph 1.01.A.38.b of Supplementary Conditions for definition of Specialist.

- M. Submittals Required by Laws, Regulations, and Governing Agencies:
 - 1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
 - 2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- N. Test, Evaluation, and Inspection Reports:
 - 1. General: Shall contain signature of person responsible for test or report.
 - 2. Factory:
 - a. Identification of product and specification section, type of inspection or test with referenced standard or code.
 - b. Date of test, Project title and number, and name and signature of authorized person.
 - c. Test results.
 - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - e. Provide interpretation of test results, when requested by Engineer.
 - f. Other items as identified in individual specification sections.
 - 3. Field:
 - a. As a minimum, include the following:
 - 1) Project title and number.
 - 2) Date and time.
 - 3) Record of temperature and weather conditions.
 - 4) Identification of product and specification section.
 - 5) Type and location of test, Sample, or inspection, including referenced standard or code.
 - 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
 - 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - 8) Provide interpretation of test results, when requested by Engineer.
 - 9) Other items as identified in individual specification sections.

SUBMITTAL PROCEDURES 01 33 00 - 8

1.05 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this specification:
 - 1. Transmittal of Contractor's Submittal.
- PART 2 PRODUCTS (NOT USED)
- PART 3 EXECUTION (NOT USED)

END OF SECTION

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

| JACOBS [®] TRANSMITTAL OF CONTRACTOR'S SUBMITTAL (ATTACH TO EACH SUBMITTAL) | | | | | | |
|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| | Date: | | | | | |
| TO: | Submittal No.: New Submittal Project: Project No.: Specification Section No.: (Cover only one section with each transmittal) Schedule Date of Submittal: | | | | | |
| SUBMITTAL TYPE: Shop Drawing Deferred | Sample Informational | | | | | |

The following items are hereby submitted:

| Number of CopiesDescription of Item Submitted (Type, Size, Model Number, Etc.) | Description of Item Submitted | Spec. and | Drawing or | Contains Variation to Contract | |
|--------------------------------------------------------------------------------------|-------------------------------|-----------------|------------|-----------------------------------|--|
| | Para. No. | Brochure Number | No | Yes | |
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Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____ Contractor (Authorized Signature)

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS SUBMITTAL PROCEDURES 01 33 00 SUPPLEMENT - 1

SECTION 01 45 16.13 CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 DEFINITIONS

A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. CQC Plan: Submit, not later than 30 days after receipt of Notice to Proceed.
 - 2. CQC Report: Submit, weekly, an original and one copy in report form.

1.03 OWNER'S QUALITY ASSURANCE

- A. All Work is subject to Owner's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.
- B. Owner's quality assurance inspections and tests are for the sole benefit of Owner and do not:
 - 1. Relieve Contractor of responsibility for providing adequate quality control measures;
 - 2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance;
 - 3. Constitute or imply acceptance; or
 - 4. Affect the continuing rights of Owner after acceptance of the completed Work.
- C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Engineer.
- E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or

test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
 - B. Maintain complete inspection records and make them available at all times to Owner and Engineer.
 - C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Engineer and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

3.03 QUALITY CONTROL ORGANIZATION

- A. CQC System Manager:
 - 1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
 - 2. CQC System Manager may perform other duties on the Project.
 - 3. CQC System Manager shall be an experienced construction person, with a minimum of 3 years construction experience on similar type Work.
 - 4. CQC System Manager shall report to the Contractor's project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
 - 5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
 - 6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.
- B. CQC Staff:
 - 1. Designate a CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by Engineer.
 - 2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.
 - 3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
 - 4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. Add additional staff when necessary for a proper CQC organization.
- C. Organizational Changes: Obtain Engineer's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

3.04 CONTRACTOR QUALITY CONTROL PLAN

- A. General:
 - 1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
 - 2. An interim plan for the first 30 days of operation will be considered.
 - 3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
 - 4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.
- B. Content:
 - 1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
 - a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Paragraph QC Phasing) for all aspects of the Work specified.
 - b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
 - c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
 - d. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
 - e. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.

CONTRACTOR QUALITY CONTROL 01 45 16.13 - 4

- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
- g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.
- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Engineer, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Engineer.

3.05 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.
- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
 - 1. Contractor/subcontractor and their areas of responsibility.
 - 2. Operating plant/equipment with hours worked, idle, or down for repair.
 - 3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
 - 4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
 - 5. Material received with statement as to its acceptability and storage.

- 6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
- 7. Offsite surveillance activities, including actions taken.
- 8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- 9. List instructions given/received and conflicts in Drawings and/or Specifications.
- 10. Contractor's verification statement.
- 11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
- 12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.06 SUBMITTAL QUALITY CONTROL

A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

3.07 TESTING QUALITY ASSURANCE

A. Owner will contract the services of an independent material testing firm. Contractor shall provide minimum 72 hours' notice to Owner and testing firm for scheduling tests. Contractor responsible for costs associated with correcting Work and for retesting.

3.08 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.
- B. Punchlist:
 - 1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
 - 2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
 - 3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.

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NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

END OF SECTION

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
 - 2. Federal Emergency Management Agency (FEMA).
 - 3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
 - 4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
 - 5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
 - U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
 - 2. Temporary Construction Submittals:
 - a. Contractor's storage yard.
 - b. Fencing and protective barrier locations and details.
 - c. Staging area location plan.
 - d. Traffic and Pedestrian Control and Routing Plans: As specified herein, and proposed revisions thereto.
 - 3. Temporary Control Submittals:
 - a. Noise control plan.
 - b. Dust control plan.

1.03 MOBILIZATION

- A. Mobilization includes, but is not limited to, these principal items:
 - 1. Obtaining required permits.
 - 2. Providing onsite sanitary facilities as specified and as required by Laws and Regulations, and governing agencies.
 - 3. Arranging for and erection of Contractor's work and storage yard.
 - 4. Posting OSHA required notices and establishing safety programs and procedures.
 - 5. Having Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.04 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Owner informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.05 VEHICULAR TRAFFIC

- A. Traffic Control Plan: Adhere to traffic control plan reviewed and accepted by Owner and Colorado Department of Transportation (CDOT). Changes to this plan shall be made only by written approval of the City of Florence and Colorado Department of Transportation, for work as applicable to each jurisdictional location. Secure approvals for necessary changes so as not to delay progress of the Work.
- B. Traffic Routing Plan: Show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles.

PART 2 PRODUCTS

- 2.01 ENGINEER'S FIELD OFFICES
 - A. None.

2.02 PROJECT SIGN

A. Provide and maintain one, 8-foot-wide by 4-foot-high sign constructed of 3/4-inch exterior high density overlaid plywood. Sign shall bear name of Project, Owner, Contractor, Engineer, and other participating agencies. Lettering shall be blue applied on white background by an experienced sign painter. Provide exterior type enamel paint. Information to be included and logo graphic will be provided by Owner.

PART 3 EXECUTION

3.01 TEMPORARY UTILITIES

- A. Power:
 - 1. No electric power is available at Site. Make arrangements to obtain and pay for electrical power used, if any.
 - 2. Cost of electric power will be borne by Contractor.
- B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.
- C. Water:
 - 1. Hydrant Water:
 - a. Is available from nearby hydrants. Secure written permission for connection and use from water department and meet requirements for use. Notify fire department before obtaining water from fire hydrants.
 - b. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
 - 2. Owner will furnish construction water required at no cost to Contractor on Site at location shown. Furnish and install temporary piping and facilities to transport water to the Work.
 - 3. Provide means approved by water department to prevent water used for testing from flowing back into source pipeline.
 - 4. Do not operate hydrants without Owner approval.
 - 5. Do not operate existing water system valves coordinate with Owner for this to be done by the water department.

D. Sanitary and Personnel Facilities: Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.

3.02 PROTECTION OF WORK AND PROPERTY

- A. General:
 - 1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
 - 2. No residence or business shall be cut off from vehicular traffic for a period exceeding 4 hours, unless special arrangements have been made.
 - 3. Schedule the Work so construction will not interfere with irrigation of cultivated lands or pasturelands. Construction may proceed during irrigation season, provided Contractor constructs temporary irrigation ditches, turnouts, and miscellaneous structures acceptable to property owners.
 - 4. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
 - 5. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with owner of said utility and perform work to their satisfaction.
 - 6. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
 - 7. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
 - 8. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
 - 9. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
 - 10. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and

other debris from entering sewers, pump stations, or other sewer structures.

- 11. Maintain original Site drainage wherever possible.
- B. Site Security: Provide and maintain temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.
- C. Barricades and Lights:
 - 1. Provide as required by the City of Florence and Colorado Department of Transportation Vehicle Code and in sufficient quantity to safeguard public and the Work.
 - 2. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
 - 3. Provide to protect existing facilities and adjacent properties from potential damage.
 - 4. Locate to enable access by facility operators and property owners.
 - 5. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs.
 - 6. Locate barricades at the nearest intersecting public thoroughfare on each side of blocked section.
 - 7. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
- D. Signs and Equipment:
 - 1. Conform to requirements of manual published by the Colorado Department of Transportation.
 - 2. Portable TOW-AWAY-NO STOPPING Signs: Place where approved by police department and Owner.
 - 3. Traffic Cones: Provide to delineate traffic lanes to guide and separate traffic movements.
 - 4. High-Level Warning Flag Units: Provide two in advance of traffic approaching the Work, each displaying three flags mounted at a height of 9 feet.
 - 5. ROAD CONSTRUCTION AHEAD Signs: Provide four, size 48 inches by 48 inches. Place in conspicuous locations, approximately 200 feet in advance of the Work, and facing approaching traffic.
 - 6. DETOUR Signs: Provide two, right arrow or left arrow, placed as approved by Owner.

- 7. RIGHT or LEFT LANE CLOSED AHEAD Signs: Provide two, place in advance of lane to be closed.
- 8. Provide at obstructions, such as material piles and equipment.
- 9. Use to alert general public of construction hazards, which would include surface irregularities, unramped walkways, grade changes, and trenches or excavations in roadways and in other public access areas.
- E. Trees and Plantings:
 - 1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on Drawings to remain undisturbed.
 - a. Where practical, tunnel beneath trees when on or near line of trench.
 - b. Employ hand excavation as necessary to prevent tree injury.
 - c. Do not stockpile materials or permit traffic within drip lines of trees.
 - d. Provide and maintain temporary barricades around trees.
 - e. Water vegetation as necessary to maintain health.
 - f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
 - g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.
 - h. Dispose of removed trees in a legal manner off the Site.
 - Balling and burlapping of trees indicated for replacement shall conform to recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. Balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by ball and not by top.
 - 3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
 - 4. Replace each plant that dies as a result of construction activities.
- F. Existing Structures:
 - 1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer.
 - 2. Move mailboxes to temporary locations accessible to postal service.
 - 3. Replace items removed in their original location and a condition equal to or better than original.

- G. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.
- H. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.
- I. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.
- J. Endangered and Threatened Species:
 - 1. Take precautions necessary and prudent to protect native endangered and threatened flora and fauna.
 - 2. Notify Engineer of construction activities that might threaten endangered and threatened species or their habitats.
 - 3. Engineer will mark areas known as habitats of endangered and threatened species prior to commencement of onsite activities.
 - 4. Additional areas will be marked by Engineer as other habitats of endangered and threatened species become known during construction.

3.03 TEMPORARY CONTROLS

- A. Air Pollution Control:
 - 1. Minimize air pollution from construction operations.
 - 2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
 - 3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
 - 4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Noise Control:

- 1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
- 2. Noise Control Ordinance: City of Florence.
- 3. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.
- C. Water Pollution Control:
 - 1. Divert sanitary sewage and non-storm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
 - 2. Prior to commencing excavation and construction, obtain Owner's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and dewatering pump discharges.
 - 3. Comply with Section 01 57 13, Temporary Erosion and Sediment Control, for stormwater flow and surface runoff.
 - 4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.
- D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities as specified in Section 01 57 13, Temporary Erosion and Sediment Control, to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.04 STORAGE YARDS AND BUILDINGS

- A. Coordinate requirements with Section 01 61 00, Common Product Requirements.
- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.
- C. Temporary Storage Buildings:
 - 1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
 - 2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
 - 3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

TEMPORARY FACILITIES AND CONTROLS 01 50 00 - 8

3.05 PARKING AREAS

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Provide parking facilities for personnel working on Project. No employee or equipment parking will be permitted on Owner's existing paved areas, except as specifically designated for Contractor's use.
- C. Use area designated on Drawings for parking of Contractor's and Contractor's employees' vehicles.

3.06 VEHICULAR TRAFFIC

- A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Ensure the least possible obstruction to traffic and normal commercial pursuits.
- B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
- C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- D. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to each owner so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result.
- E. Maintenance of traffic is not required if Contractor obtains written permission from Owner and tenant of private property, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point.
- F. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.

- G. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.
- H. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.
- I. Provide snow removal to facilitate normal vehicular traffic on public or private roads affected by construction. Perform snow removal promptly and efficiently by means of suitable equipment whenever necessary for safety, and as may be directed by proper authority.
- J. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.
- K. Detours: Where authority having jurisdiction requires that traffic be maintained over construction work in a public street, road, or highway, and traffic cannot be maintained on original roadbed or pavement, construct and maintain detour around the Work.
- L. Coordinate traffic routing with that of others working in same or adjacent areas.

3.07 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other specification sections, and as required herein.
- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

D. At least daily, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.

END OF SECTION

SECTION 01 57 13 TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers Work to implement structural and nonstructural Best Management Practices (BMP) to control soil erosion by wind or water and keep eroded sediments and other construction-generated pollutants from moving off project sites. Requirements described in this specification and shown on the Drawings are part of the project Temporary Erosion and Sediment Control Plan (TESC Plan) and are the minimum for all project construction sites and conditions. This specification covers all project activities, including material sources, disposal sites, and offsite mitigation areas unless specific project activities are excluded elsewhere in this specification or in other Contract Documents controlling the Work.
- B. National Pollutant Discharge Elimination System: Comply with Federal, state, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Discharge Permit or Permits applicable to the project. A copy of the Project's General Construction Permit, if applicable to the Project, is available from Owner. NPDES General Construction permits are required on projects that involve disturbance of 1 acre or more with potential to discharge stormwater to surface waters.
- C. Other Regulations: A local government erosion and sediment control permit may apply and some local agency requirements may be more stringent than this specification. Adequate erosion and sediment control is essential for complying with the federal Endangered Species Act where construction runoff enters waters inhabited by protected species.

1.02 REFERENCES

- A. Activities shall conform to the Colorado Department of Public Health and Environment (CDPHE) Permit.
- B. The following is a list of standards that may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO): M252, Standard Specification for Corrugated Polyethylene Drainage Pipe.

- 2. ASTM International (ASTM):
 - a. D638, Standard Test Method for Tensile Properties of Plastics.
 - b. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
 - c. D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
 - d. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
 - e. D4397, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
 - f. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - g. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - h. D4632/D4632M, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - i. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - j. D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
 - k. D6459, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.
 - 1. D6460, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion.
 - m. D6475, Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets.
 - n. D7322, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.
 - o. D7367, Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.
- 3. National Weather Service:
 - a. Precipitation-Frequency of the United States by State/Territory, 2012.
 - b. Precipitation Frequency Data Server, 2012.
- 4. North American Weed Management Association (NAWMA).
- 5. U.S. Department of Agriculture, Natural Resources Conservation Service: *Urban Hydrology for Small Watersheds*; 1986. Technical Release 55.

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- 6. U.S. Environmental Protection Agency:
 - a. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, 2007. EPA-833-R-06-004.
 - b. National Menu of BMPs, 2012.

1.03 SYSTEM DESCRIPTION

- A. Erosion and Sediment Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases during construction period.
- B. Erosion and Sediment Control (ESC) Lead:
 - 1. Identify the ESC Lead at the preconstruction discussions and in the TESC Plan. The ESC Lead shall have certification in construction site erosion and sediment control from a course approved by Owner.
 - 2. The ESC Lead shall implement the TESC Plan, including, but not limited to:
 - a. Installing and maintaining all temporary erosion and sediment control Best Management Practices (BMPs) included in the TESC Plan to assure continued performance of their intended function. Damaged or inadequate TESC BMPs shall be corrected immediately.
 - b. Updating TESC Plan to reflect current field conditions.
 - c. Terminating TESC Plan.
- C. Personnel Training: Prior to commencement of construction, applicable personnel must have an understanding of the Construction Stormwater Discharge Permit's requirements and their specific responsibilities under the permit. At a minimum, personnel must be trained to understand the following as it relates to the scope of their job duties:
 - 1. The location of all stormwater controls and how to maintain them.
 - 2. Procedures for complying with the pollution prevention requirements.
 - 3. Procedures for conducting inspections, recording findings, and taking corrective action.
- D. Temporary Erosion and Sediment Control Plan (Stormwater Pollution Prevention Plan):
 - 1. A TESC Plan is furnished as part of the Drawings, which helps fulfill part of the plan requirement of the NPDES Permit. This initial TESC Plan, when adopted by Contractor, may be used as the basis of the construction TESC Plan. Additional or revised erosion and sediment control features, not shown on the initial TESC Plan, may be required depending on Contractor's methods of operation and schedule.

- 2. For each phase of the scheduled work, indicate on the TESC Plan all the BMPs proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original Contract plans. Refer to the current local jurisdiction's erosion and sediment control manual.
- 3. Some TESC Plan required elements typically required by NPDES permits:
 - a. Narrative Site Description:
 - 1) Nature of construction activity planned for the Site.
 - 2) Estimates of total site area and the areas of the Site expected to be disturbed.
 - 3) Soil types found onsite and their erosion potential.
 - 4) The types of fill materials to be used.
 - 5) Timetable for sequence of major construction events.
 - b. Site Map:
 - 1) All areas of development.
 - 2) Drainage patterns.
 - 3) Areas of soil disturbance, including pre-development and post-development elevation contours.
 - 4) Areas used for storage of soils or wastes.
 - 5) Areas where vegetative practices are to be implemented.
 - 6) Location of all erosion and sediment control BMP or structures.
 - 7) Location of all impervious structures and surfaces after project is completed.
 - 8) Springs, wetlands, and other surface waters located onsite.
 - 9) Boundaries of the 100-year floodplain, if determined.
 - 10) Ordinary high water line, if determined.
 - 11) Location of storm drainage outfalls to receiving waters, if applicable.
 - 12) Details of sediment and erosion controls.
 - 13) Details of detention ponds, storm drain piping, inflow and outflow details.
 - c. Required BMPs and Procedures for Erosion Prevention, Runoff Control, and Sediment Control:
 - 1) Construction entrances and parking areas.
 - 2) Unpaved site roads such as haul roads.
 - 3) Hauling saturated soils from the Site.
 - 4) Water washed from concrete trucks.
 - 5) Correct installation of erosion and sediment control BMPs.
 - 6) Prompt maintenance and repair of BMPs.

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- 7) Clearing and grading practices to minimize area of exposed soil throughout life of the Project.
- 8) Schedule of phased clearing operations to limit soils to what can be stabilized.
- 9) Vegetative practices, including preservation of existing vegetation, seeding, mulching, and buffer strips.
- 10) Preventing erosion of exposed areas.
- 11) Diverting flows from exposed slopes.
- 12) Limiting runoff from exposed areas.
- 13) Limiting sediment transport within work sites and keeping it from moving off of project areas.
- 14) Perimeter controls for all clearing and grubbing, both planned and installed.
- 15) Additional controls for wet season work and temporary work suspensions.
- 16) Sensitive areas such as wetlands.
- 17) Offsite material source and waste areas.
- 18) Dust.
- 19) Emergency materials stockpiled onsite.
- 20) Storing flows and filtering sediment.
- 21) Soil stockpiles.
- 4. Contractor's construction TESC Plan and implementation schedules must be prepared by a competent individual. Furnish a signed copy of the TESC Plan with individual's name, title, state certifications, and employing firm if different than Contractor's firm.
- 5. Do not begin any Site activities that have potential to cause erosion or sediment movement until the TESC Plan and implementation schedules are approved by Engineer.
- 6. Keep a copy of the approved TESC Plan with updated changes onsite during all construction activities. During inactive periods longer than 7 calendar days, keep the TESC Plan onsite or provide a copy to Engineer to retain.
- 7. Continually update the TESC Plan and schedules as needed for unexpected storm or other events to ensure that sediment-laden water does not leave the construction site. Add approved changes to the TESC Plan no later than 24 hours after implementation.
- E. Install high visibility fence along the Site shown on the Drawings or as instructed by Engineer. Space posts and attach fence fabric to posts as shown on the Drawings. Do not fasten fence to trees. Throughout the life of the Project, preserve and protect delineated area, acting immediately to repair or restore any fencing damaged or removed.

- F. Preventing erosion, and controlling runoff, sedimentation, and non-stormwater pollution, requires Contractor to perform temporary Work items including, but not limited to:
 - 1. Providing ditches, berms, culverts, and other measures to control surface water.
 - 2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows.
 - 3. Controlling underground water found during construction.
 - 4. Covering or otherwise protecting slopes until permanent erosion control measures are working.
- G. To the degree possible, coordinate this temporary Work with permanent drainage and erosion control work the Contract requires.
- H. Engineer may require additional temporary control measures if it appears pollution or erosion may result from weather, nature of materials, or progress on the Work.
- I. When natural elements rut or erode the slope, restore and repair damage with eroded material where possible, and remove and dispose of any remaining material found in ditches and culverts. When Engineer orders replacement with additional or other materials, unit Contract prices will cover quantities needed.
- J. Install all sediment control devices including, but not limited to, sediment ponds, perimeter silt fencing, or other sediment trapping BMPs prior to any ground disturbing activity. Do not expose more erodible earth than necessary during clearing, grubbing, excavation, borrow, or fill activities without written approval by Engineer. Engineer may increase or decrease the limits based on project conditions. Erodible earth is defined as any surface where soils, grindings, or other materials may be capable of being displaced and transported by rain, wind, or surface water runoff. Cover inactive areas of erodible earth, whether at final grade or not, within specified time period (see [NPDES] Erosion and Sediment Control Permit), using an approved soil covering practice. Phase clearing and grading to maximum extent practical to prevent exposed inactive areas from becoming a source of erosion.

- K. Water Management:
 - 1. Manage site water in accordance with the conditions of the waste discharge permit from a local permitting authority. If site water management is not subject to permit, manage as follows:
 - a. Groundwater. When groundwater is encountered in an excavation, treat and discharge as follows:
 - 1) When groundwater conforms to CDPHE Water Quality Standards, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
 - 2) When turbidity of groundwater is similar to turbidity of site runoff, groundwater may be treated using same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
 - 3) When groundwater turbidity is greater than turbidity of site runoff, treat ground water separately until turbidity is similar to or better than site runoff, and then it may be combined with site runoff and treated as described above.
 - b. Process Water:
 - Do not discharge high pH process water or wastewater (nonstormwater) that is generated onsite, including water generated during concrete grinding, rubblizing, washout, and hydrodemolition activities.
 - 2) Treat all water generated onsite from construction or washing activities that is more turbid than site runoff separately until turbidity is the same or less than site runoff, and then it may be combined with site runoff and treated as described above. Water may be infiltrated upon approval of Engineer.
 - c. Offsite Water: Prior to disruption of normal watercourse, intercept offsite stormwater and pipe it either through or around the Project Site. This water shall not be combined with onsite stormwater. Discharge offsite water at its preconstruction outfall point preventing an increase in erosion below the site. Submit proposed method for performing this Work for Engineer's approval.
- L. Dispersion/Infiltration: Convey water only to dispersion or infiltration areas designated in the TESC Plan or to sites approved by Engineer. Water shall be conveyed to designated dispersion areas at a rate such that, when runoff leaves the area turbidity standards are achieved. Convey water to designated infiltration areas at a rate that does not produce surface runoff.

- M. Detention/Retention Pond Construction: Whether permanent or temporary, construct before beginning other grading and excavation Work in the area that drains into that pond. Install temporary conveyances concurrently with grading in accordance with the TESC Plan so that newly graded areas drain to the pond as they are exposed.
- N. Pollution Control: Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, leftover paints, solvents, and glues from construction operations. Implement the following BMPs when applicable:
 - 1. Written spill prevention and response procedures.
 - 2. Employee training on spill prevention and proper disposal procedures.
 - 3. Spill kits in all vehicles.
 - 4. Regular maintenance schedule for vehicles and machinery.
 - 5. Material delivery and storage controls.
 - 6. Training and signage.
 - 7. Covered storage areas for waste and supplies.
- O. If Engineer orders the Work suspended, continue to control erosion, pollution, and runoff during the shutdown.
- P. Nothing in this section shall relieve Contractor from complying with other Contract requirements.

1.04 SUBMITTALS

- A. Informational Submittals:
 - 1. When a TESC Plan is included on the Drawings, either adopt or modify the TESC Plan. Provide a schedule for TESC Plan implementation and incorporate it into Contractor's progress schedule. Obtain Engineer's approval of the TESC Plan and schedule before any Work begins.
 - 2. Modified TESC Plans shall meet all requirements of the applicable jurisdictions.
 - 3. The TESC Plan shall cover all areas that may be affected inside and outside the limits of the Project (including all Owner-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).
 - 4. Allow at least 5 working days for Engineer to review any original or revised TESC Plan. Failure to approve all or part of any such Plan shall not make Owner liable to Contractor for any Work delays.

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PART 2 PRODUCTS

2.01 CHECK DAMS

A. Specified by Contractor with approval of Engineer.

2.02 COIR LOG

- A. Logs made of 100 percent durable coconut (coir) fiber uniformly compacted within woven netting.
- B. Netting: Made of bristle coir twine with minimum strength of 80 pounds tensile strength. Nominal 2-inch by 2-inch openings.
- C. Log Segments: Maximum length of 20 feet, with a minimum diameter as shown on the Drawings.
- D. Log Minimum Density: 7 lbs/cf.
- E. Stakes: Untreated softwood species with a notch to secure rope ties.
- F. Rope Ties: 1/4-inch diameter commercially available hemp rope.

2.03 COMPOST BLANKET

- A. Composed of products resulting from the biological degradation and transformation of plant-derived materials under controlled conditions designed to promote aerobic decomposition and:
 - 1. Stable in oxygen consumption and carbon dioxide generation.
 - 2. Mature and suitable for serving as a soil amendment or an erosion control BMP.
 - 3. Appropriate in Moisture Content: No visible free water or dust produced when handling material.
 - 4. Test compost products in accordance with U.S. Composting Council Testing Methods for the Examination of Compost and Composting (TMECC) 02.02-B, "Sample Sieving for Aggregate Size Classification."

- B. Meet the following criteria for Coarse Compost:
 - 1. Gradation:

| | Percent Passing | | |
|------------|-----------------|-----|--|
| Sieve Size | Minimum Maximum | | |
| 3" | 100 | | |
| 1" | 90 | 100 | |
| 3/4" | 70 | 100 | |
| 1/4" | 40 | 60 | |

Maximum particle length of 6 inches.

- 2. pH: Between 6.0 and 8.5 when tested in accordance with U.S. Composting Council TMECC 04.11-A, "1:5 Slurry pH".
- 3. Manufactured Inert Material (Plastic, Concrete, Ceramics, Metal, etc.): Less than 1.0 percent by weight per U.S. Composting Council TMECC 03.08-A "Classification of Inerts by Sieve Size".
- 4. Minimum Organic Matter: 40 percent by dry weight basis as determined by U.S. Composting Council TMECC 05.07A "Loss-On-Ignition Organic Matter Method (LOI)".
- 5. Soluble salt content: less than 4.0 mmhos/cm when tested in accordance with U.S. Composting Council TMECC 04.10 "Electrical Conductivity".
- 6. Maturity: Greater than 80 percent in accordance with U.S. Composting Council TMECC 05.05-A, "Germination and Root Elongation".
- Stability: 7 mg CO2–C/g OM/day or below in accordance with U.S. Composting Council TMECC 05.08-B "Carbon Dioxide Evolution Rate".
- 8. The compost product must originate a minimum of 65 percent by volume from recycled plant waste. A maximum of 35 percent by volume of feedstocks, source-separated food waste, and/or biosolids may be substituted for recycled plant waste. Provide a list of feedstock sources by percentage in final compost product.
- 9. Engineer may evaluate compost for maturity using U.S. Composting Council TMECC 05.08-E "Solvita[®] Maturity Index". Coarse Compost shall score a 5 or above on the Solvita[®] Compost Maturity Test.

2.04 COMPOST SOCK

- A. Provide socks fabricated from of extra heavy weight biodegradable fabric, with a minimum strand thickness of 5 mils.
- B. Fill fabric with Coarse Compost.

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- C. Diameter: 8 inches minimum.
- D. Fabric: Clean, evenly woven, and free of encrusted concrete or other contaminating materials. Shall be free from cuts, tears, broken or missing yarns. Shall be free of thin, open, or weak areas. Shall be free of any type of preservative.
- E. Wood Stakes: Untreated softwood species, be 2-inch by 2-inch nominal dimension and 36 inches in length.

2.05 EROSION CONTROL BLANKET (MATTING), BIODEGRADABLE

A. Temporary erosion control blanket shall be made of natural plant fibers. Supply independent test results meeting the following:

| Properties | ASTM Test Method | Requirements | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--|
| Protecting Slopes from Rainfall-Induced Erosion | D6459: Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle. | Maximum C factor of 0.15 using Revised Universal Soil Loss Equation (RUSLE) | |
| Dry Weight per Unit Area | D6475 | 0.36 lb/sq. yd. minimum | |
| Performance in Protecting Earthen Channels from Stormwater-Induced Erosion | D6460: Test in one soil type. Soil tested shall be loam as defined by the NRCS Soil Texture Triangle. | 1.0 lb/sq. ft. minimum | |
| Seed Germination Enhancement | D7322 | 200 percent minimum | |
| Netting, if present, shall be biodegradable with a life span not to exceed 1 year. | | | |

2.06 FILTRATION SYSTEM

- A. Sand: The sand filtration system shall be rapid or slow. Rapid sand filters achieve relatively high hydraulic flow rates, on the order of 2 gpm/sf to 20 gpm/sf, because they have automatic backwash systems to remove accumulated solids. Slow sand filters have very low hydraulic rates, on the order of 0.02 gpm/sf, because they do not have backwash systems.
- B. Chemical: The chemical treatment system shall consist of a stormwater collection system (either temporary diversion or the permanent site drainage system), a storage pond (or portable trailer-mounted tanks), pumps, a chemical feed system, treatment cells, and interconnecting piping.

2.07 GEOTEXTILE

A. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. Geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. Geotextile properties shall be as described in Table 1 through Table 3.

| Table 1 Geotextile for Permanent Erosion Control | | | | | | | |
|-----------------------------------------------------------------------|------------------|----------------------------------|------------------|-----------------|-------------------|-----------------------------|-------------|
| | | Geotextile Property Requirements | | | | | |
| | | | Permanent E | rosion Contr | ol | | |
| G (17 | ASTM | Moderate | Survivability | High Su | rvivability | Ditcl | Lining |
| Geotextile Property | Test Method | Woven | Nonwoven | Woven | Nonwoven | Woven | Nonwoven |
| AOS | D4751 | See 7 | Table 2 | See | Table 2 | U.S. N | o. 30 max. |
| Water Permittivity | D4491 | See 7 | Table 2 | See | Table 2 | 0.02 sec ⁻¹ min. | |
| Grab Tensile Strength, in machine and x-machine direction | D4632/ D4632M | 250 lb min. | 160 1b min. | 315 lb min. | 200 lb min. | 250 lb min. | 160 lb min. |
| Grab Failure Strain, in machine and x-machine direction | D4632/ D4632M | 15% -50% | ≥50% | 15% -50% | ≥50% | <50% | ≥50% |
| Seam Breaking Strength | D4632/ D4632M | 220 lb min. | 140 lb min. | 270 lb min. | 180 lb min. | 220 lb min. | 140 lb min. |
| Puncture Resistance | D6241 | 495 lb min. | 310 lb min. | 620 lb min. | 430 lb min. | 495 lb min. | 310 lb min. |
| Tear Strength, in machine and x- machine direction | D4533 | 80 lb min. | 50 lb min. | 112 lb min. | 79 lb min. | 80 lb min. | 50 lb min. |
| Ultraviolet (UV) Radiation Stability | D4355 | 7 | 0% strength reta | ained min., aft | er 500 hours in x | enon arc dev | ice |

| Table 2 Filtration Properties for Geotextile for Permanent Erosion Control | | | | |
|--------------------------------------------------------------------------------------|-----------|----------------------------|----------------------------|----------------------------|
| Geotextile | ASTM Test | Geotextil | e Property Req | uirements |
| Property | Method | Class A | Class B | Class C |
| AOS | D4751 | U.S. No. 40 max. | U.S. No. 60 max. | U.S. No. 70 max. |
| Water Permittivity | D4491 | 0.7 sec ⁻¹ min. | 0.4 sec ⁻¹ min. | 0.2 sec ⁻¹ min. |

| Table 3 Geotextile for Temporary Silt Fence | | | | |
|------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------|-----------------------------------------------------------|--|
| | | Geotextile Property Requirements | | |
| Geotextile Property | ASTM Test Method | Unsupported Between Posts | Supported Between Posts with Wire or Polymeric Mesh | |
| AOS | D4751 | U.S. No. 30 max. for silt for all other geotextile types | | |
| Water Permittivity | D4491 | 0.2 sec ⁻¹ min. | | |
| Grab Tensile Strength, in machine and x- machine direction | D4632/ D4632M | 180 lb min. in machine direction, 100 lb min. in x-machine direction | 100 lb min. | |
| Grab Failure Strain, in machine and x-machine direction | D4632/ D4632M | 30% max. at 180 lb or more | | |
| Ultraviolet (UV) Radiation Stability | D4355 | 70% strength retained mi xenon arc device | n., after 500 hours in | |

2.08 GRAVEL FILTER, WOOD CHIP OR COMPOST BERM

- A. Rock Material Used for Filter Berms: Clean 3/4-inch rock, with no recycled materials.
- B. Wood Chips Used for Wood Chip Berm: As specified in Article Wood Chips and Wood Shavings.
- C. Compost Used for Compost Berms: Coarse compost as specified in Article Compost Blanket.

2.09 HIGH VISIBILITY FENCING PERIMETER FENCING

- A. High Visibility Fence: UV stabilized, orange, high-density polyethylene or polypropylene mesh.
- B. Height: 4 feet minimum.
- C. Support Posts: Wood or steel with sufficient strength and durability to support the fence through the life of the Project.

2.10 INLET PROTECTION

A. As specified under Article Geotextile.

2.11 MULCH

A. Short-Term: Provide independent test results documenting that the mulch meets the requirements in Table 4, Short-Term Mulch Test Requirements.

| Table 4 Short-Term Mulch Test Requirements | | | |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| Properties Test Method Requirements | | | |
| Performance in Protecting Slopes from Rainfall- Induced Erosion. | ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the National Resources Conservation Service (NRCS) Soil Texture Triangle. | C Factor = 0.15 maximum using Revised Universal Soil Loss Equation (RUSLE) | |

B. Moderate-Term: Within 48 hours of application, the Moderate-Term Mulch shall bond with soil surface to create a continuous, absorbent, flexible, erosion-resistant blanket that allows for seed germination and plant growth and conforms to the requirements in Table 5, Moderate-Term Mulch Test Requirements. Provide test results documenting that the mulch meets the requirements in Table 5, Moderate-Term Mulch Test Requirements. Supply independent test results.

| Table 5 Moderate-Term Mulch Test Requirements | | | |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--|
| Properties Test Method Requirements | | | |
| Performance in Protecting Slopes from Rainfall-Induced Erosion. | ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle. | C Factor = 0.05 maximum using Revised Universal Soil Loss Equation (RUSLE) | |

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- C. Long-Term:
 - 1. Provide Long-Term Mulch with demonstrated ability:
 - a. To adhere to soil and create a blanket-like mass within 2 hours of application.
 - b. To bond with the soil surface to create a continuous, porous, absorbent, and flexible erosion-resistant blanket that allows for seed germination and plant growth.
 - c. To conform to the requirements in Table 6, Long-Term Mulch Test Requirements.
 - d. Provide test results documenting that mulch meets requirements in Table 6, Long-Term Mulch Test Requirements. Supply independent test results.

| Table 6 Long-Term Mulch Test Requirements | | | |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--|
| Properties | Test Method | Requirements | |
| Performance in Protecting Slopes from Rainfall-Induced Erosion. | ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle. | C Factor = 0.01 maximum using Revised Universal Soil Loss Equation (RUSLE) | |

2.12 OUTLET PROTECTION

A. Size riprap or quarry spall to resist movement under design flows. Install at least 8 inches deep. Provide riprap or quarry spall material free of extraneous material.

2.13 PLASTIC COVERING

A. Clear plastic meeting requirements of ASTM D4397 for polyethylene sheeting having a minimum thickness of 6 mils.

2.14 POLYACRYLAMIDE (PAM)

- A. Meet ANSI/NSF Standard 60 for drinking water treatment with an AMD content not to exceed 0.05 percent.
- B. Anionic, linear, and not cross-linked.
- C. Minimum average molecular weight greater than 5 mg/mole and minimum 30 percent charge density.

- D. 80 percent active ingredients minimum with moisture content not exceeding 10 percent by weight.
- E. Delivered in a dry granular or powder form.

2.15 SEDIMENT CONTROL BARRIERS

A. Specified by Contractor with approval of Engineer. May include Compost Filter Sock or Compost Filter Berm.

2.16 SEEDING

A. Restore disturbed grassed areas with matching native grass seed.

2.17 SILT (SEDIMENT) FENCE

- A. Geotextile: As specified in Article Geotextile.
- B. Support Posts: As recommended by manufacturer of geotextile.
- C. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

2.18 STABILIZED CONSTRUCTION ENTRANCE

- A. Construct a pad from stone 3 inches to 6 inches in size, placed at least 8 inches deep and not less than 50 feet long.
- B. Provide aggregate free of extraneous materials that may cause or contribute to track out.
- C. Place separation geotextile under the rock to prevent fine sediment from pumping up into the rock pad. See Article Geotextile for required geotextile properties.
- D. Use of constructed or constructed/manufactured steel plates with ribs (such as, shaker/rumble plates or corrugated steel plates) for entrance/exit access is allowable.

2.19 STRAW BALE BARRIER

- A. Straw:
 - 1. Air dried condition free of noxious weeds, seeds, and other materials detrimental to plant life. Hay is not acceptable. Provide weed-free documentation:
 - a. Certified Weed Free Straw using North American Weed Management Association (NAWMA) standards.
 - b. Provide documentation that material is steam or heat treated to kill seeds.
 - c. Provide U.S. or state's Department of Agriculture laboratory test reports, dated within 90 days prior to date of application, showing there are no viable seeds in the straw.
- B. Straw Mulch: Suitable for spreading with mulch blower equipment.
- C. Posts for Straw Bales: 2-inch by 2-inch untreated wood or commercially manufactured metal posts.

2.20 STREET CLEANING

A. Use self-propelled pickup street sweeper(s). Mechanical broom sweepers are not allowed where environmental concerns exist about storm water pollution or air quality.

2.21 TACKIFIERS

- A. Biodegradable Hydraulically Applied Erosion Control Products (HECPs) in a dry condition, free of noxious weeds, seeds, chemical printing ink, germination inhibitors, herbicide residue, chlorine bleach, rock, metal, plastic, and other materials detrimental to plant life. Up to 5 percent by weight may be photodegradable material.
- B. Suitable for spreading with a hydroseeder.
- C. Furnish HECPs premixed by the manufacturer. Under no circumstances will field mixing of additives or components be acceptable.
- D. Provide test results, dated within 3 years prior to the date of application, from an independent, accredited laboratory, as approved by Engineer, showing that the product meets the HECP requirements in Table 7.

| Table 7 HECP Requirements | | | | |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Properties | Test Method | Requirements | | |
| Acute Toxicity | EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents. Test leachate from recommended application rate receiving 2 inches of rainfall per hour using static test for No-Observed-Adverse- Effect-Concentration (NOEC). | Four replicates are required with no statistically significant reduction in survival in 100 percent leachate for a Daphnid at 48 hours and Oncorhynchus mykiss (rainbow trout) at 96 hours. | | |
| Solvents | EPA 8260B | Benzene:< 0.03 mg/kg | | |
| Heavy Metals | EPA 6020A Total Metals | $\begin{array}{llllllllllllllllllllllllllllllllllll$ | | |
| Water Holding Capacity | ASTM D7367 | 900 percent minimum | | |
| Organic Matter Content | ASTM D2974 | 90 percent minimum | | |
| Moisture Content | ASTM D2974 | 15 percent | | |
| Seed Germination Enhancement | ASTM D7322 | Long-Term: 420 percent minimum Moderate-Term: 400 percent minimum Short-Term: 200 percent minimum | | |

2.22 TEMPORARY CURB

A. Temporary curbs may consist of asphalt, concrete, sandbags, compost socks, wattles, or geotextile/plastic encased berms of sand or gravel, or as approved by Engineer.

2.23 TEMPORARY PIPE SLOPE DRAIN

- A. Corrugated polyethylene drainpipe, couplings and fittings (up to 10-inch) meeting the requirements of AASHTO M252 Type C (corrugated both inside and outside) or Type S (corrugated outer wall and smooth inner liner).
 - 1. Maximum Pipe Size: 10 inches in diameter.

2.24 TEMPORARY SEDIMENT TRAP

A. Temporary ponding area with a rock weir or perforated riser pipe at the outlet, formed by excavation or constructing a weir. Specified by Contractor with approval of Engineer.

2.25 TIRE WASH FACILITY

A. Specified by Contractor with approval of Engineer. Wheel wash facilities should have a non-erosive base, and a small grade change, 6 inches to 12 inches for a 10-foot-wide pond, to allow sediment to flow to low side of pond to help prevent re-suspension of sediment. A drainpipe with a 2-foot to 3-foot riser should be installed at low side of pond to allow for cleaning and refilling. Pond should be deep enough to hold 14 inches of water after displacement. Alternatively, pressure washing combined with an adequately-sized and adequately-surfaced pad with direct drainage to a 10-foot by 10-foot sump can be very effective.

2.26 WATTLES

- A. Cylinders of biodegradable plant material such as weed-free straw, coir, compost, wood chips, excelsior, or wood fiber or shavings encased within biodegradable netting.
- B. Diameter: 5 inches minimum.
- C. Netting Material: Clean, evenly woven, and free of encrusted concrete or other contaminating materials such as preservatives. Also free from cuts, tears, or weak places with a minimum lifespan of 6 months.
- D. Compost Filler: Coarse compost, wood chips, or wood shavings.

E. Wood Stakes: Untreated softwood species, 2-inch by 2-inch nominal dimension and 36 inches in length.

2.27 WOOD CHIPS AND WOOD SHAVINGS

- A. Wood Chips: Derived from softwood species not containing resin, tannin, or other compounds in quantities that would be detrimental to plant life, and meeting the following loose volume gradation:
 - 1. 2-inch Sieve Size: 95 percent to 100 percent passing.
 - 2. No. 4 Sieve Size: 0 percent to 30 percent passing.
- B. Wood Shavings: Provide shavings with 80 percent of the fibers 6 inches or longer between 0.030 inch wide and 0.50 inch wide, and between 0.017 inch thick and 0.13 inch thick.

PART 3 EXECUTION

3.01 PREPARATION

- A. Engineer's acceptance of the TESC Plan is required prior to starting earth disturbing activities.
- B. Include proposed stockpile areas and installation of temporary erosion control devices, ditches, or other facilities in Work phasing plans.
- C. Areas designated for Contractor's use during Project may be temporarily developed as specified to provide working, staging, and administrative areas. Include control of sediment from these areas in the TESC Plan.
- D. Check Dams: Install check dams as soon as construction will allow, or when designated by Engineer. Contractor may substitute a different check dam, in lieu of what is specified in the Contract, with approval of Engineer. Check dam is a temporary or permanent structure, built across a minor channel. Water shall not flow through check dam structure. Construct check dams to create a ponding area upstream of dam to allow pollutants to settle, with water from increased flows channeled over a spillway in check dam. Construct check dams perpendicular to flow of water and install in accordance with the Drawings. Extend outer edges up sides of conveyance to prevent water from going around check dam. Provide check dams of sufficient height to maximize detention, without causing water to leave ditch. Place sandbags so that initial row makes tight contact with ditch line for length of dam. Stagger subsequent rows so center of bag is placed over space between bags on previous lift.

- E. Coir Log: Install coir logs in accordance with the Drawings.
- F. Compost Blanket: Place compost blanket to a depth of 3 inches over bare soil prior to seeding or other planting. Place an organic tackifier over entire composted area when dry or windy conditions are present or expected before final application of mulch or erosion control blanket. Apply tackifier immediately after compost application to prevent compost from leaving area.
- G. Compost Sock: Exercise care when installing compost socks to ensure method of installation minimizes disturbance of waterways and prevents sediment or pollutant discharge into waterbodies. Lace compost socks together, end-to-end, with coir rope to create a continuous length. Bury loose ends of continuous length 3 feet to 5 feet laterally into the bankslope. Install the upper surface of compost sock parallel to slope. Provide finished grades of a natural appearance with smooth transitions. Secure compost sock with wood stakes or live stakes of species as indicated on the Drawings. Drive stakes into place centered on top of compost sock and spaced 3 feet on center throughout length of sock.
- H. Erosion Control Blanket (Matting), Biodegradable: Temporary Erosion Control Blankets are used as an erosion prevention device and to enhance establishment of vegetation. Install erosion control blankets according to manufacturer's recommendations.
 - 1. Erosion control blankets with an open area of 60 percent or greater may be installed prior to seeding and fertilizing. Install blankets with less than 60 percent open space immediately following seeding and fertilizing operation.
 - 2. Select erosion control blanket material for an area based on the intended function; slope or ditch stabilization and Site-specific factors including soil, slope gradient, rainfall, and flow exposure. Do not use erosion Control Blankets on slopes or in ditches that exceed manufacturer's recommendations.
- I. Filtration System:
 - 1. Sand: Rapid sand filtration systems shall have stormwater pumped from a trap, pond, or tank through filtration system. Slow sand filtration systems shall have flow through using gravity. Sand media filter shall have automatic backwashing features that can filter to 50 μ m particle size. Screen or bag filters shall filter down to 5 μ m. Fiber wound filters shall remove particles down to 0.5 μ m. Sequence filters from the largest to the smallest pore opening. Filtration may be used in conjunction with

polymer treatment in a portable system to assure capture of the flocculated solids.

- 2. Chemical: Prior to discharge, sample each batch of treated and test for compliance with pH and turbidity limits, which may be established by water quality standards or a Site-specific discharge permit. Sampling and testing for other pollutants may be necessary. Obtain regulatory approval and provide a qualified, trained operator, if required by law.
- J. Gravel Filter, Wood Chip, or Compost Berm: Construct filter berms to retain sediment and direct flows.
 - 1. Gravel Filter Berm: 1-foot minimum height. Maintain at this height for entire time berm is in use.
 - 2. Wood Chip Berm: 2-foot minimum height. Maintain at this height for entire time berm is in use.
 - 3. Construct compost berm of course compost in accordance with the detail on the Drawings.
- K. High Visibility Fencing: Install high visibility fencing in accordance with the Drawings.
- L. Inlet Protection: Install inlet protection below or above, or as a prefabricated cover at each inlet grate, as shown on the Drawings. Install inlet protection devices prior to beginning clearing, grubbing or earthwork activities. Geotextile fabric used in prefabricated inlet protection devices must meet or exceed the requirements for Moderate Survivability and minimum filtration properties. When depth of accumulated sediment and debris reaches approximately one-half the height of an internal device or one-third the height of external device (or less when so specified by the manufacturers) or as designated by Engineer, remove deposits, and stabilize onsite.
 - 1. Below Inlet Grate:
 - a. Prefabricated units specifically designed for inlet protection.
 - b. Must remain securely attached to drainage structure when fully loaded with sediment and debris or at the maximum level of sediment and debris specified by manufacturer.
 - 2. Above Inlet Grate:
 - a. Devices may be silt fence, sandbags, or prefabricated units specifically designed for inlet protection.
 - b. Must remain securely in place around drainage structure under all conditions.

- 3. Inlet Grate Cover:
 - a. Prefabricated units specifically designed for inlet protection and:
 - 1) Be a sewn geotextile fabric unit fitted to individual grate and completely enclosing grate.
 - 2) Have built-in lifting devices to allow manual access of stormwater system.
 - 3) Use an orange monofilament geotextile fabric.
 - b. Check dams or functionally equivalent devices may be used as inlet protection devices with approval of Engineer.
- M. Mulch: Furnish, haul, and evenly apply at rates indicated and spread on seeded areas within 48 hours after seeding unless otherwise specified.
 - 1. Distribute straw mulch material with an approved mulch spreader that uses forced air to blow mulch material on seeded areas.
 - 2. Apply wood strand mulch by hand or by straw blower on seeded areas.
 - 3. Hydraulically apply Short-Term Mulch at the rate of 2,500 pounds per acre. May be applied in one lift.
 - 4. Hydraulically apply Moderate-Term Mulch and Long-Term Mulch at the rate of 3,500 pounds per acre with no more than 2,000 pounds applied in any single lift. Mulch may be applied with seed and fertilizer in moist climates. In dry climates, apply seed and fertilizer in a single application followed by mulch application. Provide mulch suitable for application with a hydroseeder.
 - 5. Cover temporary seed applied outside with a mulch containing either Moderate-Term Mulch or Long-Term Mulch, as designated by Engineer.
 - 6. Mulch areas not accessible by mulching equipment by approved hand methods.
- N. Outlet Protection: Provide outlet protection to prevent scour at outlets of ponds, pipes, ditches, or other conveyances.
- O. Plastic Covering: Use clear plastic covering to promote seed germination when seeding is performed outside of specified dates. Use black plastic covering for stockpiles or other areas where vegetative growth is unwanted. Place plastic with at least a 12-inch overlap of all seams. Install and maintain plastic cover tolon prevent water from cutting under the plastic and to prevent cover from blowing open in the wind.
- P. Polyacrylamide (PAM): See Paragraph Tackifiers.
- Q. Sediment Control Barriers: Install sediment control barriers in accordance with TESC Plan or manufacturer's recommendations in the areas of clearing,

grubbing, earthwork, or drainage prior to starting those activities. Maintain sediment control barriers until soils are stabilized.

- R. Silt (Sediment) Fence:
 - 1. Silt fence shall be installed in accordance with the Drawings. When backup support is used, use steel wire with a maximum mesh spacing of 2 inches by 4 inches, or plastic mesh as resistant to ultraviolet radiation as the geotextile it supports. Provide wire or plastic mesh with strength equivalent to or greater than as required for unsupported geotextile (for example, 180 pounds grab tensile strength in the machine direction).
 - 2. Attach geotextile to posts and support system using staples, wire, or in accordance with manufacturer's recommendations. Geotextile shall be sewn together at the point of manufacture, or at a location approved by Engineer, to form geotextile lengths as required.
 - 3. Provide wood or steel support posts at sewn seams and overlaps and as shown on the Drawings and necessary to support fence.
 - 4. Wood Posts: Minimum dimensions of 1-1/4-inch by 1-1/4-inch by the minimum length shown on the Drawings.
 - 5. Steel Posts: Minimum weight of 0.90 lb/ft.
 - 6. When sediment deposits reach approximately one-third the height of the silt fence, remove and stabilize deposits.
- S. Stabilized Construction Entrance: Construct temporary stabilized construction entrance in accordance with the Drawings, prior to beginning any clearing, grubbing, earthwork, or excavation. When stabilized entrance no longer prevents track out of sediment or debris, either rehabilitate existing entrance to original condition or construct a new entrance.
- T. Street Cleaning: Use self-propelled pickup street sweepers whenever required by Engineer to prevent transport of sediment and other debris off Project Site. Provide street sweepers designed and operated to meet air quality standards. Street washing with water will require approval by Engineer. Intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.
- U. Tackifiers:
 - 1. Mix and apply tackifier in accordance with manufacturer's recommendations. If applied with a hydroseeder, add Short-Term Mulch as a tracer at a rate of 125 pounds to 250 pounds per acre to visibly aid uniform application.

- 2. Soil Binding Using Polyacrylamide (PAM): Apply PAM on bare soil completely dissolved and mixed in water or applied as a dry powder. Apply dissolved PAM at a rate of not more than 2/3 pound per 1,000 gallons of water per acre. Apply a minimum of 200 pounds per acre of Short-Term Mulch with the dissolved PAM. Dry powder applications may be at a rate of 5 pounds per acre using a hand-held fertilizer spreader or a tractor-mounted spreader.
 - a. Apply PAM only to areas that drain to completed sedimentation control BMPs in accordance with the TESC Plan. PAM may be reapplied on actively worked areas after a 48-hour period.
 - b. PAM shall not be applied during rainfall or to saturated soils.
- V. Temporary Curb: Provide temporary curbs to divert or redirect water around erodible soils. Temporary curbs shall be installed along pavement edges to prevent runoff from flowing onto erodible slopes. Water shall be directed to areas where erosion can be controlled. Temporary curbs shall be a minimum of 4 inches in height. Ponding shall not be in roadways.
- W. Temporary Pipe Slope Drain: Corrugated polyethylene drainpipe constructed in accordance with the Drawings. Use water interceptor dikes or temporary curbs to direct water into pipe slope drain. Entrance to drain may consist of a prefabricated funnel device specifically designed for application, rock, sandbags, or as approved by Engineer. Construct pipe with gasketed watertight fittings and secure to slope with metal "T" posts, wood stakes, sandbags, or as approved by Engineer. Discharge water to a stabilized conveyance, sediment trap, stormwater pond, rock splash pad, vegetated strip, or as approved by Engineer. Install pipe so that water does not pond on road surface.
- X. Temporary Sediment Trap: Form trap by constructing a berm or by partial or complete excavation. Direct the discharge flow to a stabilized conveyance outlet or level spreader.
- Y. Tire Wash Facility: When the Contract requires a tire wash (in conjunction with a stabilized entrance), include details for tire wash and method for containing and treating sediment-laden runoff as part of the TESC Plan. All vehicles leaving the Site shall stop and wash sediment from their tires. Keep the water level 12 inches to 14 inches deep. Change wash water a minimum of once per day. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 pound to 0.5 pound per 1,000 gallons of water increases effectiveness and reduces cleanup time.

- Z. Wattles: Install wattles as soon as construction will allow or when designated by Engineer. Begin trench construction and wattle installation at base of slope and work uphill. Spread excavated material evenly along the uphill slope and compact using hand tamping or other method approved by Engineer. On gradually sloped or clay-type soils, provide trenches 2 inches to 3 inches deep. On loose soils, in high rainfall areas, or on steep slopes, provide trenches 3 inches to 5 inches deep, or half the thickness of the wattle. Exercise care when installing wattles to minimize disturbance of waterways and prevent sediment or pollutant discharge into waterbodies.
- AA. Wood Chips and Wood Shavings: Install in accordance with the Drawings.

3.02 ADDITIONAL REQUIREMENTS

- A. Natural Buffer or Equivalent:
 - 1. Unless natural buffer between the Project Site and receiving waters has previously been eliminated by pre-existing development disturbances, comply with one of the following alternatives if stormwater from construction will discharge to surface water:
 - a. Provide a 50-foot, undisturbed natural buffer between construction disturbances and surface water.
 - b. Provide an undisturbed natural buffer that is less than 50 feet supplemented by additional erosion and sediment controls, which in combination, achieve a sediment load reduction that is equivalent to a 50-foot buffer.
 - c. If it is infeasible to provide an undisturbed natural buffer of any size, implement erosion and sediment controls that achieve a sediment load reduction that is equivalent to a 50-foot buffer.

3.03 MAINTENANCE

- A. The ESCP measures described in this specification are minimum requirements for anticipated Site conditions. During the construction period, upgrade these measures as needed to comply with all applicable local, state, and federal erosion and sediment control regulations.
- B. Maintain erosion and sediment control BMPs so they properly perform their function until Engineer determines they are no longer needed.
- C. Construction activities must avoid or minimize excavation and creation of bare ground during wet weather.

- D. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.
- E. Inspect BMPs in accordance with the schedule in the Construction Stormwater Discharge Permit(s) or as directed by Engineer.
- F. Complete an inspection report within 24 hours of an inspection. Each inspection report shall be signed and identify corrective actions. Document that corrective actions are performed within 7 days of identification. Keep a copy of all inspection reports at the Site or at an easily accessible location.
- G. Unless otherwise specified, remove deposits before the depth of accumulated sediment and debris reaches approximately height of BMP. Dispose of debris or contaminated sediment at approved locations. Clean sediments may be stabilized onsite using BMPs as approved by Engineer.
- H. Sediment Fence: Remove trapped sediment before it reaches one-third of the above ground fence height and before fence removal.
- I. Other Sediment Barriers (such as biobags): Remove sediment before it reaches 2 inches depth above ground height and before BMP removal.
- J. Catch Basins: Clean before retention capacity has been reduced by 50 percent.
- K. Sediment Basins and Sediment Traps: Remove trapped sediments before design capacity has been reduced by 50 percent and at completion of Project.
- L. Initiate repair or replacement of damaged erosion and sediment control BMPs immediately, and work completed by end of next work day. Significant replacement or repair must be completed within 7 days, unless infeasible.
- M. Within 24 hours, remediate any significant sediment that has left construction site. Investigate cause of the sediment release and implement steps to prevent a recurrence of discharge within same 24 hours. Perform in-stream cleanup of sediment according to applicable regulations.
- N. At end of each work day, stabilize or cover soil stockpiles or implement other BMPs to prevent discharges to surface waters or conveyance systems leading to surface waters.
- O. Temporarily stabilize soils at end of shift before holidays and weekends, if needed. Ensure soils are stable during rain events at all times of year.

- P. Initiate stabilization by no later than end of next work day after construction work in an area has stopped permanently or temporarily.
- Q. Within 14 days of initiating stabilization or as specified in permit, either seed or plant stabilized area or apply non-vegetative measures and cover all areas of exposed soil. Seed dry areas as soon as Site conditions allow. Ensure that vegetation covers at least 70 percent of stabilized area. In areas where Contractor's activities have compromised erosion control functions of existing grasses, overseed existing grass. Non-vegetative measures may include blown straw and a tackifier, loose straw, or an adequate covering of compost mulch. Complete initial stabilization within 7 days if storm water discharges to surface waters impaired for sediment or nutrients, or high quality waters.
- R. Provide permanent erosion control measures on all exposed areas. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. However, do remove all temporary erosion control measures as exposed areas become stabilized, unless doing so conflicts with local requirements. Properly dispose of construction materials and waste, including sediment retained by temporary BMPs.

3.04 EMERGENCY MATERIALS

A. Provide, stockpile, and protect the following emergency erosion and sediment control materials on the Project Site for unknown weather or erosion conditions. Emergency materials are in addition to other erosion control materials required to implement and maintain the TESC Plan. Replenish emergency materials as they are used. Remove all unused emergency materials from the Project Site at completion of the Project.

| Item | Quantity |
|------------------------------------------|---------------------------|
| Silt (sediment) fence | 100 ft |
| Plastic sheeting | 260 sq. ft. |
| Rope | 1,000 ft |
| Sandbags (empty, to be filled as needed) | 50 |
| Straw bales | 10 |
| Biofilter bags (with stakes) | 10 |
| Inflatable pipe plugs | One for each size of pipe |
| Water pump and hose | One |

TEMPORARY EROSION AND SEDIMENT CONTROL 01 57 13 - 28 PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS

3.05 REMOVAL

- A. When Engineer determines that an erosion control BMP is no longer required, remove BMP and all associated hardware from the Project limits. When materials are biodegradable, Engineer may approve leaving temporary BMP in place.
- B. Permanently stabilize all bare and disturbed soil after removal of erosion and sediment control BMPs. Dress sediment deposits remaining after BMPs have been removed to conform to existing grade. Prepare and seed graded area. If installation and use of erosion control BMPs have compacted or otherwise rendered soil inhospitable to plant growth, such as construction entrances, take measures to rehabilitate soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or seeding with specified seed.

3.06 MEASUREMENT AND PAYMENT

- A. Erosion control will be measured and paid on a lump sum basis. Erosion Control includes:
 - 1. Providing the ESC Lead.
 - 2. Developing, revising, and documenting TESC Plan.
 - 3. Mobilization.
 - 4. Monitoring activities.
 - 5. Furnishing, stockpiling, protecting, restocking, and removing emergency materials.
 - 6. Preparing Project for winter shutdown.
 - 7. Inspecting, maintaining, and removing erosion control devices.
 - 8. Restoring, mulching, tacking, and seeding all disturbed ground, work, and storage areas not otherwise covered.]
- B. No separate or additional payment will be made for:
 - 1. Removing and disposing of sediment build-up behind sediment fences and sediment barriers.
 - 2. Removing and reinstalling required appurtenances to modify temporary slope drains as the embankment slopes are changed.
 - 3. Constructing and removing temporary slope berms.
 - 4. Applying dust control.
 - 5. Erosion control for work outside construction limits including, but not limited to, borrow pits, haul roads, disposal sites, and equipment storage sites.

C. When only Erosion Control is listed in the Contract Schedule of Items, no separate or additional payment will be made for modifications or additions to the BMPs that become necessary for permit compliance during construction.

END OF SECTION

SECTION 01 61 00 COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Products:

- 1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
- 2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
- 3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 ENVIRONMENTAL REQUIREMENTS

- A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 5,180 feet above sea level.
- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of minus 30 degrees F to 110 degrees F.

1.03 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

- C. Extra Materials, Special Tools, Test Equipment, and Expendables:
 - 1. Furnish as required by individual Specifications.
 - 2. Schedule:
 - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
 - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
 - 3. Packaging and Shipment:
 - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
 - b. Prominently displayed on each package, the following:
 - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
 - 2) Applicable equipment description.
 - 3) Quantity of parts in package.
 - 4) Equipment manufacturer.
 - 5) Deliver materials to Site.
 - 4. Notify Engineer and Owner upon arrival for transfer of materials.
 - 5. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of arrival.
- E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual specification sections.

1.04 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.

- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.05 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to ensure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.
- E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.

H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

- I. Authority Having Jurisdiction (AHJ):
 - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
 - 2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
 - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
 - 2. If manufacturer has no standard color, provide equipment with finish as approved by Owner.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.
- M. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 FABRICATION AND MANUFACTURE

- A. General:
 - 1. Manufacture parts to U.S.A. standard sizes and gauges.
 - 2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
 - 3. Design structural members for anticipated shock and vibratory loads.
 - 4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
 - 5. Modify standard products as necessary to meet performance Specifications.
- B. Lubrication System:
 - 1. Require no more than weekly attention during continuous operation.
 - 2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
 - 3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
 - 4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.
- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing

COMMON PRODUCT REQUIREMENTS 01 61 00 - 6

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.
- B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

3.03 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Repaint painted surfaces that are damaged prior to equipment acceptance.
- E. Do not cut or notch any structural member or building surface without specific approval of Engineer.
- F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.

2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.04 FIELD FINISHING

- A. In accordance with individual specification sections.
- 3.05 ADJUSTMENT AND CLEANING
 - A. Perform required adjustments, tests, operation checks, and other startup activities.
- 3.06 LUBRICANTS
 - A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

3.07 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this specification:
 - 1. Manufacturer's Certificate of Compliance.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

| OWNER: | CUDMITTED. | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|--|--|
| PROJECT NAME: | | | | |
| PROJECT NO: | | | | |
| Comments: | | | | |
| | | | | |
| I hereby certify that the above-referenced pro Contract for the named Project will be furnis requirements. I further certify that the product specified and conform in all respects with the quantity shown. | thed in accordance with all applicable ct, material, or service are of the quality | | | |
| Date of Execution: | , 20 | | | |
| Manufacturer: | | | | |
| Manufacturer's Authorized Representative (| print): | | | |

(Authorized Signature)

SECTION 01 64 00 OWNER-FURNISHED PRODUCTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Seller: The party under separate contract with Owner to furnish the products or special services specified herein.

1.02 OWNER-FURNISHED PRODUCTS

- A. Flow Meters and Meter Boxes:
 - 1. Quantity: All required meters and meter boxes.
 - 2. Special Handling or Storage Instructions: Handle and store per manufacturer's recommendations.
- B. Materials Prepurchased by City from Core and Main:
 - 1. Refer to Article Supplement.
 - 2. Special Handling or Storage Instructions: Handle and store per manufacturer's recommendations.

1.03 INFORMATION FURNISHED BY OWNER

- A. Shop drawings related to Owner-furnished products will be made available for Contractor's use in performing the work under this section.
- B. Manufacturer's installation, operation, and maintenance instructions for Owner-furnished products will be made available.

1.04 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Show layout, location, and identification of materials provided by Contractor for installation of Owner-furnished products.
 - b. Include pipe, fittings, valves, specialties, hangers, supports, equipment, and required specialties.

- c. Show materials that are not Owner-furnished, including but not limited to:
 - 1) Corrosion protection.
 - 2) Materials where insufficient quantity was Owner-furnished and therefore needs to be Contractor-furnished at Contractor's cost. For any such additional quantities, Contractor shall provide shop drawings unless products are provided that are identical to those furnished by the Owner.

1.05 TRANSFER OF PRODUCTS

- A. Unless indicated otherwise, items will be available for collection by the Contractor from the City's Public Works Facility, 300 Mica Street, Florence, CO 81226.
- B. Prior to collection, conduct with Owner or Engineer a joint inspection for the purpose of identifying product, general verification of quantities, and observation of apparent condition. Such inspection will not be construed as final or as receipt of any product that, as a result of subsequent inspections and tests, are determined to be nonconforming.
- C. Damaged or incomplete products to be returned for replacement will not be transferred. Owner will submit claims with supplier for transportation damage and expedite replacement of damaged, defective, or deficient items.
- D. Indicate signed acceptance of delivery on a copy of the invoice.

1.06 LOADING, UNLOADING, STORAGE AND MAINTENANCE

- A. Subsequent to transfer, Contractor shall have complete responsibility for loading and unloading Owner-furnished products. Handle product in accordance with manufacturers' instructions, or as specified.
- B. Store, protect, and maintain product to prevent damage until final acceptance of completed work. Damage to or loss of products after date of transfer to Contractor shall be repaired to original condition, or replaced with new identical products, at the discretion of Engineer.
- C. Maintain complete inventory of all Owner-furnished products after their transfer to Contractor.

1.07 SCHEDULING AND SEQUENCING

- A. Include loading of Owner-furnished products in the Progress Schedule.
- B. Provide a minimum of 3 days' notice to Owner of when Contractor plans to collect Owner-furnished products. Maintain a detailed record of the products that are picked up each day from the Owner's storage facility.

PART 2 PRODUCTS

2.01 LIST OF MATERIALS

A. List of materials furnished by City supplied by Core and Main. See Supplement at end of section.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in conformance with Owner-furnished product shop drawings and installation instructions, and the Specifications.
- B. Provide all interconnecting structures, equipment, piping, electrical and instrumentation work, finish painting, and appurtenances to achieve a complete and functional system.
- C. Provide foundation pads for Owner-furnished products as shown. Verify exact dimensions and configuration of all pads, including penetrations, with Owner-furnished product shop drawings.
- D. Mechanical and electrical equipment shall be properly aligned, plumb and level, with no stresses on connecting piping or conduit.
- E. Verify direction of meter installation before installation.

3.02 PRODUCT PROTECTION

- A. Immediately after installation, lubricate components in accordance with manufacturer's instructions.
- B. Follow manufacturer's instructions for protection and maintenance during storage, after installation but prior to testing and startup, and after startup but prior to acceptance.

C. Furnish incidental supplies including lubricants, cleaning fluids, and similar products as needed for protecting and maintaining the Owner-furnished products.

3.03 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this specification:
 - 1. Owner-Furnished Materials.

END OF SECTION

OWNER FURNISHED MATERIALS

BID SCHEDULE C

| ITEM NO. | ITEM DESCRIPTION | QTY. | UNIT | UNIT COST | UNIT TOTAL |] |
|-------------|---------------------------------------------------|------------------------------|------|-----------|------------|------|
| 1 | 12" 350 Class Ductile Iron | 1100 | LF | | | 1015 |
| 2 | 12" Gripper Gaskets | 62 | | | | 1 |
| 3 | 8" 350 Class Ductile Iron | 230 sticks - Quoted 240' | LF | - | | 1 |
| 4 | 8" Gripper Gaskets | 12 | | | | |
| 5 | 6" 350 Class Ductile Iron | 60 | LF | | | 1 |
| 6 | 6" Gripper Gaskets | 3 | | | | |
| . 7 | 4" 350 Class Ductile Iron | 40 | LF | | | |
| 8 | 4" Gripper Gaskets | 1 | | | | |
| 9 | ¾" PEP Pipe − 250PSI 30 | 840 D' rolls. Quoted 900' | LF | | | |
| 10 | 2" PEP Pipe – 250 PSI | 50 0' roll. Quoted 100' | LF | | | |
| 11 | 12" Gate Valve | 3 | | | | |
| 12 | 8" Gate Valve | 6 | | | | |
| 13 | 6" Gate Valve | 2 | | | | |
| 14 | 4" Gate Valve | 1 | | | | 1 |
| 15 | Valve Box 36" Base 18" tops Screw on | 12 | | | | |
| 16 | Valve Box Lids | 12 | | | | |
| 17 | 8" 45 Elbow | 4 | 3 1 | | | |
| 18 | 8" x 6" Reducer | 3 | × . | | | |
| 19 | 6" 45 Elbow | 2 | | | | |
| 20 | 12" x 8" Anchor Tee 12" MJ – 8" Anchor | 4 | | | | |
| 21 | 8" x 6" Anchor Tee 8" MJ – 6" Anchor | 1 | 1.6 | | | |
| 22 | 12" x 4" Anchor Tee 12" MJ – 4" Anchor | 1 | | | | |
| 23 | 12" x ¾ " PEP Tapping saddles | 17 | | | | 7 |
| 24 | %" Corps Pack Joint – Preferred Ford | 17 | | | | 7 |
| 25 | 18" DBC ¾" Setters Pack Joint – Preferred Ford | 17 | (\$ | | | |
| 26 | Pit Domes with inner/Outer Lids with 2" hole | 17 | N. | | | - |
| 27 | Meter Pit Bases 30" Bullet Style | 17 | | | | - |

| 28 | ¾" PEP x ¾" PEP coupling – Preferred Ford | 8 | | |
|----|----------------------------------------------------------------------|-----------------------------|-----|--|
| 30 | 3/" PEP x 3/" CTS coupling – Preferred Ford | 8 | | |
| 31 | ³ ⁄ ₄ " PEP Stiffeners | 50 | | |
| 32 | %" CTS Stiffeners | 25 | | |
| 33 | 2" Stiffeners | a car Dec 3 | | |
| 34 | 12" Orange Mega Lug | 13 | | |
| 35 | 12" Bolt and Gaskets | 13 | | |
| 36 | 8" Orange Mega Lug | 23 | | |
| 37 | 8" Bolt and Gaskets | 24 | | |
| 38 | 6" Orange Mega Lug | 13 | | |
| 39 | 6" Bolt and Gaskets | 13 | | |
| 40 | 4" Orange Mega Lug | 1 | | |
| 41 | 4" Bolt and Gaskets | 1 | | |
| 42 | 8" Plug | 1 | | |
| 43 | 8" Cap | 1 | | |
| 44 | 4" Plug | 1 | | |
| 45 | V-Bio Poly wrap 10" - 12" | 1400 380' rolls - 1,520' | LF | |
| 46 | V-Bio Poly Wrap 8" – 10" | 400 500' roll | LF | |
| 47 | V-Bio Poly Wrap 6" – 4" *Quoted 4" - 8" option* #9 Locate wire | 200 500' roll | LF | |
| 48 | #9 Locate wire | 300 500' roll | LF | |
| 49 | Wire Connectors | 30 | 2 | |
| 50 | Fire Hydrant 51/4 bury | 2 | | |
| 51 | 12" x 2" tapping saddle | 1 | | |
| 52 | 2" Corps | 1 | 1.0 | |
| 53 | 2" Curbstop | 1 | | |

CONTRACT IDENTIFICATION AND NUMBER: Pikes Peak Water Project (Pipe)

PROJECT NUMBER: Schedule C

SECTION 01 77 00 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational Submittals:
 - 1. Submit prior to application for final payment.
 - a. Approved Shop Drawings and Samples: As required in the General Conditions.
 - b. Special bonds, Special Guarantees, and Service Agreements.
 - c. Consent of Surety to Final Payment: As required in General Conditions.
 - d. Releases or Waivers of Liens and Claims: As required in General Conditions.
 - e. Releases from Agreements.
 - f. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
 - g. Extra Materials: As required by individual specification sections.

1.02 RECORD DOCUMENTS

- A. Quality Assurance:
 - 1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
 - 2. Accuracy of Records:
 - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
 - 3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
 - 4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may

result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the event Contractor is unable to secure written releases:
 - 1. Inform Owner of the reasons.
 - 2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
 - 3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
 - 4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

- 1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
- 2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
- 3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

CLOSEOUT PROCEDURES 01 77 00 - 2

- B. Preservation:
 - 1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
 - 2. Make documents and Samples available at all times for observation by Engineer.
- C. Making Entries on Drawings:
 - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
 - a. Color Coding:
 - 1) Green when showing information deleted from Drawings.
 - 2) Red when showing information added to Drawings.
 - 3) Blue and circled in blue to show notes.
 - 2. Date entries.
 - 3. Call attention to entry by "cloud" drawn around area or areas affected.
 - 4. Legibly mark to record actual changes made during construction, including, but not limited to:
 - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
 - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
 - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
 - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
 - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
 - 5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
 - a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
 - b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).

c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
 - 1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Engineer.
 - 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
 - 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
 - 4. Clean all windows.
 - 5. Clean and wax wood, vinyl, or painted floors.
 - 6. Broom clean exterior paved driveways and parking areas.
 - 7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
 - 8. Rake clean all other surfaces.
 - 9. Remove snow and ice from access to buildings.
 - 10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
 - 11. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

SECTION 02 41 00 DEMOLITION

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:
 - 1. Air-Conditioning, Heating, and Refrigeration Institute (AHRI): Guideline K, Containers for Recovered Non-flammable Fluorocarbon Refrigerants.
 - 2. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
 - 3. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.
 - 4. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40:
 - a. Part 61—National Emission Standards for Hazardous Air Pollutants.
 - b. Part 82—Protection of Stratospheric Ozone.
 - c. Part 273—Standards for Universal Waste Management.

1.02 DEFINITIONS

- A. ACM: Asbestos-containing material.
- B. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof. Demolition also includes removal of pipes, manholes tanks, conduit, and other underground facilities, whether as a separate activity or in conjunction with construction of new facilities.
- C. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.
- D. Relocate: Remove, protect, clean, and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.
- E. Renovation: Altering a facility or one or more facility components in any way.
- F. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from

destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

- G. Universal Waste Lamp: In accordance with 40 CFR 273, the bulb or tube portion of an electric lighting device, examples of which include, but are not limited to, fluorescent, high-intensity discharge, neon, mercury vapor, high-pressure sodium, and metal halide lamps.
- H. Universal Waste Thermostat: A temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR 273.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Submit proposed Demolition/Renovation Plan, in accordance with requirements specified herein, for approval before such Work is started.
 - 2. Submit copies of any notifications, authorizations and permits required to perform the Work.
 - 3. Submit a shipping receipt or bill of lading for all containers of ACM shipped.

1.04 REGULATORY AND SAFETY REQUIREMENTS

- A. When applicable, demolition Work shall be accomplished in strict accordance with 29 CFR 1926-Subpart T.
- B. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.

1.05 DEMOLITION

- A. Demolition shall provide for safe conduct of the Work and shall include:
 - 1. Detailed description of methods and equipment to be used for each operation.
 - 2. The Contractor's planned sequence of operations, including coordination with other work in progress.

- 3. Procedures for removal and disposition of materials specified to be salvaged.
- 4. Disconnection schedule of utility services.
- B. Include the Work of this Specification in the progress schedule, as specified in Section 01 32 00, Construction Progress Documentation.

1.06 USE OF EXPLOSIVES

A. Not permitted.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXISTING FACILITIES TO BE DEMOLISHED

- A. Structures: Sidewalks, curbs, gutters bases shall be removed as indicated.
- B. Utilities and Related Equipment:
 - 1. Notify Engineer and Owner or appropriate utilities to turn off affected services at least 48 hours before starting demolition activities.
 - 2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by Engineer.
 - 3. When utility lines are encountered that are not indicated on the Drawings, notify Engineer and Owner prior to further work in that area.
 - 4. Remove meters and related equipment and deliver to a location as determined by the Owner.
 - 5. Provide a permanent leak-proof closure for water and gas lines.
- C. Paving and Slabs:
 - 1. Sawcut concrete and asphaltic concrete paving and slabs including aggregate base to the full depth of the material, or to a depth of a depth of 12 inches below existing adjacent grade, whichever is less.
 - 2. Provide neat sawcuts at limits of pavement removal as indicated.

3.02 PROTECTION

A. Traffic Control Signs: Where pedestrian and driver safety is endangered in the area of removal Work, use traffic barricades with flashing lights.

- B. Existing Work:
 - 1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition or renovation.
 - 2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.
 - 3. Do not overload pavements to remain.
- C. Trees: Protect trees within the Site that might be damaged during demolition and are indicated to be left in place, by a 6-foot-high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the Work shall be replaced in kind, as approved by the Engineer.
- D. Facilities:
 - 1. 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.
 - 2. Protect all facility elements not scheduled for demolition.
 - 3. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities.
- E. Protection of Personnel: Provide temporary barricades and other forms of protection to protect Owner's personnel and the general public from injury due to demolition Work.

3.03 RELOCATIONS

A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Clean all items to be relocated prior to reinstallation, to the satisfaction of Engineer. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by Engineer.

3.04 BACKFILL

- A. Do not use demolition debris as backfill material.
- B. Fill excavations, and other hazardous openings to existing ground level or foundation level of new construction in accordance with Section 31 23 23, Fill and Backfill, and Section 31 23 23.15, Trench Backfill.

3.05 TITLE TO MATERIALS

- A. With the exception of the following listed salvaged equipment and materials, all items designated to be removed shall become the property of Contractor:
 - 1. Flow meter and valves in the existing irrigation vault
 - 2. The first three cast iron water pipe bell-ends with 2-foot spool of any cast iron pipe slated for removal if date stamped prior to 1900.

3.06 DISPOSITION OF MATERIAL

- A. Remove salvaged items designated as the property of Owner in a manner to prevent damage.
- B. Deliver salvaged items that are designated as the property of Owner to a storage site within 3 miles of the Site, as directed by the Owner.

3.07 CLEANUP

A. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

END OF SECTION

SECTION 26 42 01 PIPE BONDING AND TEST STATIONS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Concrete Institute (ACI): 301, Specifications for Structural Concrete.
 - 2. American National Standards Institute (ANSI).
 - 3. American Petroleum Institute (API): SPEC 5L, Specification for Line Pipe.
 - 4. American Water Works Association (AWWA):
 - a. C110, Ductile-Iron and Gray-Iron Fittings for Water.
 - 5. American Wood Preservers' Association (AWPA):
 - a. C2, Lumber, Timber, Bridge Ties, and Mine Ties-Preservative Treatment by Pressure Processes.
 - b. P9, Standards for Solvents and Formulations for Organic Preservative Systems.
 - 6. ASTM International (ASTM):
 - a. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
 - b. A615/A615M, Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
 - c. B418, Standard Specification for Cast and Wrought Galvanic Zinc Anodes.
 - d. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - e. C150, Standard Specification for Portland Cement.
 - f. C387/C387M, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
 - g. F436, Standard Specification for Hardened Steel Washers.
 - 7. Concrete Reinforcing Steel Institute (CRSI).
 - 8. NACE International (NACE): RP0169, Control of External Corrosion on Underground or Submerged Metallic Piping Systems.
 - 9. National Electrical Manufacturers Association (NEMA):
 - a. C80.1, Electrical Rigid Steel Conduit (ERSC).
 - b. TC 2, Electrical Polyvinyl Chloride (PVC) Conduit.
 - c. WC 70, Nonshielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.
 - 10. NSF International (NSF).

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- 11. The Society for Protective Coatings (SSPC):
 - a. SP 1, Solvent Cleaning.
 - b. SP 10, Near-White Blast Cleaning.

1.02 DEFINITIONS

- A. Electrically Continuous Pipeline: Pipeline that has a linear electrical resistance equal to or less than the sum of the resistance of the pipe plus the maximum allowable bond resistance for each joint as specified in this section.
- B. Ferrous Metal Pipe: Pipe made of iron such as ductile iron, or pipe containing steel or iron as a principal structural material, except reinforced concrete pipe.
- C. Foreign-Owned: Buried pipe or cable not specifically owned or operated by Owner.
- D. Lead, Lead Wire, Joint Bonds, Pipe Connecting Wires, Cable: Insulated copper conductor; the same as wire.
- E. Pipe Section: A single fitting or a single piece of pipe less than 20 feet in length. Pipe sections between 20 feet and 40 feet in length shall be treated as two pipe sections. Each 20 feet of pipe and fittings with joint bonds may be treated as one pipe section.

1.03 SUBMITTALS

- A. Action Submittals: Catalog cuts and information for products proposed for use.
- B. Informational Submittals:
 - 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements.
 - 2. Field Test Reports.
 - 3. Qualifications of Cathodic Protection Specialist.

1.04 QUALITY ASSURANCE

A. Obtain the services of a qualified Cathodic Protection Specialist to inspect, adjust, and evaluate the effectiveness of the Cathodic Protection System. The Cathodic Protection Specialist shall be a person accredited or certified by NACE International at the level of Corrosion Specialist or Cathodic Protection Specialist (i.e., NACE International CP Level 4). The Cathodic Protection Specialist shall have not less than 5 years of experience inspecting pipeline cathodic protection systems.

1. The Cathodic Protection Technician shall be a person accredited or certified by NACE International at the level of Cathodic Protection Technician (i.e., NACE International CP Level 2). Cathodic Protection Technician shall have not less than 5 years of experience testing cathodic protection systems and be under the direct supervision of a Cathodic Protection Specialist.

1.05 SCHEDULING

A. Specified weld-in fittings may have long delivery times; contact manufacturers and obtain commitments for delivery before scheduling installation.

PART 2 PRODUCTS

2.01 WIRES

- A. Conform to applicable requirements of NEMA WC 70.
- B. Joint Bond:
 - 1. General: Single-conductor, stranded copper wire with 600-volt HMWPE insulation. Supply joint bonds complete with formed copper sleeve on each end of wire.
 - 2. Push-On, Mechanical, or Flanged Joints: 2 AWG wires, 18 inches long.
- C. Pipe Connecting: Single-conductor, 12 AWG stranded copper wire with 600-volt HMWPE insulation.
- D. Insulation Colors:
 - 1. Galvanic Anodes: Black.
- E. Wire Labels:
 - 1. Materials shall be suitable for permanent identification.
 - 2. Plastic, paper, or cloth markers will not be permitted.
 - 3. Each pipe test wire shall include pipe diameter and pipe type, reference electrode, casing, or galvanic anode, as applicable.

2.02 THERMITE WELD MATERIALS

- A. General:
 - 1. Thermite weld materials consist of wire sleeves, welders, and weld cartridges according to weld manufacturer's recommendations for each wire size and pipe or fitting size and material.
 - 2. Welding materials and equipment shall be product of a single manufacturer. Interchanging materials of different manufacturers is not acceptable.
- B. Molds: Graphite; ceramic "One-Shot" molds not acceptable.
- C. Adapter Sleeves:
 - 1. For 12 AWG, 4 AWG, and 2 AWG wires.
 - 2. Prefabricated factory sleeve joint bonds or bond wires with formed sleeves made in field are acceptable. Attach field-formed joint bond sleeves with appropriate size and type of hammer die furnished by thermite weld manufacturer.
 - 3. Extend wire conductor 1/4 inch beyond end of sleeve.
- D. Cartridges: Cast-iron thermite weld cartridges for cast and ductile iron pipe and fittings.
 - 1. Maximum Cartridge Size: 45 grams for cast and ductile iron materials, respectively.
- E. Welders and Cartridges: For attaching copper wire to pipe material:

| Pipe Material | Weld Type | Cartridge Size, Max. |
|-------------------------|------------|-------------------------|
| 4 AWG Wire and Smaller: | | |
| Ductile or Cast Iron | HB, VH, HE | 45 gm |
| 2 AWG Joint Bonds: | | |
| Ductile or Cast Iron | FC | 45 gm |

- F. Welding Materials Manufacturers:
 - 1. Erico Products Inc. (Cadweld), Cleveland, OH.
 - 2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

- G. Thermite Weld Coating:
 - 1. Thermite Weld Caps: Prefabricated weld cap with coating and suitable primer, such as Handy Cap II with Royston Primer 747, as manufactured by Royston Laboratories, Inc.
 - 2. Insulating Resin: 100 percent solids epoxy that can cure in submerged or buried conditions. At Contractor's option, bitumastic coating (Carboline Bitumastic 50 or equal) may be used if it is allowed to dry completely before covering.
 - 3. Use products recommended by pipe or fitting coating manufacturer to repair spot damage at thermite weld connections not covered by standard pipeline coating repair procedure or thermite weld cap.

2.03 ANCILLARY MATERIALS

- A. Mastic Coating: TC Mastic (Brush Applied) as manufactured by Tapecoat Co., Evanston, IL.
- B. Wire Connectors: One-piece, tin-plated crimp-on lug connector as manufactured by Burndy Co. or Thomas and Betts.
- C. Compression Connectors:
 - 1. For in-line, tap, and multisplice furnish "C" taps made of conductive wrought copper, sized to fit wires being spliced.
 - 2. Manufacturer and Product: Burndy; Type "YC."
- D. Silver Brazing Alloy: 15 percent silver content; 1,185 degrees F to 1,300 degrees F melting range.
- E. Electrical Tape:
 - 1. Linerless rubber high-voltage splicing tape and vinyl electrical tape suitable for moist and wet environments.
 - 2. Manufacturer and Products: 3M Products; Scotch 130 C and Scotch 88.

2.04 FUNCTIONAL TEST EQUIPMENT

- A. Test Equipment:
 - 1. Before construction begins, obtain test equipment necessary for electrical continuity testing, and the following equipment:
 - a. One Model 77 Series III, Digital Multimeter, with case and test leads, as manufactured by Fluke Corporation, Everett, WA.

B. Store test equipment at Site and maintain in accurately calibrated, working condition. Test equipment shall be available to Engineer for testing purposes. Upon completion of Project, test equipment listed above shall be turned over to Owner in clean, accurate, and fully functional condition, along with operating manuals, test wires, and cases supplied with equipment.

PART 3 EXECUTION

3.01 INSTALLATION

A. Construct system of pipe joint bonds at fittings and valves to form an electrically continuous metallic structure. Each pipe section shall be cathodically protected individually and no joint bonds are needed to connect pipe segments.

3.02 PIPE JOINT BONDING

- A. Electrically bond joints at fittings and valves of buried ductile iron.
- B. Install one joint bond wire assemblies at each joint that requires bonding.
- C. Use thermite weld process for electrical connection of wires to pipe and fittings.
- D. Test each bonded joint for continuity.
- E. Bronze wedges are not an acceptable method of achieving electrical continuity.

3.03 PIPE CONNECTING WIRES

- A. Buried Ductile Iron Pipelines: Connect together with insulated wires to provide electrical continuity between pipe joints at fittings and valves.
- B. Connect pipes together with 4 AWG insulated copper wire.

3.04 WIRE CONNECTIONS

- A. Thermite Weld:
 - 1. Use thermite weld method for electrical connection of copper wire to ductile and cast iron surfaces. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation recommended by welder manufacturer. Ensure that pipe or fitting wall thickness is of sufficient thickness that thermite weld

process will not damage integrity of pipe or fitting wall or protective lining.

- 2. After weld connection has cooled, remove slag, visually inspect, and physically test wire connection by tapping with a hammer; remove and replace defective connections.
- 3. On pipe and fittings with dielectric linings, make weld connection on shop tab provided or on a thick metal section to minimize damage to lining and coating. After weld is made, coat weld with coating repair material.
- 4. Install prefabricated thermite weld cap over each completed connection. Repair exposed metal surfaces not covered by thermite weld cap in accordance with coating manufacturer's recommendations. Repair damage to pipe lining in accordance with lining applicator's recommendations. Alternatively, for thermite weld connections to pipe, apply insulating resin, then specified joint coating at each completed connection. Repair exposed metal surfaces not covered by resin or pipe coating in accordance with coating manufacturer's recommendations.
- 5. Make wire connections to concrete cylinder pipe by thermite welding to shop welded steel studs or plates provided on pipe for this purpose. Clean steel studs to bright metal before thermite welding. Coat completed wire connection with cement mortar.

3.05 WIRE INSULATION REPAIR

A. Handle wires with care. Splices are not allowed. Damaged anode wires shall be replaced in its entirety including the anode it is connected to. New anode must have factory installed anode wire connection.

3.06 FIELD QUALITY CONTROL

- A. Electrical Continuity Testing:
 - 1. Provide necessary equipment and materials and make electrical connections to pipe as required to test continuity of bonded joints at all valves and fittings.
 - 2. Conduct continuity test on buried joints that are required to be bonded. Test electrical continuity of joint bonds after bonds are installed but before backfilling of pipe.
 - 3. Have Cathodic Protection Specialist monitor tests of bonded joints.

- 4. Test electrical continuity of completed joint bonds using either a digital low resistance ohmmeter or by Calculated Resistance Method, at Contractor's option.
 - a. Digital Low Resistance Ohmmeter Method:
 - 1) Provide the following equipment and materials:
 - a) One Biddle Model 247001 digital low resistance ohmmeter.
 - b) One set of duplex helical current and potential hand spikes, Biddle Model No. 241001, cable length as required.
 - c) One calibration shunt rated at 0.001 ohm, 100 amperes, Biddle Model No. 249004.
 - 2) Test Procedure:
 - a) Measure resistance of joint bonds with low resistance ohmmeter in accordance with manufacturer's written instructions.
 - b) Use helical hand spikes to contact pipe on each side of joint, without touching thermite weld or bond.
 - c) Clean contact area to bright metal by filing or grinding and without surface rusting or oxidation.
 - d) Record measured joint bond resistance on test form described herein.
 - e) Repair damaged pipe coating.
 - b. Calculated Resistance Method:
 - 1) Provide the following equipment and materials:
 - a) One dc ammeter (meter or clamp-on) with full scale reading of 100 amperes and a minimum resolution of 1 ampere or a 100-ampere shunt with a voltmeter as specified herein.
 - b) One high resistance electronic voltmeter with a dc low range of 200 millivolts full scale to a dc high range of 20 volts full scale and capable of a minimum resolution of 1 millivolt (two voltmeters are required if a shunt is used).
 - c) One knife switch, safety switch, or time controlled relay suitable for test current.
 - d) Two electrical probes for the voltmeter.
 - e) Insulated wire suitable for carrying the test current, length as required.
 - f) One dc power supply with a steady capacity of 50 amperes minimum; storage batteries are not an acceptable power supply.
 - g) Test Procedure: Either tightly clamp or thermite weld current wire connections to the pipe. Determine wire

PIPE BONDING AND TEST STATIONS 26 42 01 - 8

size for the test current, and do not exceed 1,000 feet in length.

- c. Apply a minimum direct current of 50 amperes.
- d. Measure voltage drop across each joint with voltmeter by contacting pipe on each side of joint. Voltmeter connections to bond wire or thermite welds will not be acceptable.
- e. Measure current applied to test span and voltage drop across joint simultaneously.
- f. Record measured voltage drop and current for each joint of test form described herein and calculate bond resistance in accordance with the following formula:

$$R = \frac{E}{I}$$

Where:

R = Resistance of the joint bond.

- E = Measured voltage drop across the joint, in volts.
- I = Test current applied to the pipe test span, in amperes.
- 5. Joint Bond Acceptance:
 - a. Joint Bond Resistance: Less than or equal to the maximum allowable bond resistance values in Table 1.

| Table 1 | | | |
|-----------------------|---------------------------|---------------|--|
| | Max. Allowable Resistance | | |
| Joint Type | 1 Bond/Joint | 2 Bonds/Joint | |
| Push-On or Mechanical | 0.000325 ohm | 0.000162 ohm | |
| Flexible Coupling | 0.000425 ohm | 0.000212 ohm | |

- b. Replace joint bonds that exceed the allowable resistance. Retest replacement joint bonds for compliance with bond resistance.
- c. Repair defective joint bonds discovered during energizing and testing.

3.07 FUNCTIONAL TESTING

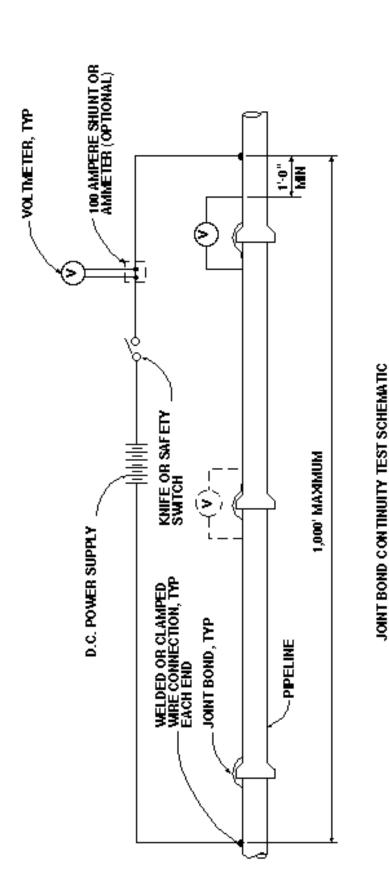
- A. Verify that anodes are electrically connected to the pipe prior to full burial.
- B. Tabulate structure-to-soil potential measurements, with date and test location.

3.08 SUPPLEMENT

- A. The supplement listed below, following "End of Section," is a part of this Specification.
 - 1. Joint Bond Continuity Test Schematic.

END OF SECTION





PIPE BONDING AND TEST STATIONS 26 42 01 SUPPLEMENT - 1

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SECTION 26 42 02 GALVANIC ANODE CATHODIC PROTECTION SYSTEM

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM): B418, Standard Specification for Cast and Wrought Galvanic Zinc Anodes.
 - 2. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

1.02 DEFINITIONS

- A. Ferrous Metal Pipe: Pipe made of steel or iron, and pipe containing steel or iron as a principle structural material, except reinforced concrete.
- B. Lead, Lead Wires, Joint Bonds, Cable: Insulated copper conductor; the same as wire.
- C. Pipe Section: A single fitting or a single piece of pipe less than 20 feet in length. Pipe sections between 20 feet and 40 feet in length shall be treated as two pipe sections. Each 20 feet of pipe and fittings with joint bonds may be treated as one pipe section.

1.03 SUBMITTALS

- A. Action Submittals: Catalog cuts and other information for products to be used.
- B. Informational Submittals:
 - 1. Compliance Statement: Provide compliance statement that galvanic anode composition meets chemical requirements specified herein.
 - 2. Test data for open circuit potential measurements and electrochemical capacity for zinc anodes, as specified herein.
 - 3. Field test reports.
 - 4. Cathodic Protection Specialist qualifications.

1.04 QUALITY ASSURANCE

A. Obtain the services of a qualified Cathodic Protection Specialist to inspect, adjust, and evaluate the effectiveness of the Cathodic Protection System. The Cathodic Protection Specialist shall be a person accredited or certified by

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS NACE International at the level of Corrosion Specialist or Cathodic Protection Specialist (i.e., NACE International CP Level 4). The Cathodic Protection Specialist shall have not less than 5 years of experience inspecting pipeline cathodic protection systems.

- 1. The Cathodic Protection Technician shall be a person accredited or certified by NACE International at the level of Cathodic Protection Technician (i.e., NACE International CP Level 2). Cathodic Protection Technician shall have not less than 5 years of experience testing cathodic protection systems and be under the direct supervision of a Cathodic Protection Specialist.
- 2. The Cathodic Protection Specialist shall attend the final Cathodic Protection System Activation Survey.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Provide electrode packaged in a plastic or heavy paper bag of sufficient thickness to protect electrode, backfill, and cloth bag during normal shipping and handling.
- B. Store prepackaged anodes off the ground and keep them dry. Protect against weather, condensation, and mechanical damage. Immediately remove wet or mechanically damaged prepackaged anodes from Site. Handle anodes with care to prevent loss of backfill material. Do not lift or hold anodes by lead wire.

PART 2 PRODUCTS

- 2.01 GALVANIC ANODES
 - A. Zinc Anodes:
 - 1. Composition: ASTM B418, Type II.
 - 2. Dimensions:
 - a. Length: 65-inch inches minimum.
 - b. Bare Weight: 33 pounds as specified below.
 - B. Anode Wire: Furnish each anode with 12 AWG solid copper wire with HMWPE insulation, 5 feet long.
 - C. Wire-to-Anode Connection: Manufacturer's standard. Anode connection shall be stronger than the wire.

- D. Backfill:
 - 1. Composition:
 - a. Ground Hydrated Gypsum: 75 percent.
 - b. Powdered Wyoming Bentonite: 20 percent.
 - c. Anhydrous Sodium Sulfate: 5 percent.
 - 2. Grain Size: 100 percent passing through a 20-mesh screen and 50 percent retained by a 100-mesh screen.
 - 3. Mixture: Thoroughly mixed and firmly packaged around galvanic anode within cloth bag by means of adequate vibration.
 - 4. Quantity of backfill shall be sufficient to cover surfaces of anode to a depth of 1 inch.

2.02 ANCILLARY MATERIALS

- A. Compression Connectors:
 - 1. For in-line, tap, and multisplice compression connectors furnish "C" taps made of conductive wrought copper, sized to fit wires being spliced.
 - 2. Manufacturer and Product: Burndy; Type YC.
- B. Wire Connectors: One-piece, tin-plated crimp-on lug connector as manufactured by Burndy Co. or Thomas and Betts.
- C. Earthfill: Native soil free of roots and other organic matter, ashes, cinders, trash, debris, and rocks.

2.03 THERMITE WELD MATERIALS

- A. General:
 - 1. Thermite wire sleeves, welders, and weld cartridges according to manufacturer's recommendations for each wire size, pipe or fitting size, and material.
 - 2. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers will not be acceptable.
- B. Molds: Graphite. Ceramic "One-Shot" molds are not acceptable.

- C. Cartridges:
 - 1. Cast-iron thermite weld cartridges for cast and ductile iron pipe and fittings.
 - 2. Maximum Cartridge Size: 45 grams for cast and ductile iron materials.
- D. Welding Materials Manufacturers:
 - 1. Erico Products Inc. (Cadweld), Cleveland, OH.
 - 2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

2.04 COATING REPAIR MATERIAL FOR PIPE AND FITTINGS

- A. As recommended by pipe or fitting coating manufacturer for spot damage at thermite weld connections not covered by standard pipeline coating repair procedure.
- B. Material: 100 percent solids epoxy that cures in submerged or buried conditions.
- C. Manufacturers and Products:
 - 1. Carboline, St. Louis, MO; Carboguard A-788 Splash Zone Mastic.
 - 2. Raven Linings, Tulsa, OK; Aquatapoxy A-7.

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Construct galvanic anode cathodic protection system on buried ductile iron pipe and appurtenances.
 - B. Conform to NFPA 70.

3.02 GALVANIC ANODE INSTALLATION

- A. General:
 - 1. Install galvanic anodes directly connected to the pipe without the use of test stations and place underneath the polyethylene encasement as shown on Drawings.
 - 2. Place anodes on the crown of pipe under the V-bio.
 - 3. Provide minimum anode spacing of 2 feet from other unprotected pipelines.
 - 4. Install anodes at intervals of two anodes per stick of pipe of approximately 20 feet in length per stick.

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- 5. Install anodes at approximately 1/3 and 2/3 the length of each pipe section.
- 6. Install anodes on opposite sides of the pipe (i.e. 3 o'clock and 9 o'clock).
- 7. Install two 33-pound zinc anodes per pipe section for all buried 12-inch ductile iron pipe.
- 8. Where newly installed buried 12-inch ductile iron piping connects to existing metallic piping, install four 33-pound zinc anodes for each connecting pipe section. These anodes shall be installed on opposite sides of the pipe (i.e. alternating 3 o'clock and 9 o'clock) and at approximately 1/4, 1/3, 2/3, and 3/4 the length of the pipe section.
- B. Ductile Iron and Cast-Iron Pipe: Install anodes as shown on Drawings or as specified.

3.03 BURIED PIPE APPURTENANCES

- A. Each buried ductile iron fitting, valve, pipe section, and appurtenance used in conjunction with nonmetallic pipe shall be cathodically protected with zinc anodes. Where two or more metallic fittings are adjacent to each other, install joint bonds as specified in Section 26 42 01, Pipe Bonding and Test Stations, and install specified quantity of zinc anodes on each fitting, pipe, section, or appurtenance.
- B. Use thermite weld method for zinc anode connections to cast iron or steel fittings and appurtenances.
- C. Equally space zinc anodes around fittings, valves, or appurtenances underneath the polyethylene encasement. Number of anodes to be installed on each ductile iron valve or fitting:

| Pipe Size | No. of Anodes |
|-----------------|---------------|
| 16-inch or less | 1 |

- D. At Contractor's option, larger anodes may be used in place of multiple smaller anodes for a group of bonded metallic components, provided that an equal or greater total weight of zinc is used.
- E. For pipe and fittings with fusion bonded epoxy coatings, anode requirements shall be reduced by one pipe size.

3.04 WIRE CONNECTIONS TO PIPE

- A. Make electrical connection of copper wire to steel, ductile, and cast iron surfaces using thermite weld method. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation as recommended by manufacturer. Assure pipe or fitting wall thickness is of sufficient thickness that thermite weld process will not damage integrity of pipe or fitting wall or protective lining.
- B. Before connection is made, clean surface to bare metal by making a 2-inch by 2-inch window in coating, and then filing or grinding surface to produce a bright metal finish. Grinding shall be with a vitrified type grinding wheel; use of resin, rubber, or shellac impregnated type grinding wheels is not acceptable. Prepared metal surface shall be dry.
- C. Install wire sleeves on the ends of the wires before welding to metal surface. Perform thermite welding in strict accordance with manufacturer's written instructions. After weld connection has cooled, remove slag and physically test wire connection by tapping with a hammer; remove and replace defective connections.
- D. Install prefabricated thermite weld cap over each completed connection. Repair exposed metal surfaces not covered by thermite weld cap in accordance with coating manufacturer's recommendations. Repair damage to pipe lining in accordance with lining applicator's recommendations.

3.05 WIRE INSULATION REPAIR

A. Splices are not allowed. Damaged anode lead wires shall be replaced along with the anode in its entirety. New anode shall have factory connected lead wire.

3.06 FIELD TESTING

A. Provide Cathodic Protection Technician to visit Site during installation of galvanic anode cathodic protection system to verify that anodes are electrically connected to the pipe prior to full burial. Cathodic Protection Specialist shall be responsible to ensure compliance with these Specifications, and for final cathodic protection system activation and testing services.

END OF SECTION

SECTION 31 23 13 SUBGRADE PREPARATION

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).
 - b. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

1.02 DEFINITIONS

- A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.
- D. Relative Density: As defined in Section 31 23 23, Fill and Backfill.
- E. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.
- F. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

Complete applicable Work specified in Sections 02 41 00, Demolition, and 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Prepare subgrade when unfrozen and free of ice and snow.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

- A. Under Pavement and sidewalks: Compact upper 6 inches to minimum of 100 percent relative compaction as determined in accordance with ASTM D1557.
 - 1. Method such as three passes with a loaded dump truck or similar heavywheeled vehicle or as appropriate based on soil condition and judgment of the testing laboratory.
 - 2. Sample tests will be representative of materials to be placed.
 - 3. Determine and provide optimum density curve for each type of material encountered or utilized.
 - 4. Include Atterberg Limits, grain size determination, and specific gravity.

3.03 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.04 CORRECTION

- A. Soft or Loose Subgrade:
 - 1. Adjust moisture content and recompact.
 - 2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.
- B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

END OF SECTION

SECTION 31 23 16 EXCAVATION

PART 1 GENERAL

1.01 DEFINITIONS

- A. Common Excavation: Removal of material not classified as rock excavation.
- B. Rock Excavation:
 - 1. General: Removal of solid material which by actual demonstration cannot, in Engineer's opinion, be reasonably loosened or ripped by single-tooth, hydraulically operated ripper mounted on crawler tractor in good condition and rated at minimum 300 flywheel horsepower; and which must be systematically drilled and blasted or broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.
 - 2. Trench: Removal of solid material which by actual demonstration cannot, in Engineer's opinion, be reasonably excavated with minimum 135-hp backhoe in good condition and equipped with manufacturer's standard boom, two rippers, and rock points or similar approved equipment; and which must be systematically drilled and blasted or broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.
 - 3. Term "rock excavation" indicates removal of solid material, as specified above, and does not necessarily correspond to "rock" as implied by names of geologic formations.
 - 4. Removal of boulders larger than 1/2 cubic yard will be classified as rock excavation, if drilling and blasting or breaking them apart with power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means is both necessary and actually used for their removal.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Excavation Plan, Detailing:
 - a. Methods and sequencing of excavation.
 - b. Proposed locations of stockpiled excavated material.
 - c. Proposed onsite and offsite spoil disposal sites.
 - d. Anticipated difficulties and proposed resolutions.
 - e. Reclamation of onsite spoil disposal areas.

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1.03 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized overexcavation.

1.04 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

- A. Dewatering: Conform to applicable requirements of Section 31 23 19.01, Dewatering, prior to initiating excavation.
- B. Excavation Support: Install and maintain shoring or trench boxes, as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
 - B. Do not overexcavate without written authorization of Engineer.
 - C. Remove or protect obstructions as shown and as specified in Section 01 50 00, Temporary Facilities and Controls, Article Protection of Work and Property.

3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

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3.03 TRENCH WIDTH

- A. Minimum Width of Trenches: As shown in detail Typical Trench Detail.
- B. Maximum Width of Trenches:
 - 1. Single Pipes 12 Inches or Smaller in Single Trench: 3 feet, unless specifically shown otherwise on a detail.

3.04 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and crosssections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.
- D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02 41 00, Demolition, for demolition debris.
- C. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk.

END OF SECTION

SECTION 31 23 19.01 DEWATERING

PART 1 GENERAL

1.01 SUBMITTALS

- A. Informational Submittals:
 - 1. Well permits.
 - 2. Discharge permits.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Remove and control water during periods when necessary to properly accomplish Work, including overnight, during weekends, holidays and during periods of work stoppages.

3.02 SURFACE WATER CONTROL

- A. See Section 01 50 00, Temporary Facilities and Controls, Article Temporary Controls.
- B. Remove surface runoff controls when no longer needed.

3.03 DEWATERING SYSTEMS

- A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.
- B. Design and Operate Dewatering Systems:
 - 1. To prevent loss of ground as water is removed.
 - 2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
 - 3. To relieve artesian pressures and resultant uplift of excavation bottom.

3.04 DISPOSAL OF WATER

- A. Obtain discharge permit for water disposal from authorities having jurisdiction.
- B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
- C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
- D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

3.05 PROTECTION OF PROPERTY

- A. Make assessment of potential for dewatering induced settlement. Provide and operate devices or systems, including but not limited to reinjection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed Work, and adjacent property.
- B. Securely support existing facilities, completed Work, and adjacent property vulnerable to settlement due to dewatering operations. Support shall include, but not be limited to, bracing, underpinning, or compaction grouting.

END OF SECTION

SECTION 31 23 23 FILL AND BACKFILL

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
 - b. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - c. D75, Standard Practice for Sampling Aggregates.
 - D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - e. D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - f. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - h. D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - i. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.02 DEFINITIONS

- A. Relative Compaction:
 - 1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
 - 2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

- B. Optimum Moisture Content:
 - 1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
 - 2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.
- C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.
- D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- E. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- F. Lift: Loose (uncompacted) layer of material.
- G. Geosynthetics: Geotextiles, geogrids, or geomembranes.
- H. Well-Graded:
 - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
 - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
 - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- I. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
 - 1. 1 foot outside outermost edge at base of foundations or slabs.
 - 2. 1 foot outside outermost edge at surface of roadways or shoulder.
 - 3. 0.5 foot outside exterior at spring line of pipes or culverts.
- J. Borrow Material: Material from required excavations or from designated borrow areas on or near Site.
- K. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.

- L. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- M. Structural Fill: Fill materials as required under structures, pavements, and other facilities.
- N. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.
- O. Standard Specifications: When referenced in this section, shall mean Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Tank manufacturer's recommendations for backfill around each buried tank.
 - 2. Samples: Imported material taken at source.
- B. Informational Submittals:
 - 1. Manufacturer's data sheets for compaction equipment.
 - 2. Certified test results from independent testing agency.

1.04 QUALITY ASSURANCE

- A. Notify Engineer when:
 - 1. Structure or tank is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.
 - 2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
 - 3. Fill material appears to be deviating from Specifications.

1.05 SEQUENCING AND SCHEDULING

- A. Backfill against concrete structures only after concrete has attained compressive strength, as specified on Drawings. Obtain Engineer's acceptance of concrete work and attained strength prior to placing backfill.
- B. Do not place granular base, subbase, or surfacing until after subgrade has been prepared as specified in Section 31 23 13, Subgrade Preparation.

PART 2 PRODUCTS

2.01 EARTHFILL

- A. Excavated material from required excavations free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.
- B. Material containing more than 10 percent gravel, stones, or shale particles is unacceptable.
- C. Provide imported material of equivalent quality, if required to accomplish Work.

2.02 GRANULAR FILL

- A. 1-inch minus crushed gravel or crushed rock.
- B. Free from dirt, clay balls, and organic material.
- C. Well-graded from coarse to fine and containing sufficient fines to bind material when compacted, but with maximum 8 percent by weight passing No. 200 sieve.
- 2.03 SAND
 - A. Free from clay, organic matter, or other deleterious material.
 - B. Gradation as determined in accordance with ASTM C117 and ASTM C136:

| Sieve Size | Percent Passing by Weight |
|------------|---------------------------|
| 1/4-inch | 100 |
| No. 4 | 95 - 100 |
| No. 200 | 0 - 8 |
| No. 200 | |

2.04 WATER FOR MOISTURE CONDITIONING

A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

2.05 BASE COURSE ROCK

A. As specified in Section 32 11 23, Aggregate Base Course(s).

FILL AND BACKFILL 31 23 23 - 4

2.06 FOUNDATION STABILIZATION ROCK

- A. Crushed rock or pit run rock.
- B. Uniformly graded from coarse to fine.
- C. Free from excessive dirt and other organic material.
- D. Maximum 2-1/2-inch particle size.

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
 - B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
 - C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.
 - D. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.
 - E. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
 - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
 - 2. Excavate trench for installation of item.
 - 3. Install bedding, if applicable, as specified in Section 31 23 23.15, Trench Backfill.
 - 4. Install item.
 - 5. Backfill envelope zone and remaining trench, as specified in Section 31 23 23.15, Trench Backfill, before resuming filling or backfilling specified in this section.
 - F. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

FILL AND BACKFILL 31 23 23 - 5 G. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

3.02 BACKFILL UNDER AND AROUND STRUCTURES

A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 90 percent relative density.

3.03 SITE TESTING

- A. Gradation:
 - 1. One sample of finished product for the Project or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
 - 2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
 - 3. Remove material placed in Work that does not meet Specification requirements.

3.04 GRANULAR BASE, SUBBASE, AND SURFACING

A. Place and compact as specified in Section 32 11 23, Aggregate Base Course(s).

3.05 REPLACING OVEREXCAVATED MATERIAL

- A. Replace excavation carried below grade lines shown or established by Engineer as follows:
 - 1. Beneath Slabs-On-Grade or Buried Concrete Vaults: Granular fill.
 - 2. Trenches:
 - a. Unauthorized Overexcavation: Either trench stabilization material or granular pipe base material, as specified in Section 31 23 23.15, Trench Backfill.
 - b. Authorized Overexcavation: Trench stabilization material, as specified in Section 31 23 23.15, Trench Backfill.

END OF SECTION

FILL AND BACKFILL 31 23 23 - 6

SECTION 31 23 23.15 TRENCH BACKFILL

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Public Works Association (APWA): Uniform Color Code.
 - 2. ASTM International (ASTM):
 - a. C33/C33M, Standard Specification for Concrete Aggregates.
 - b. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - c. C117, Standard Test Method for Materials Finer than 75 Micrometer (No. 200) Sieve in Mineral Aggregates by Washing.
 - d. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - e. C150/C150M, Standard Specification for Portland Cement.
 - f. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - g. C1012/C1012M, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
 - h. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - i. D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 micrometer) Sieve.
 - j. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - k. D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 1. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - m. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - n. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - o. D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
 - 3. National Electrical Manufacturers Association (NEMA): Z535.1, Safety Colors.

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1.02 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.
- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.
- F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D698. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Engineer.
- H. Relative Density: As defined by ASTM D4253 and ASTM D4254.
- I. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.
- J. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Satisfying both of the following requirements, as defined in ASTM D2487:
 - 1. Coefficient of Curvature: Greater than or equal to 1 and less than or equal to 3.
 - 2. Coefficient of Uniformity: Greater than or equal to 4 for materials classified as gravel, and greater than or equal to 6 for materials classified as sand.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Manufacturer's descriptive literature for marking tapes and tracer wire.
 - 2. Samples, as applicable:
 - a. Trench stabilization material.
 - b. Bedding and pipe zone material.
 - c. Granular drain.
 - d. Granular backfill.
 - e. Earth backfill.
 - f. Sand(s).
- B. Informational Submittals:
 - 1. Catalog and manufacturer's data sheets for compaction equipment.
 - 2. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.
 - 3. Controlled Low Strength Material: Certified mix design and test results. Include material types and weight per cubic yard for each component of mix.

PART 2 PRODUCTS

2.01 MARKING TAPE

- A. Nondetectable:
 - 1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
 - 2. Thickness: Minimum 5 mils.
 - 3. Width: 6 inches.
 - 4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
 - 5. Manufacturers and Products:
 - a. Reef Industries; Terra Tape.
 - b. Mutual Industries; Non-detectable Tape.
 - c. Presco; Non-detectable Tape.

B. Color: In accordance with APWA Uniform Color Code.

| Color* | Facility |
|--------------------------------------------------|---------------|
| Blue | Potable water |
| *As specified in NEMA Z535.1, Safety Color Code. | |

2.02 TRACER WIRE

- A. Material: Minimum 12-gauge solid copper or copper jacket with a steel core, with high-density polyethylene (HDPE) or high-molecular weight polyethylene (HMWPE) insulation suitable for direct bury.
- B. Splices: Use wire nut or lug suitable for direct burial as recommended by tracer wire manufacturer.
- C. Manufacturers:
 - 1. Copperhead Industries, LLC.
 - 2. Performance Wire & Cable Inc.
 - 3. Pro-line Safety Products Company.

2.03 TRENCH STABILIZATION MATERIAL

- A. Granular Backfill:
 - 1. Clean gravel or crushed rock, reasonably well-graded from coarse to fine.
 - 2. Maximum Particle Size: 1-inch.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
- B. Clean or gravelly sand with less than 5 percent passing No. 200 sieve, as determined in accordance with ASTM D1140, or gravel or crushed rock within maximum particle size and other requirements as follows unless otherwise specified.
 - 1. Duct Banks: 3/4-inch maximum particle size.
 - 2. Pipe Under 18-Inch Diameter: 3/4-inch maximum particle size, except 1/4 inch for stainless steel pipe, copper pipe, tubing, and plastic pipe under 3-inch diameter.

2.05 EARTH BACKFILL

- A. Soil, loam, or other excavated material suitable for use as backfill.
- B. Free from roots or organic matter, refuse, boulders and material larger than 1/2 cubic foot, or other deleterious materials.

2.06 PROCESSED EARTH BACKFILL

- A. Class A Backfill: Earth backfill, meeting the following additional requirement.
 - 1. Free of boulders and cobbles that would be retained on a 3-inch screen.

2.07 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. Select and proportion ingredients to obtain compressive strength between 50 psi 100 psi at 28 days in accordance with ASTM D4832.
- B. Materials:
 - 1. Cement: ASTM C150/C150M, Type I or Type II.
 - 2. Aggregate: ASTM C33/C33M, Size 7.
 - 3. Fly Ash (Pozzolan): Class F or Class C fly ash in accordance with ASTM C618, except as modified herein:
 - a. ASTM C618, Table 1, Loss on Ignition: Unless permitted otherwise, maximum 3 percent.
 - 4. Water: Clean, potable, containing less than 500 ppm of chlorides.

2.08 TOPSOIL

- A. Re-use clean site-salvaged topsoil.
- 2.09 SOURCE QUALITY CONTROL
 - A. Perform gradation analysis in accordance with ASTM C136 for:
 - 1. Earth backfill, including specified class.
 - 2. Trench stabilization material.
 - 3. Bedding and pipe zone material.
 - B. Certify Laboratory Performance of Mix Designs:
 - 1. Controlled low strength material.
 - 2. Concrete.

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PART 3 EXECUTION

3.01 TRENCH PREPARATION

- A. Water Control:
 - 1. Promptly remove and dispose of water entering trench as necessary to grade trench bottom and to compact backfill and install vaults, or pipe. Do not place concrete, or lay pipe in water.
 - 2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
 - 3. Provide continuous water control until trench backfill is complete.
- B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

- A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.
- B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

- A. Rebuild trench bottom with trench stabilization material.
- B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.
- C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

- A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.
- B. Place over full width of prepared trench bottom in two equal lifts when required depth exceeds 8 inches.
- C. Hand grade and compact each lift to provide a firm, unyielding surface.

- D. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe.
- E. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.
- F. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

- A. Upper limit of pipe zone shall not be as follows:
 - 1. Pipe: 12 inches above top of pipe, unless shown otherwise.
- B. Restrain pipe as necessary to prevent their movement during backfill operations.
- C. Place material simultaneously in lifts on both sides of pipe.
 - 1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
 - 2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.
- D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by "walking in" and slicing material under haunches with a shovel to ensure voids are completely filled before placing each succeeding lift.
- E. Do not use power-driven impact compactors to compact pipe zone material. After full depth of pipe zone material has been placed as specified, compact material by a minimum of three passes with a vibratory plate compactor only over area between sides of pipe and trench walls.

3.06 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of buried piping, on top of last lift of pipe zone material shown on Drawings. Coordinate with piping installation drawings.
 - 1. Detectable Marking Tape: Install with nonmetallic piping and waterlines.
 - 2. Nondetectable Marking Tape: Install with metallic piping.

3.07 TRACER WIRE INSTALLATION AND TESTING

- A. Install tracer wire continuously along centerline of buried piping.
- B. Attach wire to top of pipe using tape at maximum of 10-foot intervals. In areas where depth of cover is excessive for allowing detection of tracer wire with electronic pipe locator, install tracer wire within pipe backfill directly above pipe centerline at a minimum depth of 4 feet.
- C. Install splices in accordance with manufacturer's instructions for direct bury applications. Tie ends of wire to be joined in a knot as required to reduce tension on splice.
- D. Bring tracer wire to surface at each valve box, curb box, vault, air valve, blowoff valve, hydrant, and pipeline marker. Tracer wire shall be brought to surface at least every 1,000 feet. If distance between pipe appurtenances exceeds 1,000 feet, install valve box to allow access to tracer wire. Mark valve box cover with the word "TRACER". Coil enough excess tracer wire at each appurtenance to extend wire 12 inches above ground.
- E. Test continuity of tracer wire using electronic pipe locator in presence of Engineer prior to paving.

3.08 BACKFILL ABOVE PIPE ZONE

- A. General:
 - 1. Process excavated material to meet specified gradation requirements, except where imported material is specified to be used.
 - 2. Adjust moisture content as necessary to obtain specified compaction.
 - 3. Do not allow backfill to free fall into trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over top of pipe.
 - 4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
 - 5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
 - 6. Backfill around structures with same class backfill as specified for adjacent trench, unless otherwise shown or specified.
- B. Class A Backfill:
 - 1. Place in lifts not exceeding thickness of 9 inches.
 - 2. Mechanically compact each lift to a minimum of 98 percent relative compaction prior to placing succeeding lifts.

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- C. Class D Backfill: Backfill trench above pipe zone with granular backfill in lifts not exceeding 8 inches. Compact each lift to a minimum of 98 percent relative compaction prior to placing succeeding lifts.
- D. Class E Backfill:
 - 1. Backfill trench above pipe zone with earth backfill to a depth of 9 inches below original ground surface.
 - 2. Fill remainder of trench with gravel surfacing rock over entire trench width.
 - 3. Compact gravel surfacing rock by at least five passes with the wheels of a loaded 10-yard dump truck or other approved equipment over entire trench surface as necessary to prevent settlement.
 - 4. Finish completed backfilled surface at same level as original surface.
- E. Concrete Backfill:
 - 1. Place above bedding.
 - 2. Minimum Concrete Thickness: 6 inches on top and sides of pipe.
 - 3. Do not allow dirt or foreign material to become mixed with concrete during placement.
 - 4. Allow sufficient time for concrete to reach initial set before additional backfill material is placed in trench.
 - 5. Prevent flotation of pipe.
 - 6. Begin and end concrete backfill within 4 inches of a pipe joint on each end.
 - 7. Do not encase pipe joints except within the limits of the concrete backfill.
- F. Controlled Low Strength Material:
 - 1. Discharge from truck mounted drum type mixer into trench.
 - 2. Place in lifts as necessary to prevent uplift (flotation) of new and existing facilities.
 - 3. In traveled areas within CDOT right-of-way fill entire trench section above the pipe zone to pavement finish grade for a temporary driving surface, and screed off excess and finish with a float.
 - 4. In other areas, fill trench section as shown.

3.09 REPLACEMENT OF TOPSOIL

- A. Replace topsoil in top 12 inches of backfilled trench.
- B. Maintain finished grade of topsoil even with adjacent area and grade as necessary to restore drainage.

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3.10 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain surface of backfilled trench even with adjacent ground surface until final surface restoration is completed.
- B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep surface of backfilled trench even with adjacent ground surface, and grade and compact as necessary to keep surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.
- C. Topsoil: Add topsoil where applicable and as necessary to maintain surface of backfilled trench level with adjacent ground surface.
- D. Concrete Pavement: Replace settled slabs as specified in Section 32 12 16, Asphalt Paving.
- E. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, Asphalt Paving.
- F. Other Areas: Add excavated material where applicable and keep surface of backfilled trench level with adjacent ground surface.

3.11 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

END OF SECTION

SECTION 32 11 23 AGGREGATE BASE COURSE(S)

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. C29, Standard Test Method for Bulk Density (Unit Weight) and Voids in Aggregate.
 - b. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - c. C117, Standard Method of Test for Materials Finer Than 75μm (No. 200) Sieve in Mineral Aggregates by Washing.
 - d. C131, Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - e. C183, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
 - f. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).
 - g. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft³ (2700 kN-m/m³)).
 - h. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - i. D2216, Standard Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - j. D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 - k. D2844, Standard Specification for Resistance R-Value and Expansion Pressure of Compacted Soils.
 - 1. D4318, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
 - m. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - n. D5195, Standard Test Methods for Density of Soil and Rock In-Place Below Surface by Nuclear Methods.

- o. D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- 2. Colorado Department of Transportation (CDOT): Applicable sections of the Standard Specification for Road and Bridge Construction, current edition.

1.02 **DEFINITIONS**

- A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.
- B. Completed Lift: Compacted with uniform cross-section thickness.
- C. Base Course: Crushed aggregate or similar as specified placed and compacted on prepared subgrade or subbase course.
- D. Standard Specifications: When referenced in this section, shall mean Colorado Department of Transportation Standard Specification for Road and Bridge Construction, current edition.
- E. Subbase Course: Sandy, gravelly material placed and compacted on prepared subgrade.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Certified Test Results on Source Materials: Submit copies from commercial testing laboratory 20 days prior to delivery of materials to Project showing materials meeting the physical qualities specified.

PART 2 PRODUCTS

- 2.01 BASE COURSE AND GRAVEL SURFACING
 - A. As specified for Class 6 road base in Section 703 of the Standard Specifications.
- 2.02 SOURCE QUALITY CONTROL
 - A. Perform tests necessary to locate acceptable source of materials meeting specified requirements.
 - B. Final approval of aggregate material will be based on test results of installed materials.

AGGREGATE BASE COURSE(S) 32 11 23 - 2

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PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. As specified in Section 31 23 13, Subgrade Preparation.
- B. Obtain Engineer's acceptance of subgrade before placing base course or surfacing material.
- C. Do not place base course or surfacing materials in snow or on soft, muddy, or frozen subgrade.

3.02 EQUIPMENT

A. Compaction Equipment: Adequate in design and number to provide compaction and to obtain specified density for each layer.

3.03 HAULING AND SPREADING

- A. Hauling Materials:
 - 1. Do not haul over surfacing in process of construction.
 - 2. Loads: Of uniform capacity.
 - 3. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.
- B. Spreading Materials:
 - 1. Distribute material to provide required density, depth, grade, and dimensions with allowance for subsequent lifts.
 - 2. Produce even distribution of material upon roadway or prepared surface without segregation.
 - 3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

- A. Base Course:
 - 1. Maximum Completed Lift Thickness: 6 inches.
 - 2. Spread lift on preceding course to required cross-section.

- 3. Lightly blade and roll surface until thoroughly compacted.
- 4. Add keystone to achieve compaction and as required when aggregate does not compact readily because of lack of fines or natural cementing properties, as follows:
 - a. Use leveling course or surfacing material as keystone.
 - b. Spread evenly on top of base course, using spreader boxes or chip spreaders.
 - c. Roll surface until keystone is worked into interstices of base course without excessive displacement.
 - d. Continue operation until course has become thoroughly keyed, compacted, and will not creep or move under roller.
- 5. Blade or broom surface to maintain true line, grade, and cross-section.
- 6. Completed Course Total Thickness: As shown.
- 7. Spread on preceding course in accordance with cross-section shown.
- 8. Blade lightly and roll surface until material is thoroughly compacted.

3.05 ROLLING AND COMPACTION

- A. In accordance with Section 304 of the Standard Specifications.
- B. Commence rolling at outer edges and continue toward center; do not roll center of road first.
- C. Apply water as needed to obtain specified densities.
- D. Place and compact each lift to the required density before succeeding lift is placed.
- E. Surface Defects: Remedy by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.
- F. Finished surface shall be true to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

- A. Blade or otherwise work surfacing as necessary to maintain grade and crosssection at all times, and to keep surface smooth and thoroughly compacted.
- B. Finished Surface of Untreated Aggregate Base Course: Within plus or minus 0.04 foot of grade shown at any individual point.
- C. Surfacing: Within 0.04 foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.

3.07 DRIVEWAY RESURFACING

- A. Replace gravel surfacing on driveways that were gravel surfaced prior to construction.
- B. Provide compacted gravel surfacing to depth equal to original, but not less than 4 inches.
- C. Leave each driveway in as good or better condition as it was before start of construction.

3.08 FIELD QUALITY CONTROL

- A. In-Place Density Tests:
 - 1. Provide testing laboratory at least 24 hours' advance notification prior to testing.
 - 2. Show proof that areas meet specified requirements before

3.09 CLEANING

A. Remove excess material from the Work area. Clean stockpile and staging areas of all excess aggregate.

END OF SECTION

SECTION 32 12 16 ASPHALT PAVING

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M17, Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
 - b. M81, Standard Specification for Cut-Back Asphalt (Rapid Curing Type).
 - c. M82, Standard Specification for Cut-Back Asphalt (Medium Curing Type).
 - d. M140, Standard Specification for Emulsified Asphalt.
 - e. M156, Standard Specification for Requirements for Mixing Plants for Hot-mixed, Hot-laid Bituminous Paving Mixes.
 - f. M208, Standard Specification for Cationic Emulsified Asphalt.
 - g. R35, Standard Practice for Superpave Volumetric Design for Hot Mix Asphalt.
 - h. T166, Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Mixtures Using Saturated Surface-Dry Specimens.
 - i. T176 Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
 - j. T209, Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Hot Mix Asphalt (HMA).
 - k. T245, Standard Method of Test for Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus.
 - 1. T246, Standard Method of Test for Resistance to Deformation and Cohesion of Hot Mix Asphalt (HMA) by Means of Hveem Apparatus.
 - m. T247, Standard Method of Test for Preparation of Test Specimens of Hot Mix Asphalt (HMA) by Means of California Kneading Compactor.
 - n. T283, Standard Method of Test for Resistance of Compacted Hot Mix Asphalt (HMA) to Moisture-Induced Damage.
 - o. T304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate.

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- p. T312, Standard Method of Test for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of a Superpave Gyratory Compactor.
- 2. Asphalt Institute (AI):
 - a. Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete.
 - b. Superpave Series No. 2 (SP-2), Superpave Mix Design.
- 3. ASTM International (ASTM):
 - a. D75, Standard Method of Test for Sampling of Aggregates.
 - b. D140, Standard Method of Test for Sampling Bituminous Materials.
 - c. D979, Standard Method of Test for Sampling Bituminous Paving Mixtures.
 - d. D2041, Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 - e. D2489, Standard Method of Test for Determining Degree of Particle Coating of Asphalt Mixtures.
 - f. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - g. D4791, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
 - h. D5821, Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.
 - i. E329 REV A, Standard Specification for Agencies Engaged in Construction Inspection Testing, or Special Inspection.

1.02 **DEFINITIONS**

- A. Combined Aggregate: All mineral constituents of asphalt concrete mix, including mineral filler and separately sized aggregates.
- B. Maximum Aggregate Size: One sieve size larger than the nominal aggregate size.
- C. Nominal Aggregate Size: One sieve size larger than the first sieve that retains more than 10 percent aggregate.
- D. Prime Coat: Low viscosity cutback or emulsified asphalt applied to granular base in preparation of paving to coat and bond loose materials, harden the surface, plug voids, prevent moisture migration, and provide adhesion.
- E. Reclaimed asphalt pavement (RAP): Removed and/or processed pavement materials containing binder and aggregate.

- F. Seal Coat: Term used for various applications of emulsified asphalt, with or without sand or aggregate, to protect the asphalt surface from aging due to wear, degradation from the sun, wind, and water. Also used to improve skid resistance and aesthetics. The term seal coat can be used to define fog seal, slurry seal, chip seal or sand seal, depending on application.
- G. Standard Specifications: Colorado Department of Transportation, Standard Specifications for Road and Bridge Construction, current edition, modified by the following Colorado Department of Transportation Standard Special Provisions:
 - 1. Revision of Sections 105 and 106 Conformity to the Contract of Hot Mix Asphalt (Voids Acceptance) dated October 1, 2019.
 - 2. Revision of Section 401 Composition of Mixtures Voids Acceptance dated October 1, 2019.
 - 3. Revision of Section 401 Plant Mix Pavements dated October 1, 2019.
 - 4. Revision of Section 401 Tolerances for Hot Mix Asphalt (Voids Acceptance) dated October 1, 2019.
- H. Tack Coat: Thin layer of emulsified asphalt applied to hard surfaces, including new pavement lifts, to promote adhesion and bonding.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Samples: Sample per ASTM D140 and ASTM D195.
- B. Informational Submittals:
 - 1. Test Report for Asphalt Cement:
 - a. Submit minimum 10 days prior to start of production.
 - b. Show appropriate test method(s) for each material and the test results.
 - 2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for the following materials:
 - a. Aggregate: Gradation, source test results as defined in Section 703 of the Standard Specifications.
 - b. Asphalt for Binder: Type, grade, and viscosity-temperature curve.
 - c. Prime Coat: Type and grade of asphalt.
 - d. Tack Coat: Type and grade of asphalt.
 - e. Additives.
 - f. Mix: Conforms to job-mix formula.
 - 3. Statement of qualification for independent testing laboratory.

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- 4. Test Results:
 - a. Mix design.
 - b. Asphalt concrete core.
 - c. Gradation and asphalt content of uncompacted mix.
 - d. Field density.
 - e. Quality control.

1.04 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Independent Testing Laboratory: In accordance with ASTM E329 REV A.
- B. Compaction Control Strip:
 - 1. General:
 - a. Construct to approximately 400 square yards in area and at location that will become a portion of completed paved area.
 - b. Thickness: Typical of thickness to be paved on Project.
 - 2. Rollers Used for Compaction:
 - a. Steel Wheel Rollers: Minimum static weight 10 tons (9 mg).
 - b. Pneumatic Rollers: Capable of exerting pressure of 80 psi (550 kPa) on bituminous surface.
 - c. Vibratory Rollers: Static weight minimum 6 tons (5.5 mg), capable of applying a 10-ton (9-mg) impact force equipped with amplitude and frequency control specifically designed for compaction of bituminous mixtures.
 - 3. Compaction:
 - a. Compact bituminous mat, using a standard rolling pattern that covers entire control strip. Request that the materials testing firm performs final density test.
 - b. Continue rolling until no further compaction can be obtained as determined by field density testing.
 - c. Temperature and condition of bituminous mat shall be considered workable when further compaction can no longer be obtained.
 - 4. Target Density Determination:
 - a. Select test point near center of normal roller pass, but no closer than 2 feet (600 millimeters) from edge of mat and 50 feet (15 meters) from either end of control strip. Mat thickness at this point shall be at least depth of finished pavement.
 - b. Point at which no further densification can be obtained.
 - 5. Establish new target density if change is made in mix design, nominal depth of mat being placed, aggregate source, or material properties.

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1.05 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Per Section 401 of the Standard Specifications.
- B. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

PART 2 PRODUCTS

2.01 ASPHALT CONCRETE MIX

- A. General:
 - 1. Mix formula shall not be modified except with written approval of Owner.
 - 2. Source Changes:
 - a. Perform check tests of properties of plant-mix bituminous materials on first day of production and as requested by Engineer or Owner to confirm that properties are in compliance with design criteria.
 - b. Make adjustments in gradation or asphalt content as necessary to meet design criteria.
 - 3. Combine mineral constituents in proportions to produce a mixture conforming to the Standard Specifications.
 - a. Minimum asphaltic concrete pavement mixture shall meet Grading SX of the Standard Specifications. Reclaimed Asphalt Pavement (RAP) will not be allowed.
 - b. Lab Compaction (Gyratory Revolutions, N, design, run with a compaction angle of 1.25 degrees) shall be 75.
 - c. Percentage by Weight of Asphalt Cement in Mixture: 5 percent to 7 percent.
 - d. Maintain thorough and uniform mixture.
 - e. Bring asphalt cement and mineral constituents to required temperatures before mixing. Ensure aggregates are sufficiently dry so as not to cause foaming in mixture.
- B. Aggregate(s): Crushed rock, slag, or gravel or a combination thereof; free of clay, silt or other deleterious material, having incorporated in it limestone dust, iron oxide, or other binding material in such proportions that the whole will be a homogeneous material after mixing at asphalt plant.
- C. Asphalt Cement: Homogeneous, free of water, Superpave Performance Graded Binder shall be 64-22 for layers below the top layer, and 64-28 for top layer, conforming to the Standard Specifications. Cement shall not foam when

heated to 177 degrees C. HMA used for patching shall use Superpave Performance Graded Binder of 64-22.

PART 3 EXECUTION

3.01 GENERAL

- A. Traffic Control:
 - 1. In accordance with Section 01 50 00, Temporary Facilities and Controls.
 - 2. Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.
- B. Driveways: Repave driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

- A. Provide and maintain intermediate control of line and grade, independent of underlying base, to meet finish surface grades and minimum thickness.
- B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 APPLICATION EQUIPMENT

A. In accordance with Section 400 of the Standard Specifications.

3.04 PREPARATION

- A. Prepare subgrade as specified in Section 31 23 13, Subgrade Preparation, and the following:
 - 1. Ensure that subgrade has been scarified and compacted.
- B. Existing Roadway:
 - 1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce smooth riding connection to existing facility.
 - 2. Remove existing material to a minimum depth of 1 inch (25 millimeters).
 - 3. Paint edges of meet line with tack coat prior to placing new pavement.

C. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

3.05 PAVEMENT APPLICATION

- A. General: Place asphalt concrete mixture on approved, prepared base in conformance with Section 400 of the Standard Specifications.
- B. Compaction: Roll until roller marks are eliminated and minimum percent compaction as stated in the Standard Specifications is obtained.
- C. Tolerances:
 - 1. General: Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
 - 2. Completed Surface or Wearing Layer Smoothness:
 - a. Uniform texture, smooth, and uniform to crown and grade.
 - b. Maximum Deviation: 1/8 inch (3 millimeter) from lower edge of a 12-foot (3.6-meter) straightedge, measured continuously parallel and at right angle to centerline.
 - c. If surface of completed pavement deviates by more than twice specified tolerances, remove and replace wearing surface.
 - 3. Transverse Slope Maximum Deviation: 1/4 inch (6 millimeters) in 12 feet (3.6 meters) from rate of slope shown.
 - 4. Finished Grade:
 - a. Perform field differential level survey on maximum 50-foot (15-meter) grid and along grade breaks.
 - b. Maximum Deviation: 0.02 foot (6 millimeters) from grade shown.
- D. Seal Coat:
 - 1. General: Apply seal coat of paving grade or emulsified asphalt to finished surface at longitudinal and transverse joints, joints at abutting pavements, areas where asphalt concrete was placed by hand, patched surfaces, and other areas as directed by Engineer.
 - 2. Preparation:
 - a. Surfaces that are to be sealed shall be maintained free of holes, dry, and clean of dust and loose material.
 - b. Seal in dry weather and when temperature is above 35 degrees F (2 degrees C).
 - 3. Application:
 - a. Fill cracks over 1/16 inch (1.5 millimeters) in width with asphalt-sand slurry or approved crack sealer prior to sealing.

PW\DEN003\D3330100\C OCTOBER 2024 ©COPYRIGHT 2024 JACOBS ASPHALT PAVING 32 12 16 - 7 b. When sealing patched surfaces and joints with existing pavements, extend minimum 6 inches (150 millimeters) beyond edges of patches.

3.06 PAVEMENT OVERLAY

- A. Preparation:
 - 1. Remove fatty asphalt, grease drippings, dust, and other deleterious matter.
 - 2. Surface Depressions: Fill with asphalt concrete mix, and thoroughly compact.
 - 3. Damaged Areas: Remove broken or deteriorated asphalt concrete and patch as specified in Article Patching.
 - 4. Portland Cement Concrete Joints: Remove joint filler to minimum 1/2 inch (12 millimeters) below surface.
- B. Application:
 - 1. Tack Coat: As specified in this section.
 - 2. Place and compact asphalt concrete as specified in Article Pavement Application.
 - 3. Place first layer to include widening of pavement and leveling of irregularities in surface of existing pavement.
 - 4. When leveling irregular surfaces and raising low areas, the actual compacted thickness of any one lift shall not exceed 2 inches (50 millimeters).
 - 5. Actual compacted thickness of intermittent areas of 120 square yards (100 square meters) or less may exceed 2 inches (50 millimeters), but not 4 inches (100 millimeters).
 - 6. Final wearing layer shall be of uniform thickness, and meet grade and cross-section as shown.

3.07 PATCHING

- A. Preparation:
 - 1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.
 - 2. Prepare patch subgrade as specified in Section 31 23 13, Subgrade Preparation.

- B. Application:
 - 1. Patch Thickness: 3 inches (75 millimeters) or thickness of adjacent asphalt concrete, whichever is greater.
 - 2. Place asphalt concrete mix across full width of patch in layers of equal thickness.
 - 3. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched.
- C. Compaction:
 - 1. Roll patches with power rollers capable of providing compression of 200 pounds per linear inch to 300 pounds per linear inch (350 Newtons per linear centimeter to 525 Newtons per linear centimeter). Use hand tampers where rolling is impractical.
 - 2. Begin rolling top course at edges of patches, lapping adjacent asphalt surface at least one-half the roller width. Progress toward center of patch overlapping each preceding track by at least one-half width of roller.
 - 3. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface.
- D. Tolerances:
 - 1. Finished surface shall be flush with and match grade, slope, and crown of adjacent surface.
 - 2. Tolerance: Surface smoothness shall not deviate more than plus 1/4 inch (6 millimeters) or minus 0 inch when straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

3.08 FIELD QUALITY CONTROL

- A. General: Provide services of approved certified independent testing laboratory to conduct tests.
- B. Field Density Tests:
 - 1. Perform tests from cores or sawed samples in accordance with AASHTO T166.
 - 2. Measure with properly operating and calibrated nuclear density gauge in accordance with ASTM D2950.
 - 3. Maximum Density: In accordance with ASTM D2041, using sample of mix taken prior to compaction from same location as density test sample.

- C. Testing Frequency:
 - 1. Quality Control Tests:
 - a. Asphalt Content, Aggregate Gradation: Once per every 500 tons (400 mg) of mix or once every 4 hours, whichever is greater.
 - b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 1,000 tons (900 mg) or once every 8 hours, whichever is greater.
 - 2. Density Tests: Once every 500 tons (450 mg) of mix or once every 4 hours, whichever is greater.

END OF SECTION

SECTION 32 16 00 CURBS AND GUTTERS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - American Association of State Highway and Transportation Officials (AASHTO): T 99, Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pound) Rammer and a 305 mm (12 in.) Drop.
 - 2. American Concrete Institute (ACI): 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - 3. ASTM International (ASTM):
 - a. C94, Standard Specification for Ready-Mixed Concrete.
 - b. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - c. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - 4. Standard Specification: State of Colorado.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Form Material: Information on metal forms, if used, including type, condition, surface finish, and intended function.
 - 2. Complete data on concrete mix, including aggregate gradations and admixtures in accordance with requirements of ASTM C94.
- B. Informational Submittals:
 - 1. Curing Compound: Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, and application instructions.
 - 2. Ready-mix delivery ticket for each truck in accordance with ASTM C94.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to the State of Colorado Standard Specifications for Road and Bridge Construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Conform to the requirements of Section 609 of the Standard Specification.

PART 3 EXECUTION

3.01 INSTALLATION

A. Perform Work in accordance with the referenced Standard Specification.

3.02 FORMWORK

- A. Lumber Materials:
 - 1. 2-inch dressed dimension lumber, or metal of equal strength, straight, free from defects that would impair appearance or structural quality of completed curb and sidewalk.
 - 2. 1-inch dressed lumber or plywood may be used where short-radius forms are required.
- B. Metals: Steel in new undamaged condition.
- C. Setting Forms:
 - 1. Construct forms to shape, lines, grades, and dimensions.
 - 2. Stake securely in place.
- D. Bracing:
 - 1. Brace forms to prevent change of shape or movement resulting from placement.
 - 2. Construct short-radius curved forms to exact radius.
- E. Tolerances:
 - 1. Do not vary tops of forms from gradeline more than 1/8 inch when checked with 10-foot straightedge.
 - 2. Do not vary alignment of straight sections more than 1/8 inch in 10 feet.

3.03 PLACING CONCRETE

A. Prior to placing concrete, remove water from excavation and debris and foreign material from forms.

- B. Place concrete as soon as possible, and within 1-1/2 hours after adding cement to mix without segregation or loss of ingredients, and without splashing.
- C. Place, process, finish, and cure concrete in accordance with applicable requirements of ACI 304, and this section. Wherever requirements differ, the more stringent shall govern.
- D. To compact, vibrate until concrete becomes uniformly plastic.

3.04 CURB CONSTRUCTION

- A. Construct ramps at pedestrian crossings.
- B. Expansion Joints: Place at maximum 45-foot intervals at the beginning and end of curved portions of curb, and at connections to existing curbs. Install expansion joint filler at each joint.
- C. Curb Facing: Do not allow horizontal joints within 7 inches from top of curb.
- D. Contraction Joints:
 - 1. Maximum 15-foot intervals in curb.
 - 2. Provide open joint type by inserting thin, oiled steel sheet vertically in fresh concrete to force coarse aggregate away from joint.
 - 3. Insert steel sheet to full depth of curb.
 - 4. Remove steel sheet with sawing motion after initial set has occurred in concrete and prior to removing front curb form.
 - 5. Finish top of curb with steel trowel and finish edges with steel edging tool.
- E. Front Face:
 - 1. Remove front form and finish exposed surfaces when concrete has set sufficiently to support its own weight.
 - 2. Finish formed face by rubbing with burlap sack or similar device to produce uniformly textured surface, free of form marks, honeycomb, and other defects.
 - 3. Remove and replace defective concrete.
 - 4. Apply curing compound to exposed surfaces of curb upon completion of finishing.
 - 5. Continue curing for minimum of 5 days.

- F. Backfill curb with earth upon completion of curing period, but not before 7 days has elapsed since placing concrete.
 - 1. Backfill shall be free from rocks 2 inches and larger and other foreign material.
 - 2. Compact backfill firmly.

3.05 SIDEWALK CONSTRUCTION

- A. Thickness:
 - 1. 4 inches in walk areas.
 - 2. 6 inches in driveway areas.
- B. Connection to Existing Sidewalk:
 - 1. Remove old concrete back to an existing contraction joint.
 - 2. Clean the surface.
 - 3. Apply a neat cement paste immediately prior to placing new sidewalk.
- C. Expansion Joints: Place in adjacent curb, where sidewalk ends at curb, and around posts, poles, or other objects penetrating sidewalk. Install expansion joint filler at each joint.
- D. Contraction Joints:
 - 1. Provide transversely to walks at locations opposite contraction joints in curb.
 - 2. Dimensions: 3/16-inch by 1-inch weakened plane joints.
 - 3. Construct straight and at right angles to surface of walk.
- E. Finish:
 - 1. Broom surface with fine-hair broom at right angles to length of walk and tool at edges, joints, and markings.
 - 2. Mark walks transversely at 5-foot intervals with jointing tool; finish edges with rounded steel edging tool.
 - 3. Apply curing compound to exposed surfaces upon completion of finishing.
 - 4. Protect sidewalk from damage and allow to cure for at least 7 days.

END OF SECTION

SECTION 32 17 23 PAVEMENT MARKINGS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. M237, Standard Specification for Epoxy Resin Adhesives for Bonding Traffic Markers to Hardened Portland Cement and Asphalt Concrete.
 - b. M247, Standard Specification for Glass Beads Used in Traffic Paint.
 - c. M248, Standard Specification for Ready-Mixed White and Yellow Traffic Paints.
 - d. M249, Standard Specification for White and Yellow Reflective Thermoplastic Striping Material (Solid Form).
 - 2. ASTM International (ASTM): D4280, Standard Specification Extended Life Type, Nonplowable, Prismatic, Raised, Retroreflective Pavement Markers.
 - 3. Federal Specifications (FS):
 - a. A-A-2886A, Paint, Traffic, Solvent Based.
 - b. TT-B-1325C, Beads (Glass Spheres); Retroreflective.
 - 4. Standard Specification: State of Colorado.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Product Data:
 - 1) Paint.
 - 2) Thermoplastic material.
 - 3) Reflective markers.
 - 4) Epoxies, resins, and primers to be used.
 - b. Glass Beads: Proposed gradation.

- B. Informational Submittals:
 - 1. Description of proposed methods for removal of drips, overspray, improper markings, paint and thermoplastic material tracked by traffic, and existing markings.
 - 2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for products specified in this section.
 - 3. Equipment List: Proposed equipment to be used, including descriptive data.
 - 4. Manufacturer's Instructions:
 - a. Application of preformed tape.
 - b. Application of portland cement concrete primer.
 - c. Application of glass beads.
 - d. Application of epoxy resin.
 - e. Installation of reflective markers.

PART 2 PRODUCTS

- 2.01 GENERAL
 - A. All products shall be in accordance with Section 627 of the Standard Specifications.
- 2.02 PAINT
 - A. Color: White or yellow.
 - B. Traffic paint in accordance with Section 708 of the Standard Specifications.
 - C. Homogeneous, easily stirred to smooth consistency, with no hard settlement or other objectionable characteristics during storage period of 6 months.

2.03 THERMOPLASTIC MARKING

- A. Color: White or yellow.
- B. Section 713 of the Standard Specifications.
- 2.04 GLASS BEADS
 - A. In accordance with Section 713 of the Standard Specifications.

PART 3 EXECUTION

3.01 GENERAL

A. Surface Preparation, Application, and Protection: In accordance with Section 627, of the Standard Specifications.

3.02 SURFACE PREPARATION

A. Cleaning:

- 1. Thoroughly clean surfaces to be marked before application of pavement marking material.
- 2. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water or a combination of these methods.
- 3. Completely remove rubber deposits, surface laitance, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion.
- 4. Scrub areas of old pavement affected with oil or grease with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.
- 5. Surfaces shall be completely free of dirt and ice, and dry of water at the time of application of materials specified herein.
- 6. Oil-Soaked Areas: After cleaning, seal with cut shellac to prevent bleeding through the new paint.
- 7. Reclean surfaces when the Work has been stopped due to rain.
- 8. Existing Pavement Markings:
 - a. Remove existing pavement markings that may interfere or conflict with newly applied marking patterns, or that may result in a misleading or confusing traffic pattern.
 - b. Do not apply thermoplastic markings over existing preformed or thermoplastic markings.
 - c. Perform grinding, scraping, sandblasting or other operations so finished pavement surface is not damaged.
- B. Pretreatment for Early Painting: Where painting is required prior to 30 days after paving rigid pavements, pretreat with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride.

- C. New Concrete Pavement:
 - 1. Allow a minimum cure time of 30 days before cleaning and marking.
 - 2. Clean by either sandblasting or water blasting to the following results:
 - a. No visible evidence of curing compound on peaks of textured concrete surface.
 - b. No heavy puddled deposits of curing compound in valleys of textured concrete surface.
 - c. Remaining curing compound is intact, with loose and flaking material completely removed.
 - d. Peaks of textured pavement surface are rounded in profile and free of sharp edges and irregularities.
 - 3. Allow a minimum drying time of 24 hours after water blasting before applying thermoplastic markings.
- D. New Asphalt Pavement: Allow a minimum pavement cure time of 30 days before applying paint.

3.03 PAINT APPLICATION

- A. General:
 - 1. Thoroughly mix pigment and vehicle together prior to application and keep thoroughly agitated during application.
 - 2. Do not add thinner.
 - 3. Apply only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F. Maintain paint temperature within these same limits.
 - 4. Apply only when surface is dry.
 - 5. Do not apply when conditions are windy to the point of causing overspray or fuzzy line edges.
 - 6. Provide guidelines and templates to control paint application.
 - 7. Take special precautions in marking numbers, letters, and symbols.
 - 8. Sharply outline edges of markings and apply without running or spattering.
- B. Rate of Application:
 - 1. Reflective Markings: Apply evenly, 105 plus or minus 5 square feet per gallon.
 - 2. Glass Bead Application:
 - a. Apply immediately following application of paint.
 - b. Use evenly distributed drop-on application method.
 - c. Rate: 6 pounds per gallon of paint.

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- 3. Nonreflective Markings: Apply paint evenly to pavement surface at a rate of 105 plus or minus 5 square feet per gallon.
- 4. On new pavement or new asphalt surface treatments, apply two coats of paint at a uniform rate of 210 square feet per gallon.
- C. Drying:
 - 1. Provide maximum drying time to prevent undue softening of bitumen and pickup, displacement, or discoloration by traffic.
 - 2. If drying is abnormally slow, discontinue painting operations until cause is determined and corrected.
- D. Protection:
 - 1. Protect markings from traffic until paint is thoroughly dry.
 - 2. Protect surfaces from disfiguration by paint spatters, splashes, spills, or drips.
- E. Cleanup: Remove paint spatters, splashes, spills, or drips from the Work and staging areas including areas outside the immediate Work area where spills occur.

3.04 THERMOPLASTIC MARKING APPLICATION

- A. Following specified surface preparation, prime and apply marking and glass beads to provide a reflectorized strip as shown on Drawings.
- B. Application Temperatures:
 - 1. Pavement Surface: Minimum 40 degrees F and rising.
 - 2. Thermoplastic: Minimum 375 degrees F, maximum 425 degrees F.
- C. Primer:
 - 1. On portland cement concrete and existing asphalt pavements, apply epoxy resin primer/sealer according to thermoplastic manufacturer's recommendations.
 - 2. All primer/sealer to dry prior to applying thermoplastic.
- D. Thermoplastic Marking:
 - 1. Extrude or spray in a molten state, free of dirt or tint at a minimum thickness of 0.125 inch; maximum thickness of 0.190 inch.
 - 2. Apply centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator.

- 3. Apply special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable, extrusion-type applicator.
- E. Glass Bead Application:
 - 1. Immediately after marker application, mechanically apply such that the beads are held by and imbedded in the surface of the molten material.
 - 2. Application Rate: 1 pound per 20 square feet of compound.
- F. Cool completed marking to ambient temperature prior to allowing vehicular traffic.

END OF SECTION

SECTION 33 05 01 CONVEYANCE PIPING—GENERAL

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Concrete Institute (ACI): 301, Specifications for Structural Concrete.
 - 2. American Water Works Association (AWWA):
 - a. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
 - b. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - c. C207, Steel Pipe Flanges for Waterworks Service Sizes 4 in. Through 144 in. (100 mm Through 3,600 mm).
 - d. C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
 - e. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 - f. C217, Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines.
 - g. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
 - h. C221, Fabricated Steel Mechanical Slip-Type Expansion Joints.
 - i. C606, Grooved and Shouldered Joints.
 - 3. ASTM International (ASTM):
 - a. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
 - b. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - c. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - d. C150/C150M, Standard Specification for Portland Cement.
 - e. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 4. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components Lead Content.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Detailed pipe fabrication drawings showing pipe details, special fittings and bends, dimensions, coatings, and other pertinent information.
 - 2. Layout drawing showing location of each pipe section and each special length.
 - 3. Pipe pressure class.
 - 4. Wall thickness, reinforcing, and strength calculations.
 - 5. Product Data: Manufacturer's data for couplings, saddles, gaskets, and other pipe accessories. Indicate maximum rated working pressure and test pressure for each item.
- B. Informational Submittals: Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with manufacturer's recommendations and as specified in individual specification sections following this section.
- B. Marking at Plant: Mark each pipe and fitting at plant. Include date of manufacture, manufacturer's identification, specification standard, diameter of pipe class, and other information required for type of pipe.
- C. Pipe, specials, and fittings received at Project Site in damaged condition will not be accepted.
- D. Gasket Storage: Store rubber gaskets in cool, well ventilated place, and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.
- E. Store and support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
- F. Handling:
 - 1. Pipe shall be handled with proper equipment in a manner to prevent distortion or damage. Use of hooks, chains, wire ropes, or clamps that could damage pipe, damage coating or lining, or kink and bend pipe ends is not permitted.
 - 2. Use heavy canvas, or nylon slings of suitable strength for lifting and supporting materials.

- 3. Lifting pipe during unloading or lifting into trench shall be done using two slings placed at quarter point of pipe section. Pipe may be lifted using one sling near center of pipe, provided pipe is guided to prevent uncontrolled swinging and no damage will result to pipe or harm to workers. Slings shall bear uniformly against pipe.
- 4. Pipe and fittings shall not be stored on rocks or gravel, or other hard material that might damage pipe. This includes storage area and along pipe trench.

PART 2 PRODUCTS

2.01 GENERAL

- A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 PIPE

A. As specified in the individual specification sections following this section.

2.03 JOINTS

A. As specified in the individual specification sections following this section.

2.04 COUPLINGS

- A. General:
 - 1. Coupling linings for use in potable water systems shall be in conformance with NSF/ANSI 61.
 - 2. Couplings shall be rated for appropriate operating pressure and hydrostatic test pressure.
 - 3. Exposed, bolted, sleeve-type couplings shall be lined and coated with fusion bonded epoxy in accordance with AWWA C213.
 - 4. Buried, bolted, sleeve-type couplings shall be lined and coated with fusion-bonded epoxy in accordance with AWWA C213.

- B. For Pipe with Plain-Ends: Solid sleeves shall be ductile iron mechanical joint, restrained with Megalugs suited for the pipe material to which they attach. (See also Section 33 05 01.02, Ductile Iron Pipe and Fittings.)
- C. Bolting Materials for Couplings: As recommended by coupling manufacturer for specified conditions.

2.05 SERVICE SADDLES

- A. Double strap design rated for 150 psi minimum working pressure.
- B. Manufacturers and Products: Refer to Section 33 12 13, Water Service Connections.
- 2.06 FLANGES, FLANGE GASKETS, AND BOLTING MATERIALS
 - A. As specified in individual specifications following this section.
 - B. Flanges, bolting materials, and flange gaskets for ductile iron flanges shall conform to AWWA C110 and AWWA C115.
 - C. Stainless steel bolting material shall conform to ASTM F593, Type 304 stainless steel, Group 1, Condition SH1, 2, 3, or 4.
 - D. If the flanges are coated, provide two washers for each bolt on each side of the flange to minimize damage to the coating as the nuts are tightened. Provide bolts of the proper length to accommodate the washers.

2.07 CONCRETE FOR THRUST BLOCKS

- A. Thrust Block and Thrust Wall Concrete: As shown on Drawings, or as specified below.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 deformed bars.
- C. Welded Wire Fabric: ASTM A497/A497M.
- D. Formwork: Plywood; earth cuts may be used as approved by Engineer.
- E. Mix: ASTM C94/C94M, Option A.
 - 1. Cement: ASTM C150/C150M, Type II.
 - 2. Coarse Aggregate Size: 3/4 inch.
 - 3. Design for Minimum Compressive Strength at 28 Days: 4,000 psi.

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2.08 PIPE LOCATING TAPE

A. As specified in Section 31 23 23.15, Trench Backfill.

2.09 PIPE BEDDING AND PIPE ZONE MATERIAL

A. Granular material as specified in Section 31 23 23.15, Trench Backfill.

2.10 TRENCH STABILIZATION MATERIAL

A. As specified in Section 31 23 23.15, Trench Backfill.

PART 3 EXECUTION

3.01 GENERAL

- A. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.
- B. Furnish feeler gauges of proper size, type, and shape for use during installation for each type of pipe furnished.
- C. Distributing Materials: Place materials along trench only as will be used each day, unless otherwise approved by Engineer. Placement of materials shall not be hazardous to traffic or to general public, obstruct access to adjacent property, or obstruct others working in area.

3.02 EXAMINATION

- A. Verify size, material, joint types, elevation, and horizontal location of existing pipeline to be connected to new pipeline or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.
- C. Damaged Coatings and Linings: Repair using coating and lining materials in accordance with manufacturer's instructions.

3.03 PREPARATION OF TRENCH

- A. Prepare trench as specified in Section 31 23 16, Excavation.
- B. Unless otherwise permitted by Engineer, maximum length of open trench shall not exceed 50 feet.

3.04 INSTALLATION

- A. General:
 - 1. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
 - 2. Install individual pipe lengths in accordance with approved lay diagram. Misplaced pipe shall be removed and replaced.
 - 3. Inspect pipe and fittings before installation, clean ends thoroughly, remove foreign matter and dirt from inside.
 - 4. Flanged Joints:
 - a. Install perpendicular to pipe centerline.
 - b. Bolt Holes: Straddle vertical centerline, aligned with connecting equipment flanges or as shown on Drawings.
 - c. Use torque-limiting wrenches to provide uniform bearing and proper bolt tightness.
 - d. Flange Type: Use flat-faced flange when joining with flat-faced ductile or cast iron flange.
 - 5. Couplings:
 - a. Install in accordance with manufacturer's written instructions.
 - b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
 - c. Clean gaskets before installation.
 - d. If necessary, lubricate with gasket lubricant for installation on pipe ends.
 - e. Tighten coupling bolts progressively, drawing up bolts on opposite sides gradually until bolts have uniform tightness.
- B. Buried Pressure Pipe:
 - 1. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown on Drawings.
 - 2. Placement:
 - a. Keep trench dry until pipe laying and joining is completed.
 - b. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
 - c. Measure for grade at pipe invert, not at top of pipe.
 - d. Excavate trench bottom and sides of ample dimensions to permit proper joining, welding, visual inspection, and testing of entire joint.
 - e. Prevent foreign material from entering pipe during placement.
 - f. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.

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- g. In general, lay pipe upgrade with bell ends pointing in direction of laying.
- h. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
 - 1) Shorter pipe lengths.
 - 2) Special mitered joints.
 - 3) Standard or special fabricated bends.
- i. Check gasket position with feeler gauge to assure proper seating.
- j. After joint has been made, check pipe alignment and grade.
- k. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
- 1. Prevent uplift and floating of pipe prior to backfilling.
- 3. Tolerances:
 - a. Deflection from Horizontal Line: Maximum 4 inches.
 - b. Deflection from Vertical Line: Maximum 2 inches.
 - c. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
 - d. Horizontal position of pipe centerline on alignment around curves maximum variation of 1 foot from position shown.
- 4. Cover Over Top of Pipe: Minimum 4 feet 6 inches, unless otherwise shown.
- 5. Disposal of Excess Excavated Material: As specified in Section 31 23 16, Excavation.

3.05 THRUST RESTRAINT

- A. Location: At pipeline tees, plugs, caps, bends, and locations where unbalanced forces exist.
- B. Thrust blocking shall be in addition to pipe and fitting joint restraint.
- C. Thrust Blocking:
 - 1. Place where shown on Drawings.
 - 2. Quantity of Concrete: Sufficient to cover bearing area of pipe and provide required soil bearing area as shown on Drawings.
 - 3. Place blocking so pipe and fitting joints are accessible for repairs.

3.06 CORROSION PROTECTION

A. Buried Pipe: As specified in the individual specifications in Division 26, Electrical, and as shown on the Drawings.

B. Notify Engineer at least 3 days prior to start of surface preparation, coating application, and corrosion protection work.

3.07 PLACEMENT OF PIPE LOCATING TAPE

- A. Place pipe locating tape in accordance with Section 31 23 23.15, Trench Backfill.
- 3.08 PIPE BEDDING AND ZONE MATERIAL
 - A. Place pipe bedding and pipe zone material in accordance with Section 31 23 23.15, Trench Backfill.
- 3.09 FIELD QUALITY CONTROL
 - A. Pressure Leakage Testing: As specified in Section 33 05 01.02, Ductile Iron Pipe and Fittings.
- 3.10 CLEANING
 - A. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines with water at 2.5 fps minimum flushing velocity until foreign matter is removed. Dispose of water and flushed foreign matter.
 - B. Remove accumulated debris through blowoffs 2 inches and larger or by removing spools and valves from piping.
 - C. Disinfection: As specified in Section 33 13 00, Disinfection of Water Utility Distribution Facilities.

END OF SECTION

SECTION 33 05 01.02 DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO): T99, Standard Method of Test for the Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop.
 - 2. American Society of Mechanical Engineers (ASME):
 - a. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
 - b. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300.
 - 3. American Water Works Association (AWWA):
 - a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 - b. C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - c. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
 - d. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - e. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Fittings.
 - f. C116/A21.16, Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.
 - g. C150/A21.50, Thickness Design of Ductile-Iron Pipe.
 - h. C151/A21.51, Ductile-Iron Pipe. Centrifugally Cast, for Water.
 - i. C153/A21.53, Ductile-Iron Compact Fittings for Water Service.
 - j. C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - k. C606, Grooved and Shouldered Joints.
 - 4. ASTM International (ASTM):
 - a. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - b. A563, Standard Specification for Carbons and Alloy Steel Nuts.
 - c. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - d. D1330, Standard Specification for Rubber Sheet Gaskets.

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- e. D1922, Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method.
- f. D2000, Standard Classification System for Rubber Products in Automotive Applications.
- g. D4976, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.
- 5. International Organization for Standardization (ISO): 9001, Quality Management Systems Requirements.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings: Marking plan and details of standard pipe section showing dimensions, pipe joints, fitting and special fitting pressure rating and thickness, size, coating and lining data.
- B. Informational Submittals:
 - 1. Manufacturer shall furnish sworn certificates that pipe and fittings have been manufactured, tested, and inspected in accordance with this and all applicable Specifications.
 - 2. Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:
 - a. Testing dates.
 - b. Piping systems and section(s) to be tested.
 - c. Method of isolation.
 - d. Method of conveying water from source to system being tested.
 - e. Calculation of maximum allowable leakage for piping section(s) to be tested.
 - 3. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
 - 4. Test documentation form and results.

1.03 QUALITY ASSURANCE

A. Pipe manufacturer shall be ISO 9001 registered or provide the services of an independent inspection agency.

- B. Prior to start of manufacturing, manufacturer not meeting or having ISO registration requirements shall submit name of at least two independent inspection agencies for approval.
 - 1. Independent inspection agency shall be responsible, on a daily basis, for sample monitoring of chemical and mechanical tests, sample visual inspection of quality assurance tests performed on in-process pipe and fittings, and sample visual and dimensional inspection on finished products.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General:
 - 1. Ductile iron pipe shall be manufactured, lined, coated, and tested domestically in the United States of America.
 - 2. Ductile iron fittings shall be manufactured, lined, coated, and tested domestically or for fittings produced outside of the United States of America they shall bear the name of the domestic manufacturer supplying the pipe.
 - 3. Pipe manufacturer shall certify source manufacturing facility has been producing ductile iron pipe of the specified diameters, pressure, dimensions and standards for a period of not less than 10 years.
 - 4. Ductile iron pipe and fitting shall be supplied by a single manufacturer.
 - a. Mixing of components and sources is not permitted.
 - b. Fitting from outside the United States of America shall be produced in a facility with a minimum of 5 years' documented experience manufacturing, coating, testing, and delivery of size and type specified to projects in the United States of America.
- B. Pipe:
 - 1. General:
 - a. Pipe shall be new and recently manufactured. Refurbished pipe shall not be provided.
 - b. Lined and coated as specified.
 - 2. Meet requirements of AWWA C150/A21.50, AWWA C151/A21.51, and AWWA C111/A21.11.
 - 3. Centrifugally cast, Grade 60-42-10 iron.
 - 4. Pressure rating of pipe from 6 inches to 12 inches in diameter shall be Pressure Class 350 psi.

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- C. Joints:
 - 1. Push-On Joint: Rated at minimum working pressure equal to pipe material design.
 - 2. Restrained Joint:
 - a. Manufactured proprietary joint that mechanically restrains pipe to adjoining pipe.
 - b. Manufacturers and Products:
 - 1) American Cast Iron Pipe; Fast-Grip gaskets.
 - 2) McWane Ductile; Sure Stop 350 gaskets.
 - 3) U.S. Pipe; Field Lok 350 gaskets.
 - 3. Mechanical Wedge Action Type Joint:
 - a. Use only in areas where adjoining to fixed points where laying length is determined in field.
 - b. Prior to purchase and installation, type and application of this joint shall be approved by Engineer.
 - 4. Use of set screws for restraint or field-lock gaskets shall not be allowed.
- D. Fittings:
 - 1. Fittings shall be new and recently manufactured. Refurbished fittings will not be accepted.
 - 2. Mechanical, Push-On, Flanged, or Restrained Joint: In accordance with the following table:

| Minimum Pressure Ratings for AWWA C110/A21.10 and C115/A21.15 Ductile Iron Fittings | | | |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------|--|
| Diameter (inches) | Rubber Gasket Joints (Push-on, Mechanical, Restrained) (psi) | Flanged Joints (psi) | |
| 3 to 24 | 350 | 350 | |
| Minimum Pressure Ratings for AWWA C153/A21.53 Ductile Iron Fittings | | | |
| Diameter (inches) | Rubber Gasket Joints (Push-on, Mechanical, Restrained) | | |

| | (psi) | Flanged Joints |
|---------|-------|-----------------------------------------------------------------------|
| 3 to 24 | 350 | Not included in C153/A21.53 (refer to the C110/A21.10 Standard) |

- 3. Rubber Gasket Joints Including Mechanical Joints, Push-On Joints, and Flanged Joints: In accordance with AWWA C111/A21.11.
- 4. Mechanical Joint Fittings: In accordance with AWWA C110/A21.10 and AWWA C153/A21.53.
- E. Welded Outlet: Only weld to pipe in manufacturer's shop.
- F. Lining:
 - 1. Pipe and fittings for clean water applications shall be cement-lined and asphaltic seal coated in accordance with AWWA C104/A21.4.
 - 2. Pipe and fitting lining for domestic water service shall comply with requirements of AWWA C116/A21.16.
 - 3. Zinc External Coating:
 - a. Ductile Iron Pipe:
 - 1) Zinc coating shall be provided on all ductile iron pipe.
 - The zinc coating system shall conform to ISO 8179-1
 "Ductile iron pipes External zinc-based coating Part 1: Metallic zinc with finishing layer; Second edition 2004-06-01."
 - 3) The mass of the zinc applied shall be 200 g/m2 of pipe surface area.
 - 4) A finishing asphaltic topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils.
 - b. Ductile Iron Fittings:
 - 1) Zinc coating shall be provided on all ductile iron fittings and sleeves unless they are lined and coated with fusion bonded epoxy.
 - The zinc coating shall be accomplished with use of the same system as for the pipe, if available. Otherwise apply TNEMEC 90-98 in accordance with the coating manufacturer's recommendations.
 - 3) The mass of the zinc applied shall be 200 g/m2 of pipe surface area.
 - 4) A finishing asphaltic topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils.

- G. Bio-Enhanced Polyethylene Encasement
 - 1. Polyethylene encasement shall be provided in quantities and sizes to wrap all buried ductile iron pipe and fittings.
 - 2. Three layers of co-extruded linear low-density polyethylene
 - 3. Inside surface wrap to be in contact with pipe infused with a blend of anti- microbial biocide to mitigate microbiologically induced corrosion and a volatile corrosion inhibitor to control galvanic corrosion.
 - 4. Elongation: 800 percent, minimum, in machine and transverse direction (ASTM D882).
 - 5. Tensile Strength: 3,600 psi, minimum.
 - 6. Dielectric Strength: 800V per mil-thickness, minimum.
 - 7. Propagation Tear Resistance: 2,550-gram force (gf), minimum, in machine and transverse direction (ASTM D1922).
 - 8. Tube Form: Conform to AWWA C105/A21.5.
 - 9. Film: 0.008 inch (8-mil) thick, minimum.
 - 10. Number of Film Layers: One.
 - 11. Bolting:
 - a. Flanged Connection Bolts: Carbon steel, ASTM A307, Grade A hex bolts and ASTM A563, Grade A hex head nuts.
 - b. Grooved End Connections Bolts: Manufacturer's standard.
- H. Bolting:
 - 1. Flanged Connection Bolts: Carbon steel, ASTM A307, Grade A hex bolts and ASTM A563, Grade A hex head nuts.
 - 2. Grooved End Connections Bolts: Manufacturer's standard.
- I. Gaskets:
 - 1. Flat Faced Flange Gaskets:
 - a. Pipe Smaller Than 54 Inches: Rated for working pressure 150 psi to 250 psi, 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F, conforming to ASME B16.21, AWWA C207, and ASTM D1330, Grade 1 and Grade 2.
 - b. Pipe 54 Inches and Larger: Rated for working pressure greater than 250 psi; shall be Toruseal gaskets as manufactured by American Ductile Iron Pipe or Flange-Tyte gaskets as manufactured by U.S. Pipe.
 - 2. Push-on Restrained Joint Gaskets:
 - a. Restraining Gaskets shall be compatible with the supplied pipe.
 - b. Gaskets shall be domestically manufactured and meet applicable requirements of AWWA/ANSI C11/A21.11. Gaskets shall be

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styrene butadiene rubber (SBR) and shall be ANSI/NSF 61 certified for contact with potable water.

 Gaskets shall be high visibility color such as yellow or orange. The color shall be consistent throughout the entire cross section of the gasket. The color shall not be attained by surface coating; it shall be inherent within the rubber. Gaskets shall be Amarillo Fast-Grip or approved high-visibility equal.

2.02 SOURCE QUALITY CONTROL

- A. Factory Tests:
 - 1. General:
 - a. Tests shall be performed on pipe with metal thickness equal to that specified.
 - b. Only pipe that passes leak test shall be shipped.
 - 2. Hydrostatic Proof Test:
 - a. All Pipe: Perform at 500 psi for a minimum duration of 10 seconds.
 - b. Pipe 30 Inches and Larger: Additionally, test to 75 percent of minimum yield strength during test duration which shall not be less than 15 seconds.
 - c. Record each test cycle on a strip chart.
 - d. Each test cycle for 30-inch and larger pipe shall be marked by pipe number.
 - e. Inspect each pipe during testing for leaks.
 - f. Pipe which shows evidence of leaks shall be scrapped.
 - g. Repair welding of leaks is not permitted.
 - 3. Perform a 15-psi air test on welded-on outlet pipe.
 - 4. Pipe ends (spigot end, bell and socket) shall be gauged with suitable gauges at sufficiently frequent intervals to ensure compliance to standard dimensions of AWWA C151/A21.51.
 - a. In addition, each socket and spigot shall be inspected in a welllighted area for injurious defects which could affect the joint performance.
 - b. Remove defects by cutting of pipe ends.
 - c. Pipe with injurious defects in the bell shall be scrapped.
 - d. Manufacturer shall have a recommended ovality tolerance for pipes 18 inches inch and larger.
 - e. Each end of each 18-inch and larger pipe shall be measured and approved by manufacturer's quality assurance inspector to meet tolerances.
 - 5. Pipe that is noted as required to be Gaged-Full-Length (GFL) shall be within outside diameter and ovality tolerances along its entire length

such that it can be assembled into a standard mechanical joint solid sleeve, with associated restraints, without need for any significant jacking of the pipe into "round" or having issues with the actual pipe outside diameter fitting properly into the sleeve for proper assembly of the mechanical joint with the specialty high-pressure rated gasket required on this project.

6. Submit a certified inspection report from the proof of design testing performed in accordance with AWWA C111 that the Restrained Joint in the sizes specified for use on this project have been successfully tested to at least twice the specified pressure rating of the joint without leakage or failure.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect pipe and fittings to ensure no cracked, broken, or otherwise defective materials are being used.

3.02 PREPARATION

- A. Trench Grade:
 - 1. When specified, grade bottom of trench by hand to specified line and grade with proper allowance for pipe thickness and pipe base. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.
 - 2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.
- B. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

3.03 INSTALLATION

- A. General:
 - 1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of the Work.
 - 2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings and linings.
 - 3. Do not drop or dump pipe materials into trench.

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- B. Cleaning Pipe and Fittings:
 - 1. Remove lumps, blisters, and excess coal tar coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.
 - 2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.
- C. Laying Pipe:
 - 1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of Engineer.
 - 2. Mechanical Joint, Push-On Joint, and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.
 - 3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.
 - 4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.
 - 5. Do not allow foreign material to enter pipe while it is being placed in trench.
 - 6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.
- D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:
 - 1. Join pipe with push-on joints and mechanical joint fittings in accordance with manufacturer's recommendations.
 - 2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.
 - 3. Lubricate pipe gaskets using lubricant furnished by pipe manufacturer. No substitutes will be permitted.
 - 4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. If necessary, lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid.

- E. Cutting Pipe:
 - 1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.
 - 2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.
 - 3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer.
- F. Field Welding:
 - 1. Use of field welded outlets will not be allowed. Welding for outlets shall be performed only in pipe manufacturer's shop.
 - 2. Field installed outlets may be installed with saddle approved by Engineer. Opening in pipe shall be machined cut and not with cutting torch.
- G. Field welding of bars for restrained joint systems will not be allowed.
- H. Line and Grade:
 - 1. Minimum Pipe Cover: 5 feet 6 inches, unless otherwise indicated.
 - 2. No high points will be allowed between air valves
 - 3. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations of 4 feet six inches from existing ground surface to top of pipe.
 - 4. Install air valves as shown and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Engineer.
 - 5. Deviations exceeding 6 inches from specified line or 1 inch from specified grade will not be allowed without express approval of Engineer.
 - 6. Pipeline sections that are not installed to elevations shown or installed as approved by Engineer shall be reinstalled to proper elevation.
- I. Thrust Restraint: Primary method of restraint shall be through use of restrained joint pipe. Thrust blocking shall be used where detailed on Drawings and as approved by Engineer.
- J. Polyethylene Encasement:
 - 1. Encase pipe, fittings, and valves where specified in accordance with AWWA C105/A21.5, Method A.

- 2. Cut polyethylene tube approximately 2 feet longer than pipe length.
- 3. Slip tube around pipe, centering to provide 1-foot overlap on each adjacent section.
- 4. Pull encasement to take out slack and wrap snug around pipe.
- 5. Secure overlap in place and fold at quarter points of pipe length.
- 6. Wrap and tape encasement snug around fittings and valves.
- 7. Extend the encasement to include exposed ferrous pipe, restraints and fittings at connections to existing infrastructure. Also extend encasement a minimum of 2 feet along service lines.
- K. Cathodic Protection, Joint Bonding, and Test Stations:
 - 1. Cathodic protection shall conform to Section 26 42 02, Galvanic Anode Cathodic Protection System.
 - 2. Joint bonds shall conform to Section 26 42 01, Pipe Bonding and Test Stations.

3.04 HYDROSTATIC TESTING

- A. Pipeline Hydrostatic Test:
 - 1. General:
 - a. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
 - b. Test newly installed pipelines. Using water as test medium, pipes shall successfully pass a leakage test prior to acceptance.
 - c. Furnish testing equipment and perform tests in manner satisfactory to Engineer. Testing equipment shall provide observable and accurate measurements of leakage under specified conditions.
 - d. Isolate new pipelines that are connected to existing pipelines.
 - e. Conduct tests on entire pipeline after trench has been backfilled. Testing may be done prior to placement of asphaltic concrete or roadway structural section.
 - f. Contractor may, if field conditions permit and as determined by Engineer, partially backfill trench and leave joints open for inspection and conduct an initial service leak test. Hydrostatic test shall not, however, be conducted until backfilling has been completed.
 - g. Supply of temporary water shall be as stated in Section 01 50 00, Temporary Facilities and Controls.
 - h. Dispose of water used in testing.

2. Procedure:

- a. Maximum filling velocity shall not exceed 0.25 foot per second, calculated based on the full area of pipe.
- b. Expel air from pipe system during filling. Expel air through air release valve or through corporation stop installed at high points and other strategic points.
- c. Test pressure shall be 150 percent of system operating pressure based on pressure as measured at low point of pipeline.
- d. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
- e. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding additional make-up water only as necessary to restore test pressure.
- f. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test and to restore the pressure to the starting pressure at the end of the test.
- g. If measured leakage exceeds allowable leakage or if leaks are visible, repair defective pipe section and repeat hydrostatic test.
- 3. Allowable Leakage: Maximum allowable leakage shall not exceed amount stated in AWWA C600.

END OF SECTION

SECTION 33 12 13 WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO).
 - 2. American Water Works Association (AWWA): C800, Underground Service Line Valves and Fittings.
 - 3. ASTM International (ASTM):
 - a. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - b. B32, Standard Specification for Solder Metal.
 - c. B88, Standard Specification for Seamless Copper Water Tube.
 - d. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Material.
 - 4. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components Lead Content.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Product Data:
 - 1) Pipe material data.
 - 2) Materials of construction for corporation stops, curb stops, and meter stops.
 - 3) Fitting types.
 - b. Details with dimensions and fabricating tolerances for component ends.
 - c. Drawing showing how components of water service connection will fit together.
 - d. Operating pressure and allowable test pressure for components making up the service connection.
 - e. Allowable test pressure for connected components.

- f. Proposed thrust restraint data for restraining joints including drawing details, materials, assembly ratings, and pipe attachment methods.
- g. Factory test results of components.
- B. Informational Submittals:
 - 1. Manufacturer's Certificate of Compliance, in accordance with AWWA C800.
 - 2. Manufacturer's Certificate of Compliance, in accordance with NSF/ANSI 61.
 - 3. Statement of Qualifications:
 - a. Piping manufacturer.
 - b. Fitting and specials manufacturer.
 - 4. Procedure for field testing water mains and service connections, including disinfection.

PART 2 PRODUCTS

- 2.01 GENERAL
 - A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 SERVICE CONNECTION

- A. Furnish components same size as nominal designation of service pipe. For example, 3/4-inch connection consists of:
 - 1. 3/4-inch corporation stop.
 - 2. 3/4-inch curb stop.
 - 3. 3/4-inch angle valve.
 - 4. 3/4-inch meter coupling.
- B. Refer to Standard Details on Drawings and coordinate product names and requirements with these Specifications.

WATER SERVICE CONNECTIONS 33 12 13 - 2

2.03 SERVICE SADDLES

A. Provide in accordance with the following:

| Mainline Material | Saddle Characteristics | Tap Size | Manufacturer* |
|---------------------------|-------------------------------------------------------------------------|-----------|-----------------------------------------|
| Cast Iron/Ductile Iron | Double strap saddle with coated saddle and stainless steel straps | 3/4" - 4" | Smith-Blair Type 313 JCM Type 405 |

*Model number for each manufacturer will depend on pipe material saddle is attached to and whether the native soils are aggressive or relatively neutral.

- 1. Choose model number for each manufacturer based on pipe being saddled and corrosivity of surrounding soils.
- 2. Style: Double strap with wide straps for metal pipe.
- 3. Saddle: Coated to prevent corrosion.
- 4. Manufacturers:
 - a. Smith-Blair.
 - b. JCM Industries.

2.04 CORPORATION STOPS

- A. Characteristics:
 - 1. Accommodate piping being connected.
 - 2. Constructed of brass.
 - 3. Corporation stop inlet threads for tapping saddles to be "cc" type only.
 - 4. Corporation stops to incorporate ball valves only. Plug valves will not be allowed. Resistant to soil corrosivity.
 - 5. Service Size: 3/4-inch through 2-inch.
 - 6. Connecting Piping: PE.
 - 7. Soil Corrosivity: Yes.
- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.05 COUPLINGS

- A. Characteristics:
 - 1. Accommodate piping being connected.
 - 2. For use in water service connections.
 - 3. Same nominal size as service.
 - 4. All couplings to use compression connections for polyethylene pipe (PE).
 - 5. Resistant to soil corrosivity.
 - 6. Service Size: 3/4-inch through 2-inch.
 - 7. Connecting Piping: PE.
 - 8. Soil Corrosivity: Yes.
- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.06 UNIONS

- A. Characteristics:
 - 1. Copper-to-copper union.
 - 2. Accommodate pipe being connected.
 - 3. Meet criteria promulgated by the Owner.
 - 4. For use on water service connections.
 - 5. Same nominal size as service.
 - 6. Service Size: 1/2-inch through 2-inch.
 - 7. Soil Corrosivity: Yes.
- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.07 MISCELLANEOUS FITTINGS

- A. Characteristics: Miscellaneous fittings, reducers, and adapters.
 - 1. Service Size: 1/2-inch through 2-inch.
 - 2. Soil Corrosivity: Yes.

- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.08 CURB STOPS

- A. Characteristics:
 - 1. Size to match associated service.
 - 2. Connections to match adjacent piping.
 - 3. Materials to resist soil corrosivity (if any).
 - 4. Meet criteria promulgated by governing agency.
- B. Soil Corrosivity: Yes.
- C. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.09 CURB BOXES

- A. Characteristics:
 - 1. Furnish with lids and/or plugs as required by the utility.
 - 2. Length to match application, extension type.
 - 3. Arch pattern base.
 - 4. Size to match curb stop.
 - 5. Service Size: Match existing.
 - 6. Soil Corrosivity: Yes.
- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.10 METER STOP

- A. Characteristics:
 - 1. Inlet compatible with inlet service piping.
 - 2. Outlet compatible with meter inlet configuration.

- B. Manufacturers:
 - 1. Mueller.
 - 2. Ford Meter Box Company.

2.11 METER BOXES, VAULTS, AND COVERS

- A. Characteristics:
 - 1. Able to withstand AASHTO H20 loading characteristics.
 - 2. Rectangular body.
 - 3. Cast iron lid, removable for meter reading.

B. Manufacturers and Products:

| Service Size | Characteristics | Manufacturer & Model |
|-----------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 3/4" through 2" | Rectangular concrete body and cast-iron lids; extensions as required | Brooks Products, Inc.; model number dependent on service size |
| 3/4" through 2" | Rectangular plastic body, cast-iron reading lid | Rhino Water Meter Boxes; model number dependent on service size |

2.12 METER YOKES

- A. Characteristics:
 - 1. Size to match associated service.
 - 2. Connections to match adjacent piping.
 - 3. Materials to resist soil corrosivity (if any).
 - 4. Meet criteria promulgated by governing agency.
 - 5. Rated for working pressure of adjacent piping.

B. Manufacturers:

- 1. Mueller.
- 2. Ford Meter Box Company.

2.13 ANGLE VALVES

- A. Characteristics:
 - 1. Size to match associated service.
 - 2. Connections to match adjacent piping.
 - 3. Materials to resist soil corrosivity (if any).
 - 4. All meter valves to use pack joint connections for polyethylene pipe (PE).
 - 5. Rated for working pressure of adjacent piping.
 - 6. Soil Corrosivity: Yes.
- B. Manufacturers and Products:
 - 1. Mueller; Model E-24259.
 - 2. Ford Meter Box Company; Model BA43-331W.

2.14 METERS

- A. Characteristics:
 - 1. Size to match associated piping service and flow requirements.
 - 2. Magnetic drive, positive displacement.
 - 3. Connections to match adjacent piping.
 - 4. Materials to resist soil corrosivity (if any).
 - 5. Frost protection bottom.
 - 6. Rated for working pressure of adjacent piping.
 - 7. Meters will be furnished by Owner.
 - 8. Meter installation by Contractor.
- B. Manufacturers and Products:
 - 1. Hersey Water Meters.
 - 2. Neptune Water Meters.

2.15 POLYETHYLENE PLASTIC PIPE

- A. Characteristics:
 - 1. Manufactured from ultra-high molecular weight, high-density polyethylene.
 - 2. Conforming to ASTM D3350, PE 355434C.

- 3. Working 150 psi.
- 4. Standard dimension ratio (SDR) of 11 or smaller.
- B. Manufacturer and Product: Phillips Products Co.; Driscopipe 5100.

PART 3 EXECUTION

3.01 GENERAL

- A. Install service connections, excluding meters, during or after construction of the main.
- B. Water Meters: Install water meters after entire water system is ready for operation.
- C. Depth of cover over the pipe shall be minimum 48 inches (and a maximum of 72 inches.
- D. When extending service to the new waterline, no couplings shall be used between the corporation stop and meter pit.
- E. Install service connection in accordance with Standard Details on Drawings.

3.02 INSPECTION

- A. The Contractor shall ensure that the corporation stop and any couplings remain exposed until after the inspection and the approval for backfill is given by the Owner.
- B. The Contractor to turn on water at the corporation stop when the service is ready for inspection.
 - 1. The packing nut on the back of the corporation stop shall be tightened, and water to be flushed through the curb stop.
- C. All tap and service inspections to be scheduled with the Owner.
- D. A minimum of 24 hours' notice is required on all tap and service inspections. There will be no exceptions to the 24-hour notice requirement.

3.03 TRENCH EXCAVATION AND BACKFILL

A. In accordance with Sections 31 23 16, Excavation, and Section 31 23 23.15, Trench Backfill.

WATER SERVICE CONNECTIONS 33 12 13 - 8

3.04 CONNECTION TO MAIN

- A. Clean exterior of main of dirt and other foreign matter that may impair the quality of the completed connection.
- B. Place service clamp (saddle) at desired location.
- C. Clamp by tightening alternate nuts progressively.
- D. Do not place service clamp within 1 foot of pipe joint, or another clamp even when taps are made on opposite sides of pipe.
- E. Taps which are made on the same side of the pipe and within 10 feet of each other (measured along the pipe length) shall be staggered 15 degrees.
- F. Make taps with adapters for the size main being tapped.

3.05 UNDERCROSSING OF HARD SURFACE ROADS

- A. Bore or jack undercrossings.
- B. For long services do not open-cut asphalt or concrete roads.

3.06 POLYETHYLENE PLASTIC PIPE

A. Install in conformance with manufacturer's recommendations.

3.07 METER BOXES AND METERS

A. Installation:

- 1. Construct enclosures plumb, and flush with existing ground surface unless shown otherwise.
- 2. Use standard extension sections to adjust to grade.
- 3. Place lightly compacted earth backfill inside meter box to depth shown.
- 4. Backfill around meter vaults as specified in Section 31 23 23.15, Trench Backfill.
- 5. Corporation Stops: OPEN position.
- 6. Angle Stops: CLOSED position.

3.08 TESTING

A. Test service connection and piping with connecting main at the main's test pressure. Inspect for leaks and repair before backfilling.

3.09 DISINFECTION OF SERVICE CONNECTIONS

A. Flush, disinfect, and test service lines concurrent with main lines.

END OF SECTION

WATER SERVICE CONNECTIONS 33 12 13 - 10

SECTION 33 12 16 WATER UTILITY DISTRIBUTION VALVES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Water Works Association (AWWA):
 - a. C500, Metal-Seated Gate Valves for Water Supply Service.
 - b. C504, Rubber-Seated Butterfly Valves.
 - c. C509, Resilient-Seated Gate Valves for Water Supply Service.
 - d. C515, Reduced-Wall Resilient-Seated Gate Valves for Water Supply Service.
 - e. C550, Protective Interior Coatings for Valves and Hydrants.
 - 2. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components—Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components—Lead Content.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Product data sheets for each make and model. Indicate valve type number.
 - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Product data sheets for coating and lining products.
 - d. Certification for compliance to NSF/ANSI 61 for valves used for drinking water service.
- B. Informational Submittals:
 - 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements.
 - a. Resilient-seated gate valves, full compliance with AWWA C509.
 - 2. Method for hydrostatic testing.
 - 3. Tests and inspection results.
 - 4. Operation and Maintenance Data.

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PART 2 PRODUCTS

2.01 GENERAL

- A. Valve same size as adjoining pipe, unless otherwise indicated.
- B. Valve ends to be mechanical joint ends or approved ends.
- C. Valves shall have no leakage (drip tight) in either direction at valve rated design pressure, unless otherwise allowed for in this section or in referenced valve standard.
- D. Valve to open by turning counterclockwise, unless otherwise specified.
- E. Valve materials in contact with or intended for drinking water service shall comply with requirements of NSF/ANSI 61 and other applicable federal, state, and local requirements.
- F. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 GATE VALVES

- A. General:
 - 1. AWWA gate valves to be in compliance with referenced AWWA standard.
 - 2. Provide 2-inch operating nut for buried valves.
 - 3. Mark AWWA gate valves with manufacturer's name or mark, year of valve casting, valve size, and working water pressure.
 - 4. Repaired AWWA gate valves will not be allowed.
 - 5. Provide buried valves with bonnets, extension stems and valve boxes.
 - 6. Valves shall open left when viewed from the top.

WATER UTILITY DISTRIBUTION VALVES 33 12 16 - 2

NORTH PIKES PEAK AVENUE/ HIGHWAY 67 WATERLINE REPLACEMENT

- B. Resilient-Seated Ductile Iron Gate Valve 3 Inches to 12 Inches:
 - 1. Ductile-iron body, resilient seat, bronze stem and stem nut, mechanical joint ends, non-rising stem, full port in accordance with AWWA C509.
 - 2. Minimum Design Working Water Pressure: 250 psig.
 - 3. Manufacturers:
 - a. Muller Valve; AWWA C509.
 - b. Waterous.
- C. Factory Finishing of Gate Valve:
 - 1. Lining and Coating:
 - a. Manufacturer's standard.
 - b. The epoxy to be non-toxic, impart no taste to the water, and to conform to AWWA C550, latest revision.
 - c. All internal and external ferrous surfaces (including the interior of the gate to be coated with epoxy to a minimum Dry Film thickness of 10 mils.
 - d. Formulated from materials deemed acceptable to NSF/ANSI 61.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Mount buried valves such that operating nut is accessible and operable from above.
- B. Install in accordance with manufacturer's written instructions.

3.02 DISINFECTION

A. Valves used for potable water service shall be disinfected in accordance with Section 33 13 00, Disinfection of Water Utility Distribution Facilities.

3.03 FUNCTIONAL AND HYDROSTATIC TESTING

- A. Functional Test:
 - 1. Test that valves open and close smoothly under operating pressure conditions.
 - 2. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.
 - 3. Count and record number of turns to open and close valve; account for discrepancies with manufacturer's data.

- B. Hydrostatic Testing:
 - 1. Valve may be tested while testing pipeline or as a separate step after pipeline has been tested.
 - 2. Apply test pressure to one side of valve and measure the pressure on the opposite side to determine if there is an increase in pressure caused by leakage. Then apply test pressure to the other side, and measure the pressure on the opposite side.

END OF SECTION

SECTION 33 12 19 WATER UTILITY DISTRIBUTION FIRE HYDRANTS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Water Works Association (AWWA):
 - a. C502, Dry-Barrel Fire Hydrants.
 - b. C503, Wet Barrel Fire Hydrants.
 - c. C600, Installation of Ductile-Iron Mains and Their Appurtenances.
 - 2. ASTM International (ASTM): C94, Standard Specification for Ready-Mixed Concrete.
 - 3. FM Global Approved.
 - 4. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components Lead Content.
 - 5. Underwriters Laboratories, Inc. (UL): 246, Standard for Hydrants for Fire-Protection Service.

1.02 SUBMITTALS

- A. Action Submittals: Catalog cuts of system components.
 - 1. Include calculations for thrust blocks for high-pressure installations (if required).
- B. Informational Submittal:
 - 1. Certificate of Compliance: Upon completion of the system installation, verify all fire department hose connections, and check all fire safety devices to ensure their readiness for emergency connection and operation.

PART 2 PRODUCTS

2.01 GENERAL

- A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 HIGH PRESSURE HYDRANTS

- A. Hydrant:
 - 1. Break flange type.
 - 2. Nominal 5-1/4-inch main valve opening with 6-inch bottom connections.
 - 3. Conform to AWWA C502, except working pressure of 250 psi.
 - 4. Two 2-1/2-inch hose nozzles.
 - 5. One 4-1/2-inch pumper nozzle.
 - 6. Operating Nut: 1-1/2-inch National Standard pentagon nut.
 - 7. Mechanical joint inlet connection.
 - 8. Red aboveground line.
 - 9. Manufacturers:
 - a. Mueller Co.
 - b. Waterous.
- B. Main Valve:
 - 1. Depth of bury minimum 3-1/2 feet.
 - 2. Equip with O-ring seals.
 - 3. Valve opens left (on counterclockwise rotation).

2.03 PRECAST CONCRETE PIER BLOCK

- A. Nominal dimensions of 8-inch thickness by 16-inch square base.
- B. Compressive Strength: 3,000 psi at 28 days.

2.04 GRAVEL FOR DRAINAGE

A. Washed 3/4-inch crushed rock or graded river gravel. Free of organic matter, sand, loam, clay, and other small particles that will restrict water flow through gravel.

2.05 FOUNDATION STABILIZATION MATERIAL

- A. Furnish when existing trench material or imported pipe base material will not support soft or flooded spots in excavated trench.
- B. Maximum 3-inch hard rock free from excessive clay material, but enough fines to bind larger fragments.

2.06 CONCRETE FOR THRUST BLOCKING

- A. Ready-mix meeting ASTM C94, Alternative 2.
- B. Compressive Strength: 4,000 psi at 28 days.
- C. Aggregate Size: 1-1/2 inches.
- D. Slump: 2 inches to 4 inches.

2.07 THRUST TIES

- A. 3/4-inch-diameter steel rods.
- B. Duc-Lugs Manufacturer: Romac.

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Install hydrants in accordance with Section 3.7 and Section 3.8 of AWWA C600, unless specified otherwise.

3.02 EXCAVATION

A. Excavate to subgrade. Fill over excavated areas with foundation stabilization material. Tamp to provide firm foundation.

3.03 BASE BLOCK

A. Place on firm, level subgrade to ensure uniform support.

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3.04 INSTALLATION OF HYDRANTS

- A. Locate hydrants to provide accessibility and to minimize potential damage from vehicles.
 - 1. Relocate improperly set hydrants.
 - 2. Rotate hydrant with pumper outlet facing the street or curb.
 - 3. Hydrant Located behind Curbs: Set barrel so pumper nozzle or hose nozzle caps are a minimum of 18 inches from gutter face of curb.
 - 4. Hydrant Located in Space between Curb and Sidewalk: Not less than 8 inches, clear from sidewalks.
 - 5. Hydrant Located between Sidewalk and Property Line: Minimum clearance 8 inches from sidewalk.
 - 6. Set hydrants so safety flange is a minimum of 3 inches above finished ground or sidewalk level.
- B. Place hydrant on base block carefully to prevent the base block from breaking.
- C. Maintain hydrant in a plumb position during subsequent Work.
- D. Backfilling: Carefully backfill and compact the soil around the hydrant to provide adequate soil support to avoid transmitting shock movement to the lower barrel and inlet connection.
- E. Connect each hydrant to the main with a 6-inch branch line with an independent gate valve located 5 feet from the hydrant.

3.05 GRAVEL FOR DRAINAGE

- A. When the hydrant is set in impervious soil, place coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to a minimum level of 6 inches above the drain port and to a distance of 1 foot around the elbow.
- B. When the hydrant is set in clay or other impervious soil, excavate a 3-foothigh, by 2-foot-wide, by 2-foot-long drainage pit below the hydrant and fill with coarse gravel or crushed stone mixed with coarse sand under and around the elbow of the hydrant to a minimum level of 6 inches above the drain point.
- C. Where groundwater rises above the drain port, plug the drain port and note this condition on the drawings. Water to be pumped from the hydrant after each use.

3.06 CONCRETE THRUST BLOCKING

- A. Place blocking after hydrant is set in final position and join to pipe.
- B. Concrete thrust block shall have a minimum of 4 square feet of bearing area against undisturbed earth for a standard pressure installation.
 - 1. Calculate required bearing area for high pressure installation.

END OF SECTION

SECTION 33 13 00 DISINFECTION OF WATER UTILITY DISTRIBUTION FACILITIES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Water Works Association (AWWA):
 - a. B300, Hypochlorites.
 - b. B301, Liquid Chlorine.
 - c. B302, Ammonium Sulfate.
 - d. B303, Sodium Chlorite.
 - e. C651, Disinfecting Water Mains.
 - f. C652, Disinfection of Water Storage Facilities.
 - g. C653, Disinfection of Water Treatment Plants.
 - 2. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components Lead Content.
 - 3. Standard Methods for the Examination of Water and Wastewater, as published by American Public Health Association, American Water Works Association, and the Water Environment Federation.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Plan describing and illustrating conformance to appropriate AWWA standards and this Specification.
 - 2. Procedure and plan for cleaning system.
 - 3. Procedures and plans for disinfection and testing.
 - 4. Proposed locations within system where Samples will be taken.
 - 5. Type of disinfecting solution and method of preparation.
 - 6. Method of disposal for highly chlorinated disinfecting water.

1.03 QUALITY ASSURANCE

A. Owner to use Independent Testing Agency: Certified in the State of Colorado with 10 years' experience in field of water sampling and testing for Bacterialogical testing. Agency shall use calibrated testing instruments and

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1.04 SEQUENCING

A. Sequencing of hydrostatic testing, flushing and testing to be determined with Owner and Engineer. New pipe and service lines shall have passed testing and disinfection and shall have been flushed, prior to making the final connections to the existing water system or customers.

PART 2 PRODUCTS

- 2.01 GENERAL
 - A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 WATER FOR DISINFECTION AND TESTING

- A. Clean, uncontaminated, and potable.
- B. Owner will supply potable quality water from Fire Hydrants adjacent to work. Contractor shall convey in disinfected pipelines or containers.

PART 3 EXECUTION

- 3.01 GENERAL
 - A. Conform to AWWA C651 for pipes and pipelines, except as modified in these Specifications.
 - B. Contractor's Equipment:
 - 1. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.
 - 2. Water used to fill pipeline may be supplied using a temporary connection to existing distribution system. Provide protection against cross-connections as required by AWWA C651.

DISINFECTION OF WATER UTILITY DISTRIBUTION FACILITIES 33 13 00 - 2

- C. Disinfect the following items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water:
 - 1. Pipelines, Service Lines and Appurtenances: Disinfect new pipelines that connect to existing pipelines up to point of connection.
 - 2. Disinfect surfaces of materials that will contact finished water, both during and following construction, using one of the methods described in AWWA C652 and AWWA C653. Disinfect prior to contact with finished water. Take care to avoid recontamination following disinfection.
- D. Prior to application of disinfectants, clean and flush pipelines, service lines and appurtenances of loose and suspended material.
- E. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so chlorine-water solution is at specified strength. Do not place concentrated liquid commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

3.02 TURBIDITY

A. Cleaning of equipment and facilities shall include removal of materials that result in a turbidity exceeding limits stated in Article Testing.

3.03 PIPELINES AND APPURTENANCES

- A. Cleaning:
 - 1. Before disinfecting, clean foreign matter from pipe in accordance with AWWA C651.
 - 2. If continuous feed method or slug method of disinfection, as described in AWWA C651, are used flush pipelines with potable water until clear of suspended solids and color. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.
 - 3. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections. Operate valves during flushing process at least twice during each flush.
 - 4. Flush pipe through flushing branches and remove branches after flushing is completed.
- B. Disinfecting Procedure: In accordance with AWWA C651, unless herein modified.

C. Short sections of pipe at tie in locations may be disinfected by spraying in accordance with method described in AWWA C652.

3.04 DISPOSAL OF CHLORINATED WATER

- A. Do not allow flow into a waterway without neutralizing disinfectant residual.
- B. See appendix of AWWA C651 for acceptable neutralization methods.

3.05 TESTING

- A. Collection of Samples:
 - 1. Coordinate activities to allow Samples to be taken by Owner in accordance with this section.
 - 2. Provide valves at sampling points.
 - 3. Provide access to sampling points.
- B. Test Equipment:
 - 1. Clean containers and equipment used in sampling and make sure they are free of contamination.
 - 2. Owner shall obtain sampling bottles with instructions for handling from Owner's selected testing laboratory.
- C. Chlorine Concentration Sampling and Analysis: Collect and analyze Samples in accordance with AWWA C651.
- D. Analysis to be performed by Owner's laboratory. After pipelines have been cleaned, disinfected, and refilled with potable water, Owner will take water Samples and have them analyzed for conformance to bacterial limitations for public drinking water supplies.
 - 1. Collect Samples in accordance with applicable AWWA Standard.
 - 2. Analyze Samples for coliform concentrations in accordance with latest edition of Standard Methods for the Examination of Water and Wastewater.
- E. If minimum Samples required above are bacterially positive, disinfecting procedures and bacteriological testing shall be repeated until bacterial limits are met.

END OF SECTION